The ownership of small domestic kitchen appliances and the effect of their usage on the nutrient intake of adult females in England and Cyprus.

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Abstract

The nutritional habits of consumers have become a cause for concern with an increasing incidence in diseases related to nutrition. The way in which food is prepared may contribute to the nutritional content of the diet. Traditional methods of cooking are influenced by kitchen domestic appliances. This study aimed to determine the ownership of small domestic kitchen appliances and their influence on macronutrient intake in England (E) and Cyprus (CY).

In each country two groups of females, aged 25-60y (E=261, CY=300) and over 60y (E=36, CY=32), completed a questionnaire concerning their ownership and use of kitchen domestic appliances. A sub-sample (25-60y: E=42, CY=32; over 60y:E=25, CY=25) completed a three-day dietary diary. A small number of focus groups provided further details on ownership and use.

The Cypriots aged 25-60y and both groups of British adults owned a large number of appliances. The elderly British and younger Cypriots were more likely than the younger British to own appliances, such as food mixers, that would compliment their cooking skills. The elderly Cypriots owned few appliances and used them infrequently, health concerns and assistance with traditional meal preparation influenced this groups use of appliances. The Cypriots considered their appliances important to them and used them more frequently than the British.

The usage of any domestic appliance was found to have little effect on macronutrient intake. A significantly higher carbohydrate intake was found in both the younger groups who frequently used a sandwich maker. Frequent use of a blender by the younger British and of a toaster by the younger Cypriots resulted in a higher saturated fat intake. Lower total intakes of total fat and monounsaturated fat were found for the elderly British subjects who used their microwave frequently. No significant differences were detected in the group of Cypriot elderly with the use of any appliance.

It is suggested that ownership of these appliances is likely to reflect status, established preferences or curiosity. It is unlikely that use of kitchen appliances is a contributing factor to changes in nutrient intake.

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For Peggy

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Introduction

1.1. Introduction to the study

In the development of the home, as we know it today, mankind's first major step forward was the control of fire and the use of metals and ceramics for fashioning tools and utensils. The discovery that wild grasses could be cultivated was notable in that it meant mankind needed no longer to wander in search of food for themselves and their animals. They could settle in a chosen place, create a home, a community and undertake the craft of husbandry and housekeeping (Brooke, 1970). The art of housekeeping, catering for the main essentials of life: food, shelter, warmth and comfort is as old as man. But mankind's progress towards this goal has been laborious. It is interesting to trace his struggles, to admire his ingenuity and foresight (Brooke, 1970). In the beginning mankind cooked over an open fire. The first ovens were heated by burning coal and wood; electricity and gas are modern substitutes and though nowadays the heat is more easily controlled, the effect remains the same. Generations of women have cooked food using the same basic principles: produce the heat, introduce the food, regulate the heat for fast or slow cooking, uncover the food to roast, or cover the food to stew or braise (Blasberg, 1969).

As the march of technology has continued relentlessly, mechanization has invaded almost every sphere of activity, helping to reduce the burden of heavy manual labour. Technological and economic change, along with the pressures of two world wars, has radically transformed the pattern of life in Britain (Johnston, 1977). In the post-war period, with an almost total absence of domestic help in the home, the housewife looked for and demanded equipment which would ease her daily routine, so the 1950s saw the beginning of the tremendous surge forward in the domestic appliance field (Brooke, 1970). To save time and labour are the reasons that immediately spring to mind. Electricity is substituted for muscle and a tireless machine does the job more quickly and in many cases, more efficiently, than human skill plus a hand-held tool (Blasberg and Rose, 1974).

Small electrical aids were treated with suspicion when they first appeared on the British market. Labelled as 'gadgets' and 'gimmicks', it is as if they were regarded as usurping the domestic functions of the housewife rather than making her work easier (Anthony, 1965). The feminists and their supporters argue that cooking and housework are an enslavement of women and that women should be liberated from time consuming domestic chores (Attar, 1990). The ideal, it has been proposed, is a home without a kitchen but communal restaurants (Lane, 1981). Small kitchen domestic appliances although not liberating women from cooking do go some way in reducing the time spent in cooking. Today there is a large expansion in the range of domestic kitchen appliances such as: toasters, sandwich makers, steamers, kettles, deep fat fryers, food processors, mixers, roasters, grills, microwaves, bread makers, rice cookers, coffee makers, blenders, juice makers, waffle makers, crepe and pancake makers, popcorn makers and soft drinks machines (Mintel, 2005a,b,c), which have the ability to change cooking practices.

1.2. Cooking Methods

Despite the fact that more and newer appliances come onto the market each year, in the main they do not effect the methods used to cook food but provide a means of cooking food in either a shorter time or with less technical expertise. Cooking methods still fall into three categories:

1. Moist heat (e.g. poaching, simmering, boiling, steaming).
2. Dry heat (e.g. baking, roasting, deep-frying, pan-frying, grilling).
3. Combination cooking (e.g. braising, stewing).

The exception to this is microwave cooking which is a method introduced in the 20th century to cook food.

1.2.1. Moist Heat Cooking Methods

The term poaching is related to all slow processes of cooking, which involve the use of a liquid, not necessarily water just below boiling point (Garrier, 1963, Foskett et al., 2004). This cooking process will not tenderise food and requires a steady temperature (160-180°F) (Barber et al., 1985, Mintel, 2000c). In contrast, simmering will tenderise a

tough food (liquid temperature 85-96°C) by breaking down the naturally tough fibres during the cooking process (Mintel, 2000c). Boiling, involves the use of a liquid usually water (Garrier, 1963, Foskett et al., 2004), and is most often used for the cooking of vegetables and starches (Mintel, 2000c). Steaming was described, in the middle of the 20th century, as an easy and simple way of cooking that should be accessible to all (Beeton, 1950). Steaming is the cooking of prepared foods by steam under varying degrees of pressure (Foskett et al., 2004). It has the benefit to reduce the loss of nutrients and the property to preserve the maximum degree of original taste (Barber et al., 1985). When food is steamed, it is cooked above rapidly boiling water and does not come in to contact with the liquid (Mintel, 2000c). Modern appliances that assist in the preparation of food using these methods are, for example, rice cookers and electric steamers.

1.2.2. Dry Heat Cooking Methods

Baking and roasting are similar methods of cooking carried out inside an oven. Roasting is a traditional British method of cookery (Beeton, 1950). It represents fast cooking in the oven where the food is cooked in fat. Baking requires slower cooking of the food at lower temperatures without extra fat (Barber et al., 1985). It is the cooking of food by dry heat in an oven in which the action of the dry convection heat is modified by steam (Foskett et al., 2004). Frying, described as boiling in fat, is a dry heat cooking method (Beeton 1950). It is associated with fast cooking by direct contact with heat (Barber et al., 1985). With deep-frying the food is cooked by being entirely submerged in hot fat, however with pan frying the food is cooked by being partially immersed in hot fat (Barber et al., 1985, Mintel, 2000c). Electric deep fat fryers have been marketed to provide a safer method of cooking than that involving hot oil over a naked flame. Grilling, probably the starting point of all cooking (Garrier, 1963), indicates food being cooked under direct heat and is usually used for tender foods such as steaks and fish (Barber et al., 1985). Electric grills are a recent addition to the market.

1.2.3. Combination Cooking Methods

Braising is a method of cooking in the oven, unlike roasting or baking, the food is cooked in liquid in a covered pan, casserole or cocotte (Foskett et al., 2004). Braising and

stewing represent a combination of cooking methods such as roasting, stewing and steaming (Garrier, 1963, Foskett et al., 2004). They are similar ways of cooking, which require first sautéing the item, then adding liquid and simmering. The difference is based on the size of food items; foods that are cut up or diced are referred to as a stew in contrast to larger items (e.g. poultry legs), which are referred to as braised (Mintel, 2000c).

1.2.4. Microwave Cooking

Microwave cooking is a relatively new technical approach to cooking methods. Microwaves are invisible electromagnetic waves. They may be transmitted through the air and various substances without causing any apparent effect, reflected from metallic surfaces like light from a mirror, or absorbed by cellular substances and other materials (Microwave Cook, 1999). "The heating of foods by microwave energy is accomplished both by the absorption of microwave energy by rotation of the dipolar water molecules and translation of the ionic components of the food. This energy is converted into heat" (Ohlsson and Bengtsson, 2001). This process can cook, thaw or reheat food because it generates heat (Microwave Technologies Association, 2002).

1.2.5. Use of cooking methods

Differences in the use and confidence of using the different cooking methods have been found between different groups of individuals. It has been reported that in general females were more confident than males about being able to cook from basic ingredients and in applying almost all cooking techniques (Caraher et al., 1999). Cooking techniques such as steaming, poaching and stewing/braising were all methods that older adults were confident in using, however they lacked confidence in using the microwave. In contrast the younger generation were more familiar with microwave cooking and found steaming, poaching, stewing/braising old fashioned cooking techniques (Caraher et al., 1999). Studies of microwave oven ownership and use showed that microwave owners were younger, had higher income and bigger families and were more innovative than non-owners (Thompson and Sweaney, 1994b).

The results of the data from the 1993 Health and Lifestyle Survey of England showed that in general confidence was high in applying most of the cooking techniques except for steaming, microwave cooking, poaching and stir-frying. It was also found that confidence increases with income, professional and managerial classes were more confident to use all the cooking techniques except for deep-frying, which the lower social classes were most confident using. A greater confidence in applying the different cooking techniques, with the exception of deep-frying, was also found among the highest educational qualification groups, especially for stir-frying and microwave cooking (Caraher et al., 1999). However, a more recent study of low income communities in Scotland found that the participants, in this socio economic group, had widely varying levels of skill and confidence in cooking and suggested that other factors such as poverty, food access and taste preference may affect their use of these skills. Thus phrases used to determine cooking skills, for example "cooking from scratch" may not correctly ascertain the cooking ability of individuals (Stead et al, 2004).

1.2.6. Effects of cooking on the nutritional content of food items

Food processing can alter the nutrient content of food items and influence nutrient intake (Severi et al., 1998). For example roast or chipped potatoes are higher in all macronutrients than a similar amount of boiled potatoes and microwaved or roasted lamb chops contain a greater amount of energy, fat and protein than the same edible amount that has been grilled (Table1.1) (Food Standards Agency 2002).

Table 1.1 Comparison of the macronutrient content of a 100g portion of potatoes and lamb chops with respect to different cooking methods

	Energy (kj)	Carbohydrate (g)	Fat (g)	Protein (g)
Potatoes (old)				
Boiled	306	17	0.1	1.8
Roast	630	25.9	4.5	2.9
Chips	796	30.1	6.7	3.9
Lamb chops				
Grilled	1268	0	22.1	26.5
Microwaved	1463	0	26.9	27.5
Roasted	1490	0	26.9	29.1

Taken from Food Standards Agency (2002) McCance and Widdowson's The Composition of foods.

The retention of vitamin C in frozen and fresh vegetables cooked in the microwave has been examined. Differences between food cooked using microwave energy and food cooked using conventional methods have demonstrated that microwave cooking tends to concentrate vitamin C in a selection of fresh and frozen vegetables, rather than conventional methods (Burnett and Rees, 1991). This is probably because of the shorter cooking time involved when using a microwave in contrast with conventional heating (Lassen and Ovesen, 1995). However, the retention of thiamine, riboflavin and potassium in meat and vitamin B6 in chicken cooked in the microwave compared with conventional cooking showed little difference (Burnett, 1990).

1.3. Changes in dietary habits and cooking techniques

The use of small kitchen appliances have provided the means to alter traditional methods of cooking which can have either a positive or negative effect on nutrition. Microwave ovens and electric steamers can provide a more nutritious diet. The use of the microwave to cook vegetables has been shown to reduce the losses of vitamin C (Burnett and Rees, 1991). Broccoli cooked in a microwave has been found to have a significantly higher content of vitamin C (156mg / 100g) than that of conventionally boiled (93mg / 100g) (Burnett 1990). However, other domestic appliances, such as deep fat fryers, may have a detrimental effect on nutrition, providing a diet that contains a higher fat content, chips contain 6.7g fat/100g compared to boiled potatoes which contain 0.1gfat/100g (Food Standards Agency, 2002).

1.3.1. Changes in dietary habits and cooking techniques in the UK

Eating patterns and cooking techniques in Britain have witnessed a dramatic change over the past 50 years for a number of reasons; greater female employment, an increasing number of single parent households, changing lifestyles, less formal eating, less time spent in the kitchen, an escalating demand for leisure time activities and advances in food technology and manufacture. Changes in family structure and the roles that individuals play in the family has resulted in the situation that household cooking is no longer entirely done by the housewife but a shared responsibility by both men and women which is thought by some to be a liberation of women (Attar, 1990) but others argue that

this feminisation of society is detrimental to both men and their families (Moir and Moir, 1999). Cooking has for many become a pleasurable experience and rarely considered to be a domestic chore (National Opinion Polls, 1997). Small kitchen appliances which are time and labour saving, simple and safe to operate are an important part of household developments in equipment which have been accompanied by advances in food technology and manufacture (Birds Eye Wall's, 1986, Burnett, 1990, Drew and Rhee, 1978, Jeffries, 1987, Microwave Cook, 1999). Ownership in most market sectors has grown in the last few years as consumer confidence and affluence has remained high (Mintel, 2005a,b,c).

A significant proportion of the population in England consume less than the recommended amount of fruit and vegetables and fibre but more than the recommended amount of fat, saturated, salt and sugar as detailed in the recent report Choosing Health: choosing a better diet (DoH, 2005a). The dietary habits of the UK, have become a cause for concern with an increased number of people suffering from diseases related to poor nutrition, such as cancer and cardiovascular disease, including heart disease and stroke (DoH, 1998, DoH, 2005a). Among the risk factors implicated in the aetiology of coronary heart disease is the intake of fat, specifically saturated fat (DoH, 1995). The recommendations given by the British Government in order to prevent coronary heart disease suggest that the average consumption of fat by the general public should be reduced to no more than 35% of dietary energy, while saturated fat should be reduced to no more than 10% of dietary energy (Sparks, 2001).

The National Diet and Nutrition Survey 2000/1 demonstrated that men derived 35.8% and women 34.9% of their food energy intake from total fat however saturated fat comprised 13.4% and 13.2% of intake for men and women respectively (Henderson et al, 2003) (Table 1.2). The reduction in the intake of fat and saturated fat since 1987 (Gregory et al, 1990) may reflect a greater awareness by the population concerning the health consequences of excess fat intake and a move towards employing different cooking methods (e.g. grilling instead of frying) which is facilitated by the addition to the domestic appliance market by items such as the electric grill, promoted with fat

reducing slogans such as "for health conscious cooks. Decrease the fat and create great-tasting healthier meals in minutes" (Cleanh, 2006).

Table 1.2. Comparison of the NDNS survey with the 1986/87 Adults Survey of average daily intakes from macronutrients for women

	2000/01 NDNS		**1986/87 Adults survey**
Energy (mJ)	6.87		7.05
	G	**% energy**	**% energy**
Protein	63.7 (16.6)	16.6	15.6
Carbohydrate	203 (59)	48.5	44.2
NSP	12.6 (5.01)		
Fat	61.4(21.7)	34.9	40.3
SFA	23.3 (9.6)	13.2	17
Cis-MUFA	20.2 (7.39)	11.5	12.2
Cis n-3PUFA	1.71(0.8)	1	0.8
Cis n-6 PUFA	9.4 (3.3)	5.3	5.3

Unhealthy diets, together with physical inactivity, have contributed to the growth of obesity. In 2003, in England, it was estimated that 22% of men and 23% of women were obese, a threefold increase since the 1980s and at least 24 million adults, 65% of men and 56% of women, were either overweight or obese (Sproston and Primatesta, 2004). Obesity has also become a problem among children and young people, with approximately 16% of 2 to 15year olds being obese (Sproston and Primatesta, 2004). Obesity leads to ill health, including hypertension, heart disease and type II diabetes (DoH, 2005a).

1.3.2. Changes in dietary habits and cooking techniques in Cyprus

1.3.2.1. The Traditional Mediterranean Diet

The typical diet consumed by people living in Mediterranean countries, the Mediterranean Diet, was first described in 1953 following a diet and health survey in Crete (Allbaugh, 1953). The Cretan diet, which had remained unchanged for centuries, consisted chiefly of foods of vegetable origin with cereals, vegetables, fruits and olive oil being the primary constituents, meat, fish eggs and sweets were consumed in small

amounts and butter rarely. Methods of food preparation were simple with the frequent use of braising and boiling. The habit of dipping bread into the sauce was said to save nutrients, particularly minerals and vitamins (Allbaugh, 1953). This Mediterranean diet has been shown to be beneficial in promoting human health and has been credited for the low cardiovascular disease morbidity and mortality in certain Mediterranean areas such as Crete (Keys, 1980). Greater adherence to the traditional Mediterranean diet is associated with a significant reduction in total mortality (Trichopoulou et al., 2003). The Seven Countries Study demonstrated five to ten fold differences in the incidence of coronary heart disease (CHD) between populations in the United States of America, Finland, Japan, The Netherlands, Italy, Greece and the former Yugoslavia (Keys, 1980). Recently the Lyon Diet Heart Study demonstrated that a Mediterranean diet also reduces the risk of myocardial infarction recurrence (De Lorgeril et al., 1999). This low incidence of disease has been related to the food items consumed, the Mediterranean diet, and the methods used for cooking, which were heavily dependant on the use of olive oil (Ferro-Luzzi and Sette 1989).

The traditional Mediterranean diet may be thought of as having eight components: high monounsaturated to high saturated fat ratio, high consumption of legumes, high consumption of cereals (including bread), high consumption of fruits, high consumption of vegetables, low consumption of meat and meat products, moderate consumption of milk and dairy products and a moderate consumption of ethanol (Trichopoulou and Lagiou, 1997). The benefits of this diet in relation to CHD have been linked to the consumption of monounsaturated fats, alcohol, fruits and vegetables. The high olive oil consumption provided a good source of C18:1 monounsaturated fatty acids (Kafatos et al, 1991). Monounsaturated fats especially olive oil, affect the blood lipid profile more favourably that polyunsaturated fats or carbohydrates, monounsaturated fats reduce serum low density lipoprotein cholesterol levels and act as an antioxidant (Ruiz-Gutierrez et al, 1998). Intakes of olive oil, vegetables, and fruit were significantly inversely associated with both systolic and diastolic blood pressure (Psaltopoulou et al., 2004). A moderate consumption of alcohol increases high density lipoprotein (Rimm et al, 1991). Folic acid found in vegetables lowers plasma homocysteine levels (Boushey et

al., 1995) and plant foods contain high quantities of flavanoids, which are considered to be important antioxidants in the human diet (Bravo, 1998).

1.3.2.2. Changes in traditional Mediterranean diet in Cyprus and cooking techniques.

During the last decade there has been a trend in the Mediterranean countries away from the traditional way of eating, this has been noted to be more obvious in the northern countries of the Mediterranean but is observed to some extent in those countries on the southern side. In Greece between 1962 and 1997 it was noted that although Greeks still consume high amounts of fruit and vegetables, they have increased their consumption of meat and dairy products and decreased the consumption of pulses and cereals. Olive oil was still found to be used but the use of other oils had increased (Simopoulos and Sidossis, 2000). It has been suggested that this departure from a traditional way of life is due to urbanisation and the adoption of a North American way of eating and lifestyle (Serra-Majem and Helsing, 1993). The adoption of a North American way of eating and lifestyle would tend to reduce the consumption of olive oil, include more meat and meat products and include a trend towards the use of domestic kitchen appliances to produce quick and convenient meals.

The island of Cyprus lies in the eastern part of the Mediterranean Sea and over the last few decades the population has been experiencing an epidemiological transition. Cyprus has seen an increase in the number of people involved in business and tourism professions. Many women have their own careers, 49% of Cypriot women are in employment (The World Bank, 2005), this may result in them lacking the time to offer their families home cooked meals. The Cypriot population aged over 65years has increased from 6.4% in 1960 to 11.0% in 1992, there has also been transition in respect to where people live, in 1960, 35.9% of the population lived in urban areas whereas by 1997 68.9% were residing in urban areas (Department of Statistics and Research, Ministry of Finance of Cyprus, 1998). For centuries, Cypriots have traditionally consumed a diet that closely resembled the Mediterranean Diet model. However, a recent large scale epidemiological study of school children by the Research and Education

Program for Child's Health of Cyprus (Tornaritis, 1996) has shown that a third of Cypriot children were overweight, half had high serum cholesterol levels and two thirds were physically unfit. The majority of children had moved away from the traditional pattern of eating and now consumed a Western-type diet, with a high consumption of fat-rich substances and low consumption of fruit, vegetables, legumes and cereals (Tornaritis, 1996). These findings have led to the Research and Education Program for Child's Health of Cyprus introducing intervention strategies to schoolchildren and their families to attempt to reverse the situation (Tornaritis et al., 2001).

In the past few years the incidence of CHD has been increasing in Cyprus and become a major concern of the Government (Markidou, 1995; Cyprus Ministry of Health, 1995; Tornaritis, 1998). Based on recent findings cardiovascular diseases are the number one cause of death in Cyprus. Thirty percent of all deaths are attributable to cardiovascular diseases. Morbidity rates due to CHD have undergone a steady increase; data from hospital discharges demonstrate a 50% increase in the number of cases of ischemic heart disease (Tornaritis et al, 2001). The incidence of other nutritionally related diseases have also been noted, for example the incidence of all cancers increased by 132% between 1980 and 1997 (Tornaritis et al, 2001). The major risk factors for CHD are the unhealthy lifestyle, which includes smoking, inappropriate diet, lack of physical activity, stress and excessive intake of alcohol, which appears to be the norm for an increasing number of the population of Cyprus (Cyprus Ministry of Health, 2005). It is presumed that this increase in incidence of disease is just an inevitable price that Cyprus is paying for the radical change of its citizens lifestyles, which is thought to have occurred because of the expansion of the economy that Cyprus has experienced during recent years, especially after the Declaration of Independence in 1960 (Tornarides et al., 2001). The increase in affluence for some, together with a lack of time, provides the means and incentives to purchase kitchen appliances, which are now readily available in the shops (The World Guide, 1998).

The dietary patterns and eating habits of adult Cypriots have undergone change. There has been found to be daily consumption of meat, regular intake of dairy products and

processed meat. Fruit has often been replaced by cakes and sweets and the consumption of a small amount of red wine replaced by other alcoholic beverages and cola. The family meal has become a rarity for some and fast food restaurants are often visited. It has been found that the total fat contribution to energy intake for a typical modern man compared with that of a similar aged farmer 50years ago has increased from 31% to 45% and saturated fat intake is double for the modern man (16% compared to 8% 50years ago). The modern man's carbohydrate contribution to energy was calculated to be 40%, lower than that of the farmer (51%) (Tornaritis et al, 2001).

1.4.1. Socio-economic status, nutrition and cooking facilities

"Data from the British Health and Lifestyles Survey (1984,1985, 1992) indicated that while tastes and habits are changing, the occupational class of the individual is considered to be a powerful predictor of food choice" (quoted from Cox, 1988, 1995 in Tomlinson, 1998b). Analysis based on the study Lifestyles and Social Classes, indicated that today everybody seems to be getting healthier, however, "there are wide gaps in health – related behaviour between social classes which are not diminishing over time" (Tomlinson, 1998a in Tomlinson, 1998b). Nutrition is perhaps the most significant factor causing inequalities in health (Wynn, 1987). Professionals appear much more likely to follow a healthy lifestyle than more routine white-collar workers or manual workers, who have the most unhealthy lifestyles of all groups (Tomlinson, 1998b).

The 2000/2001 National Diet and Nutrition Survey of British households showed that the diet of the lower socio-economic groups compared with the higher socio-economic groups provided cheap energy from foods such as sugars, fats, meat products, full cream milk, preserves, potatoes and cereals but had low intake of fruits, vegetables, and whole-wheat bread. The diet of these groups was inadequate in essential nutrients such as calcium, iron, magnesium, folate and vitamin C, which were more likely to be found in the diets of the higher socio-economic groups. Also the incidence of heart disease, stroke, some cancers and premature and low birth weight babies, were higher in people of the lower socio-economic groups than the more affluent (Philip et al., 1997). Obesity is more prevalent among the lowest socioeconomic groups, and this difference is more marked

for women. 29% of women and 22% of men in semi-routine and routine occupations are obese, compared to 19% of women and 21% of men in managerial and professional occupations (Sproston and Primatesta, 2004). Mothers from disadvantaged groups are least likely to breastfeed (Hamlyn, 2002). The diets of the homeless living in Bed and Breakfast accommodation has been shown to fail to meet the Government's nutritional guidelines (Stitt et al., 1994). The respondents had excessive fat intake, including too much consumption of saturated fat leading to an increased risk of developing coronary heart disease. The extrinsic sugar and sodium consumption in all of the respondents was in excess of the Dietary Reference Value (DRVs) (DoH, 1991). Excessive intakes of sodium can lead to hypertension, coronary heart disease, stroke and kidney failure. None of the respondents were consuming sufficient dietary fibre, primarily due to the low intake of fruit and vegetables, increasing the possible problems of constipation and diverticular disorders. All the participants were more deficient in vitamin C than any other nutrient, because of the low amounts of fruit and vegetables in their diet (Stitt et al. 1994). The consumption of fruit and vegetables varies markedly between socio-economic groups. 27% of men and 33% of women in the managerial and professional groups consume the recommended five portions per day compared to only 16% of men and 17% of women in routine and semi-routine occupations (Sproston and Primatesta, 2004).

Today the majority of people in all incomes and social class groups have access to cooking facilities. The dichotomy between rich and poor that characterized the Britain of old nowadays has been reduced. The possession of consumer goods provides a good indication of this trend (Johnston, 1977). The ownership of certain appliances, such as a microwave oven, indicates to consumers their arrival at a higher social level, which can be associated with the acquisition of material possessions (Burnett, 1990, Richins, 1994). High-income groups are significantly more likely than lower income groups to own these domestic appliances (Caraher et al., 1999, Mintel, 2000b).

Research undertaken in homeless hostels in the U.K suggested that a lack of kitchen facilities had a detrimental effect on the nutritional status of the tenants (Coufopoulos and Stitt, 1997). Another study, which examined the diets of 30 homeless people living

in bed and breakfast accommodation, showed that the lack of cooking facilities such as cookers/microwave ovens resulted in a heavy reliance on takeaway and convenience food and resulted in a low intake of vegetables (Stitt et al., 1994). High income groups are likely to own a large number of appliances and have a better diet and fewer nutritional problems than the poorer groups of society who may own fewer appliances to assist in food preparation. It is unknown whether ownership and/or usage of kitchen appliances beyond basic requirements are important.

Traditional methods of cooking and eating are being influenced by the increased ownership of domestic kitchen appliances such as microwave ovens, electric steamers and bread makers, which could provide a more, or less, nutritious diet. People have a desire to try new and healthier foods without using the traditional methods. Mintel (2000a) found that while most people rely on ready meals or quick recipes during their working days they try to cook meals from basic ingredients at the weekend. This was found to be more prevalent amongst the higher socio-economic groups. The ownership of small kitchen appliances enhanced and supplemented the traditional methods of cooking (Mintel, 2000a).

A number of studies carried out over the last decade support the theory that microwave cooking is a major improvement over traditional cooking methods (Thompson and Sweaney, 1994b). Many traditional recipes (e.g. roast beef) can be cooked in microwave oven although the finish of the food is unlike that obtained by traditional methods (Faulks and Belsten, 1991). However, today people spend less time in the kitchen and have an increased interest in time saving cooking appliances, such as microwave cookers, based on the desire for convenience, time, labour and energy saving and simple and safe operation (Drew and Rhee, 1978, Burnett, 1990).

1.4.2 Age, nutrition and cooking facilities.

It has been shown that the older adults lack confidence in the use of the microwave oven but were very familiar with other cooking techniques such as steaming and braising (Caraher et al, 1999) and that the microwave oven is more likely to be owned by younger

adults (Thompson and Sweaney, 1994b). A change in nutrition education in schools in England and Wales was introduced by the 1998 Education Reform Act that replaced Home Economics with a new subject Design and Technology (Rutland, 1997). This change has been held accountable by some for the reduction in practical cooking skills of the younger generation resulting in a diminished ability to use the more old fashioned cooking methods (Stitt, 1996). The emphasis in design and technology is to focus on the "physical, chemical, nutritional, biological and sensory properties of food and the ways in which these properties can be exploited when designing and making food products to specific criteria" (OFSTED and DFEE, 1996).

The Working party on Nutrition of Elderly People recommended in their report (DoH, 1992) that the "majority of people aged 65 years and over should adopt, where possible, similar patterns of eating and lifestyle to those advised for maintaining health in younger age groups". The main recommendations made for reference nutrient intake for the elderly by the COMA Panel for Nutrition of the Elderly are based on the survey carried out in 1968/69 on elderly people (DHSS, 1972) or are extrapolated from the requirements of young adults (DoH, 1992). A further national survey on diet and nutritional status of elderly Britains was carried out in 1995/6 (Finch et al, 1998) and in 1998/9 the nutritional status of the free living elderly in Merseyside was studied (Saini, 2000). The survey of those on Merseyside demonstrated that the nutritional intake of the respondents was inadequate to provide the required dietary energy and a number of essential nutrients. The mean reported energy intake of women (6.1 MJ) was lower than the recommended level of intake, the levels of total dietary fat as a percentage of total energy (34.3%) were desirable, however the saturated fat intake of the group was higher than the recommended at 13% of total energy intake and more than 21% of dietary energy was from sugars (Saini, 2000).

The dietary practises of the elderly have been shown to primarily be governed by taste, habit and price (Bilderbeck et al, 1981). However the more recent study by Saini (2000), although still indicating that the most important factor of food choice for the elderly was taste, it was followed by familiarity for those aged over 75years, and healthy choice for

those aged 65-74years. It has been suggested that elderly people believe that they have a healthy diet and lack the motivation to change their eating habits (Griffiths et al, 1994). Griffiths et al (1994) in their study of health and lifestyles of inner city adults found that the motivation to improve eating habits and aspirations for a healthy diet declined with age, and was very low over the age of 60years. The Scottish Heart Health Survey (McKay and Bolton-Smith, 1995) showed that the elderly are resistant to change, 26% of women claimed they would not change their diet even when faced with a major life threatening disease. However, the others in this study stated that advice from their doctor would persuade them to change their diet and a reduction in the price of healthy foods would help them make the change. Contrary to this, a study in Nottingham (Lilley and Johnson, 1996) demonstrated that the elderly can and do change their dietary habits. They reported that the elderly had adequate knowledge on dietary fats and had made dietary changes to include low fat, as opposed to high fat, foods.

1.5. Ownership of small domestic kitchen appliances

1.5.1. Ownership of small kitchen domestic appliances in the UK

In the UK, two surveys have been carried out by Mintel to assess the ownership of small kitchen domestic appliances, one in 2000 based on 1017 adults (Mintel, 2000b) and the other in 2004 based on 1024 adults (Mintel, 2005b). The results in 2000 indicated a high ownership of toasters (83%) among all groups regardless of age or socio-economic group. Those aged 45-54y were the greatest owners of toasters (89%), the survey suggested that this group was perhaps more likely to have teenage children in the home who may like snacking on toast. Between 2000 and 2004 ownership of toasters remained fairly stable and most of the purchases in this sector were for replacement purposes. Differences in ownership were found between different groups. Men were slightly more likely than women to own a toaster. Those aged over-65years were less likely to be owners of toasters (80%) maybe because these consumers may still use the grill facility on their cookers for toasting bread. The wealthy achievers (wealthy executives, affluent greys) were more likely to own a toaster (87%) than those in the urban prosperity (prosperous professionals) group (78%). However a slightly higher percentage of those in the hard pressed (struggling families, burdened singles, high rise hardship, inner city

adversity) group owned a toaster (88%) (Mintel, 2000b, Mintel, 2005a). Kettles were also found to be owned by a large number of respondents (93%). Recent purchases of kettles were found to be replacement purchases, with women and the older consumers most likely to up-grade to a more sophisticated model (Mintel, 2005b). Ownership of kettles was lowest in London, and it was suggested that this may be due to the fact that kettles still tend to be associated with tea drinking and have a less trendy image than coffee makers (Mintel, 2005b). The highest socio-economic group were the greatest owners of coffee makers, with the only increase in ownership being in the area of machines that produce strong coffee such as that sold in coffee bars. Overall 27% of respondents owned a filter machine, 9% an espresso machine and 17% a coffee percolator. Those aged 45-54years and those aged over 65 years were the most likely owners of filter machines and coffee percolators respectively (Mintel, 2005b).

In the 2000 Mintel (2000b) survey, 48% of all households were found to own a sandwich maker, with ownership decreasing above the age of 55years. Again, the presence of children in the house was suggested to influence the purchase of a sandwich maker, 61% of families with children owned a sandwich maker compared to 43% of people without children (Mintel, 2000b). Ownership of sandwich makers between 2000-2004 increased to 55%. Sandwich makers were found to be particularly popular among younger people, 62% of those aged 15-24years owned this type of appliance probably because the product is mainly used for making snacks and often given to young people when leaving home for the first time. Fewer of the prosperous professionals owned a sandwich maker (58%) compared with those in the hard pressed group (64%). Retired respondents were least likely to own a sandwich maker (41%) whereas 61% of those employed owned one. It was suggested that this indicates that in terms of appliance ownership, there is a divide between the generations with regard to those appliances that facilitate snacking and those that facilitate cooking (Mintel, 2005a).

A deep fat fryer was found to be owned by 32% (Mintel, 2000b). Younger respondents were more likely to use them often for quick snacks compared with older owners who used their fryers less frequently mainly to make more exotic dishes and when

entertaining. Only 23% of more affluent consumers owned a deep fat fryer, less than half the proportion of families on a low budget (Mintel, 2000b). By 2004 the ownership of deep fat fryers had fallen (28%) (Mintel, 2005a), this decline was thought to be likely to continue as the younger consumers took into account dietary health advice to reduce fat, especially saturated fat, intake (DoH, 1991). The ownership of deep fat fryers was found to be highest among younger adults aged 15-24years (34%), and lowest in those over 65years (23%). The presence of children in the home was an important factor, with nearly half (47%) of those with children, aged 5-9years, owning one compared to those without children (23%). Less affluent consumers and those with families were most likely to own a deep fat fryer (Mintel, 2005a).

These findings concerning deep fat fryers confirmed a previous report (Caraher et al, 1999), which demonstrated that although higher income groups were more likely to own a variety of domestic kitchen appliances such as microwaves, steamers, food processors or liquidisers, the deep fat fryer was found to be the only piece of equipment which was more often owned by lower income groups, they found that 66.8% of lower income consumers owned one, compared with 40.5% of consumers from the highest income households. A deep fat fryer can lead to an increase in the fat content of food consumed and the differences in ownership may be explained by the fact that individuals with greater income or education levels have more access to nutrition information which results in a lower ownership of an appliance which could provide a less nutritious diet (Variyam et al., 1998).

Electric steamers are a relatively new domestic appliance for food preparation. Mintel (2000b) showed that 17% of all respondents owned a steamer, which is a high proportion of consumers for a relatively new market. Women and older respondents were the two groups most likely to own a steamer, the purchase possibly being due to an interest in healthy eating. Between 2000-2004 the ownership of steamers increased (29%) suggested to be because the media had focused on healthy eating. Marital status and the presence of children in the home were important factors in steamer ownership, with 36% of those with children aged under 5years owning one and 34% of those who were

married compared to only 19% of unmarried respondents. Urban prosperity groups (35%) and households with two full-time earners (38%) had high rates of ownership. Ownership was thought to be likely to continue increasing as health awareness grows and consumers continue to prefer gadgets that will help them to achieve optimal nutrition from their food. Consumption and cooking of vegetables is still unpopular at a young age, however, the continued emphasis that the government is placing on consumption of fruit and vegetables, with the 5-a-day campaign (DoH, 2005), may help to encourage vegetable intake and awareness of the variety of cooking options (Mintel, 2005a).

The awareness of the consumer of health messages such as the 5 –a day campaign (DoH, 2005) appears to have led to a large increase in the ownership of juice makers to 21%. Ownership is highest amongst those age 25-34years and those in the highest socio-economic groups (Mintel, 2005b). The benefits of making and consuming fruit juice have been understood and these appliances are advertised and marketed as being good for health, for example one manufacturer on their web site states "As we are now being encouraged to eat 5 different portions of fruit and vegetables per day- juicing is an excellent way to get these nutrients into our bodies" (Juiceland UK, 2006).

The greatest growth in appliance ownership occurred with bread makers, between 2000-2004, ownership increased five fold (2000: 3%; 2004: 17%) (Mintel, 2005a). Increased ownership of bread makers has occurred as prices have fallen and the sales of this appliance have benefited from the recent media exposure of salt, sugar and additive levels in manufactured bread. The increase in the number and variety of mixes for speciality and ethnic bread has positively influenced the sales of bread makers. Those aged 25-34years (22%) and wealthy achievers (24%) were the groups found to be most likely to own a breadmaker. It was thought that those consumers on a low budget were unlikely to purchase breadmakers since bread is widely available and a cheaply purchased food item (Mintel, 2005a).

Between 2000-2004, the ownership of electric grills has increased by 12% (Mintel, 2005a). The increase in ownership of grills was attributed to the success of the George

Foreman Lean Mean Fat Reducing Grilling Machine and the subsequent launch of similar products from other manufacturers. Fifteen percent of those aged 25-34years owned one and 21% of prosperous professionals. The presence of children in the home was also an important factor with 23% owning one compared to 14% of those without children. Household size had an influence on ownership, with 22% of those in households with more than five people owning an electric grill and a quarter of families owning one. The Mintel (2005a) survey showed that the presence of children was a key factor in stimulating an initial interest in cooking and cookery gadgets and that older consumers are less interested in owning the latest cookery gadgets compared to younger consumers. This was thought to account for the high ownership of electric grills by families since these appliances are more useful in small households (Mintel, 2005a).

The later survey by Mintel (2005a) included appliances that could be classified as novelty rather than commodity appliances, these had a relatively low level of consumer ownership: ice-cream makers 7%, popcorn makers 6%, and waffle makers 3%. This low ownership was thought likely to reflect their task-specific nature, which makes them non-essential and more of a luxury item. Ownership of these appliances is spread across the more affluent consumers and the younger age groups (25-34years) were the most likely groups to own these appliances (Mintel, 2005a). These appliances were likely to be purchased as gifts, by and for those aged 25-34years either for Christmas, birthdays or as wedding presents. Those in the South were more likely to own one of these appliances than those in the North West. The presence of children in the home was also a factor, with homes with any children more likely to own one of these novelty appliances compared with homes without children (Mintel, 2005a).

The ownership of hand held blender/mixer increased by 5% between 2000 and 2004, with over half of consumers (51%) owning one, whereas the ownership of the larger food processors fell to 34% (Mintel, 2005b). This difference was thought to reflect the fact that consumers prefer appliances that take up less space in an often crowded kitchen and find the hand held mixer/blender more convenient to use. Similarly to other food preparation products, ownership increased with age and socio-economic status, with

retired respondents showing the highest ownership rates (Mintel, 2005a). This was thought to reflect societal changes in that older people are more likely to be able to cook, whereas younger people are consuming increasing amounts of fast food and convenience meals, and have poorer cooking skills (Lang and Caraher, 2001). Over half (59%) of the over 65years and retired respondents owned a hand-held blender/mixer, compared to just 36% of 15-24year olds. These differences were considered to be unlikely to change unless a greater emphasis on domestic prowess occurs. Two thirds of those in the higher socio-economic status categories owned a hand-held blender/mixer, with ownership falling steadily further down the socio- economic spectrum. Higher ownership where children were present was considered to be partly because hand-held blenders/mixers are often popular among mothers who undertake such tasks as blending baby food and family baking (Mintel, 2005b).

In 1987 35% of British households owned a microwave oven and it was demonstrated that the most frequent use of this appliance at that time was for reheating and defrosting food products. The foods most often prepared in the microwave oven were potatoes, other vegetables and ready meals (Leatherhead Food RA, 1987). However, by 1990 the popularity of microwave ovens in the UK had increased considerably to an ownership of 50.7% (Burnett and Rees, 1991). The findings of this later study showed that people who owned a microwave oven cooked food from raw ingredients more often than non-owners, and used the microwave for this procedure; 31.3% of owners cooked from raw ingredients during the summer and 30.6% during the winter. In contrast non-owners cooked only 24.3% of their foods from raw ingredients. This fact was said to emphasise the convenience aspect of microwave ovens, which encouraged the preparation/cooking of foods from raw commodities (Burnett and Rees, 1991).

Household ownership of microwave ovens continues to increase, and rose from 76% in 1998 (Microwave Cook, 1999), to 84% in 2004 (Mintel, 2005c). Only 77% of 15-24year olds and 78% of those with no family owned a microwave, however, this rose to 87% of 45-54year olds and 88% of families, where ownership is highest. This suggested that family and an established domestic setting are important to this market. Ownership was

higher in households with children (89%) compared to those with no children (82%). Although microwave ovens are viewed as the ideal vessel for cooking ready meals for one, it was found that ownership is lowest in single households (78%) and it would appear that these ovens are far more relevant to households dealing with cooking for several individuals (Mintel, 2005c). With regard to socio-economic grouping there is very little difference in ownership between consumers across the AB, C1 and C2D groups. However, there was a difference between the lowest income groups and the rest of the respondents, 78% of Es owned a microwave oven compared to 85% of C2s. This suggested that, despite extensive price reduction for this appliance, the older consumers who dominate this income group are still unprepared to invest in microwave technology (Mintel, 2005c).

1.5.2. Ownership of small kitchen domestic appliances in Cyprus.

Little information exists concerning the ownership of small domestic kitchen appliances in Cyprus. There have been two studies by the Department of Statistics and Research which incorporated small domestic kitchen appliances into their surveys (Department of Statistics and Research, Ministry of Finance, 1999, Department of Statistics and Research, Ministry of Finance, 2006). The 1996/97 Family Budget Survey examined the availability of durable household belongings and demonstrated that 18.6% of households owned a microwave oven (Department of Statistics and Research, Ministry of Finance 1999).

The survey in 2003 of 238,800 Cypriot households investigated the expenditure of households on various domestic kitchen appliances. It was found that the average household expenditure on small domestic kitchen appliances was Cy£1621.5 which was higher for urban compared to rural households (Urban: Cy£1795.8; Rural: Cy£1220.3). The appliances that were included in this study were electric food mixers, electric grills, electric toasters, electric kettles and juice makers. There was similar expenditure in total on electric grills, electric kettles and electric toasters (CY£ 274.6, CY£ 351.1, CY£ 279.4 respectively) with again slightly more being spent by urban compared to rural households. However in total a larger amount was found to be expended on electric food

mixers (CY£439.4) and a much smaller amount on juice makers (CY£62.1). For these two appliances a large difference in expenditure between urban and rural households was apparent, with urban households spending at least four times more than rural households (Department of Statistics and Research, Ministry of Finance, 2006).

1.6. Aim and objectives of this study

Existing studies mainly provide data on the extent of ownership of appliances in the UK but not in Cyprus where there is very little information concerning ownership of these appliances. The use of domestic kitchen appliances have the potential to alter nutrient intake both in a positive manner, such as electric steamers which could increase the intake of water soluble vitamins, or in a negative way, such as the use of a deep fat fryer which is likely to increase the fat content of the food consumed. Some of these appliances are marketed as being a means to follow healthy nutritional guidelines and improve the diet (DoH, 2005). For example, an electric grill to reduce fat intake, "You might like to try a George Foreman Grill, designed specifically to make grilling easy, healthy and as clean as possible" (Cleanh, 2006) or a juice maker to increase vitamin intake, "As we are now being encouraged to eat 5 different portions of fruit and vegetables per day – juicing is an excellent way to get these nutrients in to our bodies" (Juiceland UK, 2006). In both countries no study exists that relates the use of these kitchen appliances to their impact on nutrition.

Cyprus is experiencing an epidemiological transition with an ever increasing number of the population being employed in business and tourism professions which brings to individuals a greater affluence and the ability to purchase small domestic kitchen appliances. However, in Cyprus there are still many families, especially the elderly, with few domestic appliances, who use traditional methods for cooking. The studies in Cyprus will provide a unique opportunity to compare the nutritional intake of individuals who use different methods of preparing food from similar raw commodities and evidence of the extent that kitchen appliances have altered diet. It will also be of interest to compare the ownership and use of domestic appliances and whether usage is related to nutrient intake between individuals in two different countries; England, for whom many electric

appliances have been affordable for several decades, and Cyprus, where domestic appliances have only recently become available for many of the population.

Although heart disease mortality in Cyprus is less common than that observed in western Europe and the USA, it is still higher than other countries in the eastern Mediterranean and increasing whereas in most other European countries the incidence has decreased over the past few decades. One of the major risk factors for CHD is an inappropriate diet, it is not known as to whether the use of domestic appliances which may save time in food preparation have led to the consumption of a less nutritious diet. This study will investigate the macronutrient intake of those who use domestic appliances with those who still use traditional forms of cooking.

The aim and objectives of this study are:

Aim:

To determine extent of ownership of kitchen domestic appliances and the influence of their usage on nutrient intake in England and Cyprus.

Objectives:

1. To carry out a cross sectional study on the ownership and usage of domestic kitchen appliances in England and Cyprus.
2. To monitor the influence of usage of domestic appliances on macronutrient intake in England and Cyprus.
3. To compare the ownership and usage of domestic kitchen appliances between age groups in England and Cyprus.
4. To compare the influence of usage of specific domestic kitchen appliances on macronutrient intake between the two different countries and the different age groups.

Chapter 2

Methodology

The study was designed as a cross sectional study to investigate the extent of small domestic kitchen appliance ownership and the effect of their usage on the dietary intake of adults in two different communities, England and Cyprus. In the past these two countries had widely different rates of coronary heart disease that was suggested to be related to differences in nutrition, Cypriots consumed a traditional Mediterranean diet (Berrino et al., 1989), whereas British citizens consume a typical Western diet. Recently the incidence of coronary heart disease (CHD) in Cyprus has increased dramatically and is now of great concern to the government, concomitant with this increase in the incidence of CHD is an increase in affluence for some, providing the means to purchase kitchen appliances which are readily available (Markidou, 1995, Cyprus Ministry of Health, 1995, Tornarides, 1998).

There are a variety of methods that can be used to collect information about people. Such as administered questionnaires, self-reported questionnaires, unstructured interviews, semi-structured interviews, focus group discussions, self recorded behaviour and observational behaviour. The decision concerning which method is used depends on the type of information required and the constraints such as time, expense, the sample population and fieldworker skills (Kemm and Booth, 1992). Taking into account these factors and in order to meet the objectives of the study the two main methods used were a questionnaire and a three day dietary record.

2.1. Study design

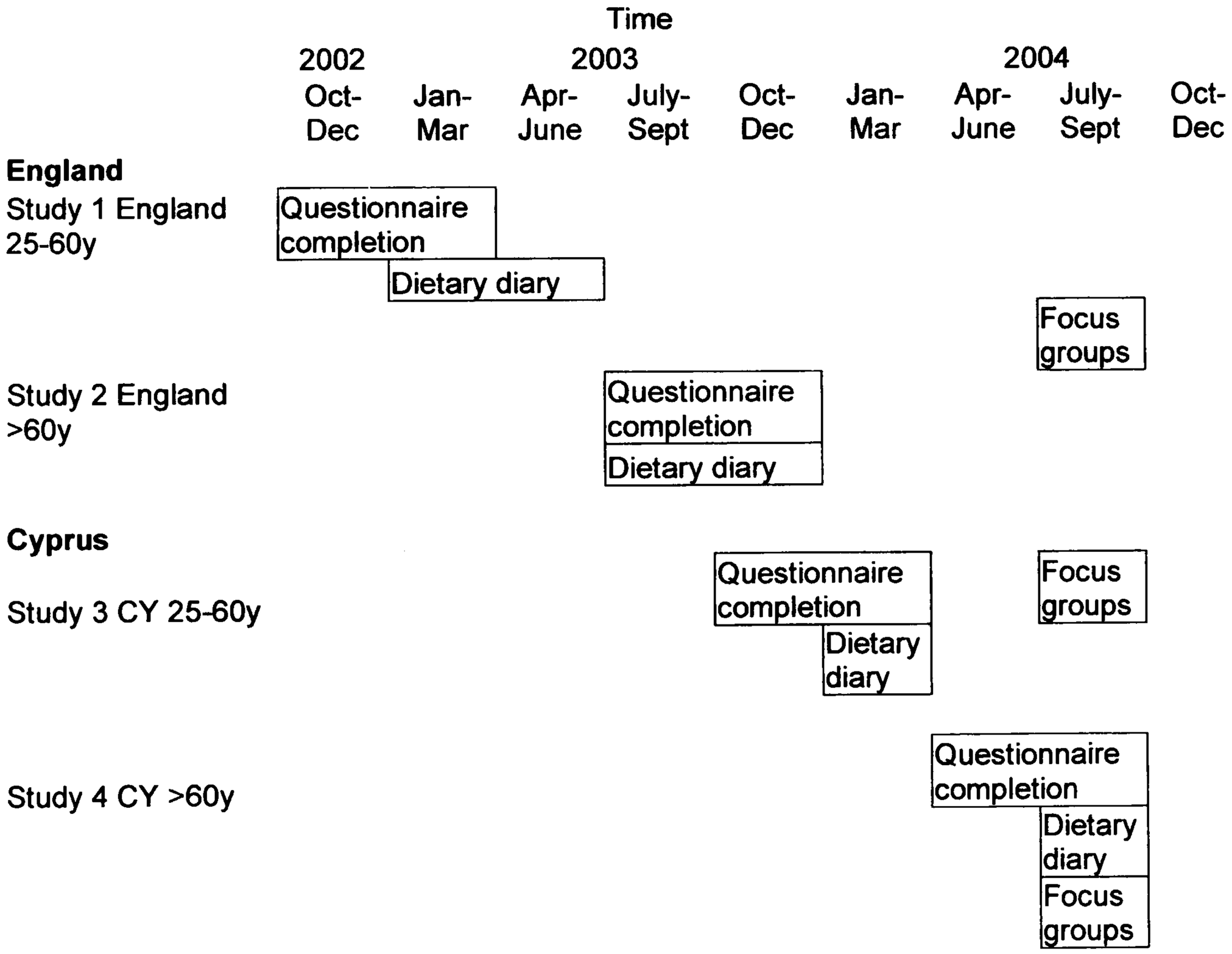
Studies to determine the ownership and use of kitchen domestic appliances and of macronutrient intake were undertaken with four separate groups of females aged:

1. 25-60y in England
2. Over 60y in England
3. 25-60y in Cyprus
4. Over 60y in Cyprus

In each country two populations were studied those aged 25-60y and those over 60y. Those under 25y were not considered suitable, as they were unlikely to have the financial ability to purchase a range of domestic appliances and were less likely to be living independently. Subjects over 60y, especially those in Cyprus, were considered more likely to use traditional methods of food preparation and thus provide evidence as to the extent that the diet has been altered by kitchen appliances.

The study was carried out in two phases. The first phase was conducted in England and the second phase in Cyprus. Data collection was carried out as shown in Table 2.1.

Table 2.1. Data collection protocol



2.2. Recruitment of subjects

Female adults only were recruited, since women are traditionally those who are more likely to be involved with food preparation and the purchase of kitchen domestic appliances (Caraher et al, 1999). They were asked to complete the questionnaire and a sub-sample was asked to complete a three-day dietary diary. Further details on ownership and use of domestic appliances were gathered from a small number of focus groups. In each country two groups of women were recruited, a sample aged 25-60 years and a smaller sample aged >60y.

Recruitment of respondents was carried out using a snowball sampling technique based on an initial opportunistic sample. Persons of responsibility in various organisations in Cyprus and England known to the researcher and her colleagues were contacted and their permission obtained for the researcher to approach members of their organisations for inclusion in the study. Slight differences in the recruitment technique occurred between the two countries due to difficulties in access to individuals and the time constraints involved.

In England the sample was recruited from amongst university staff and community groups within Merseyside. Female subjects aged 25years and over were recruited from different areas of Liverpool, in order to provide respondents from a variety of socio-economic groups. Questionnaires (Appendix 2) were distributed personally by the researcher to people who worked in schools, in the university, in care homes and organisations such as: Gingerbread, Victim Support and The Citizens Advice Bureau (CAB) were provided with verbal and written information concerning the study (Appendix 1) by the researcher and asked to sign a consent form before inclusion in the study.

In Cyprus the sample of adults aged 25-60y were parents of primary school children who were recruited by field workers involved in the "Research and Education Program for Child's Health". An information letter and consent form were distributed to all participants. The local community councils in the villages of Paphos and Limassol were

contacted and following explanation of the study, help was requested in recruiting elderly people over 60years from their communities. Adult Centres in Paphos were also visited by the researcher who recruited elderly women who were present on those days. The study was explained to all volunteers and written consent obtained.

The method of recruitment resulted in a slightly younger group of individuals (25-55y) being recruited in Cyprus compared to the UK (25-60y). This was due to restraints imposed on the study by persons of responsibility in the Cyprus government's 'Research and Education Program for Child's Health' whose staff assisted in the recruitment procedure. Other studies have noted a decline in the motivation of individuals to volunteer for research projects (Boys et al, 2003; Hendricks and Cutler, 2004), the researchers from the 'Research and Education Program for Child's Health' were concerned that their own research could suffer from a decreased motivation on behalf of their present and future respondents when the participants were faced with additional tasks to complete, such as the questionnaire for this study. It was however considered that although the populations recruited were not identical a comparison between the two groups aged 25-55y in each country would identify major similarities/differences. This research could thus form a firm foundation of knowledge for future studies in this area. Comparison of the results of the questionnaire between the socio-economic groups was not applicable, because the populations recruited in the two countries were not identical.

Ethical approval for all aspects of the study was granted from the Liverpool John Moores University Ethics Committee.

2.3. Procedure used to form the questionnaire

A questionnaire was specifically designed for this study (Appendix 2) to gather the perceptions of adult women, over 25 years of age, concerning their ownership and use of domestic appliances for food preparation. It was decided not to use previously issued questionnaires because of the differences in situations and the ages of the respondents. However for this study some statements from previous questionnaires (Mintel, 2000a,b) were modified and included; for example the question concerning factors that consumers

considered important when purchasing domestic appliances was included as this was considered to be important for this research.

The questionnaire consisted of general questions to establish age, occupation of the head of the family, home residence, marital status and children's ages (if any). The respondents were classified into three groups (professional, partly skilled and unskilled) dependent on the occupation of the head of the household based on The National Statistics Socio-economic Classifications (National Statistics, 2006): 1 & 2 professional, 3, 4 & 5 partly skilled, 6, 7 & 8 unskilled. To gather information regarding ownership and use of domestic appliances a list of domestic appliances was compiled by the researcher after visiting retail stores in both England and Cyprus and recording what was on sale (Table 2.2).

Table 2.2 Domestic appliances on sale in retail stores

Appliance
Electric Kettle
Microwave oven
Electric Toaster
Electric Grill
Coffee Maker
Hand Held Electric Food Mixer
Sandwich Maker
Blender
Food Processor
Deep Fat Fryer
Juice Maker
Electric Steamer
Bread Maker
Roaster
Rice Cooker
Ice-cream Maker
Popcorn Maker
Soft Drinks Machine
Waffle Maker
Electric Crepe and Pancake Maker

The appliances included those that may have a positive effect on diet and nutritional content: microwaves (because of retention of water soluble vitamins), an electric grill (reduction of fat content), a bread maker (increase in fibre and carbohydrate content of diet), an electric steamer (increase in water soluble vitamin content), a rice cooker (increased consumption of carbohydrate) and a juice maker (increase in fruit intake). Other appliances included those that may have a negative effect: a sandwich maker (increase in fat content, cheese sandwiches the most commonly made), a deep fat fryer (increase in fat content), an ice cream maker, a popcorn maker, a crepe and pancake maker (all these an increase in sugar and fat content) and a soft drink maker (increase in

sugar content). Finally some appliances were included that may have either positive or negative effects namely food processors, blenders and food mixers that could be used for producing either nutritious soups or high fat and sugar products such as deserts. The respondents were asked which ones they owned, to explain whether they found the domestic appliances that they owned helpful in preparing food and how they rated the appliances in importance for food preparation, the main reason for the use of each appliance, how often they used each appliance and to specify which was the single most important appliance to them. This was to try and determine whether the ownership of appliances was related to the use of them or whether they were purchased for other reasons, for example as a status symbol. According to Burnett (1990), the ownership of certain appliances, such as a microwave oven, indicates to consumers their arrival at a higher social level, which can be associated with the acquisition of material possessions.

The respondents were also asked how much time they spent on cooking each day, how often they used cooking methods such as: steaming, boiling, baking, deep frying, poaching, pan frying, microwave, simmering, roasting, stewing, grilling and, in terms of healthy eating, how they rated each method of cooking. These questions should provide information on how important they considered the preparation of healthy food for the family. The questionnaire also consisted of questions to discover the reasons for the purchase of those domestic kitchen appliances. These questions addressed issues such as which factors they considered important when purchasing a domestic appliance, if they had given or received a domestic appliance as a present and in terms of price how they rated the domestic appliances.

The questionnaire was composed of 29 questions in which 15 questions were closed, 2 questions were closed followed by an open question and the other 12 questions were open. Open-ended questions gave the opportunity to the respondent to provide more in depth information, for example they were asked to explain why they found the specific domestic appliances they owned useful rather than solely providing the information that they either did or didn't find the appliance useful. Closed questions in the questionnaire generally need less completion time and less time for the respondents to understand

them. A questionnaire using a combination of quantitative (closed questions) and qualitative (open questions) data is a method that can obtain optimum results (Krueger, 1994, Moore, 2000).

All the respondents in England answered all the questions of the questionnaire (Appendix 2) in contrast to the respondents in Cyprus. In Cyprus the questionnaire was translated into Greek and some slight changes were made resulting from advice from people of responsibility working in the Research and Education Program for Child's Health. Because the respondents had also been asked to complete another questionnaire related to the programme's research work, the questionnaire for this study in Cyprus could not be more than two pages long (four A4 sides). Some questions were shortened e.g. questions 2, 11, 12, 13, 14, 15 were re-written with fewer domestic kitchen appliances or cooking methods and by adding the phrase 'other' the respondents were provided with the opportunity to specify which other appliances or cooking methods, if any, were owned and used. Some other questions were deleted e.g. question 4 regarding ethnicity was deleted because only Cypriots were asked to complete the questionnaire. Questions 7, 8, 22 were omitted because of the page limit and question 26 was deleted because the information for that question could be gathered by question 15 (Appendix 4). It was considered that this would not prevent a comparison of the results obtained from the two different countries as the questions asked regarding domestic appliances were the same, with the changes occurring mainly in the questions concerning the demographics of the population that were not applicable to Cyprus.

Some of the elderly in Cyprus in contrast to those in England did not answer all of the questions in the questionnaire. Question 12 (the question numbered as found in the English questionnaire) (Appendix 2) was not answered mainly due to a time factor. Questions 18,19,20,21 were not fully answered, because for most of these volunteers the domestic kitchen appliances they owned had been bought by their children, thus factors related to the purchase of items were not applicable to this group. Again comparison of the results between the two countries was considered appropriate if only to identify major differences/similarities.

2.4. Pilot study

People who had significant experience in the field, specialists in Home Economics education and nutrition, piloted the questionnaire to ensure a degree of content validity (the extent to which the questionnaire was able to examine the research question) and face validity (the relevance of the questions). The questionnaires were also piloted with a group of individuals who had the same characteristics as the proposed sample group to ensure that the questions were relatively easy, clear and understandable. These were an opportunistic sample of 30 subjects residing or working near the researcher's place of residence. Following this pilot work, several alterations to the questionnaire were made. Some additions to the instructions to the questions took place in order that the questions were answered in the required manner. For example, it was found that the participants often did not know that they were only required to identify the domestic kitchen appliances that they owned. A sentence after the questions 13, 14, 15 e.g. 'Tick only the ones that you own' was added to provide further explanation.

The Cypriot questionnaire was translated into Greek and was also piloted (Appendix 4). The pilot group in Cyprus was recruited similarly to English pilot group. Some slight changes were made to the questionnaire due to traditional and/or cultural differences e.g. in the English questionnaire included in question 27, was the term roasting, this was changed to baking in a wood fire oven as this is a more commonly used description of this method of cooking. Also the names of domestic kitchen appliances in the Cypriot questionnaire were written in Greek with English in brackets because it was thought that some people might know them better by the English name.

2.5. Distribution of the questionnaire

In England, following informed consent, the researcher distributed the questionnaires personally to all subjects who had been recruited. In Cyprus the questionnaires were distributed to parents of primary school children aged 25-55years by field workers involved in the government's 'Research and Education Program for Child's Health'. In both countries the questionnaires were collected from some of them at that time or were returned by post using the stamped envelope provided. A different approach was by

necessity undertaken to collect data from the elderly volunteers in Cyprus, which resulted in a much higher response rate. The elderly in Cyprus completed the questionnaire during a face to face interview with the researcher due to the fact that it was considered that they were probably unfamiliar with research questionnaires and that they might relate the completion of forms with a Government procedure. The researcher was of the same nationality and gender as the respondents and spent some time prior to the questionnaire interview generating an atmosphere of comfort for the respondent (Denscombe, 1998). This approach resulted in a wealth of data being obtained from these individuals. The data collection methods used in Cyprus were not considered for use in England as the factors that had a positive influence on the response rate in Cyprus such as nationality/language may have had a negative effect in England, also the elderly English participants were more likely to be familiar with research questionnaires. Again a comparison of the results between the two countries was considered applicable to identify major differences/similarities.

2.6. Measurement of dietary intake

There are many techniques available for assessing dietary intake, each has it is benefits and drawbacks, and as Beaton states, "dietary intake cannot be estimated without some error and probably never will be" (Beaton, 1994). According to Bingham (1991) "the validity of measurements of dietary intake in free living individuals is difficult to assess because all methods rely on information given by the subjects themselves, which may be incorrect".

A variety of methods may be employed to assess dietary intake, ranging from prospective approaches which aim to collect food records at the time the food is consumed or very shortly after (Dwyer, 1998) to retrospective approaches focused on recalling food consumed in the recent past. Prospective methods include weighed or estimated food diaries/records whereas retrospective methods include the 24 hour recall, food frequency questionnaires and diet history. Each method has its own advantages and limitations (Bone, 1992).

Twenty four hour recall, is a retrospective method where the participants are asked to recall all the food consumed in the previous 24 hours and whether this represents their usual diet. The advantage of this method is that the 24 hour recall is quick and cheap to administer. It can be very useful when used with a food frequency questionnaire (Caughey, et al, 1994) or as an alternative "first stage" to the diet history (Bingham, 1987). However, limitations can occur since this method often underestimates food consumption and fails to assess, daily variation in an individual's eating pattern (Bingham, 1987).

A food frequency questionnaire is another retrospective method that is commonly used in epidemiological research on diet and disease to assess the usual dietary intakes of individuals (Willet, 1990, Thompson et al, 1994a); it is less burdensome than multiple records or recalls (Eck et al, 1996). Also, the food frequency questionnaire has the advantage of assessing usual intake over a long period of time (Block et al, 1986), although it may overestimate intake. Studies suggest that fruit and vegetables are more often over-reported than other food groups (Mullen et al, 1984, Feskanich et al, 1993).

A diet history is also a retrospective method of assessing dietary intake. It involves interviews with the respondents in order to obtain information about their usual food intake, portion sizes, recipes and frequency of food consumed in the past (Nelson and Bingham, 1998). The aim is to complete a typical 7-day eating pattern (Ralph, 1993). Many studies over several decades have compared the validity of the diet history and the weighed diet record. The diet history tends to obtain higher mean energy intakes (E.I) (Bingham, 1987, Black et al, 1991) than weighed methods, however, repeatability of this method has shown it to be a better measure for assessing group mean intake of energy and macronutrients, but poorer for micronutrients (Bingham, 1991).

Alternatively, prospective methods such as the technique of keeping a food diary/record involve having to record food consumed for a set period of time. The time period for which food diaries are kept will vary dependant primarily on the use of the data. For example 4-days or 5-days using weighed food records may be adequate for

macronutrients to be evaluated but 14 days using estimated food diaries may be required for vitamin and mineral intake to be assessed. Weighed food records involve the subject weighing all items of food and drink consumed including all waste and record cooked food weight when it was served and brand names and recipes where appropriate (Bingham, 1987, Seaman, 1995). The estimated food diaries are similar to weighed food records, but instead the portion sizes can be quantified using household measures and food models and photographs. Another diary/record technique is the portable tape-recording scales (PETRA), which are very useful especially for subjects with literacy problems. If food diaries or the PETRA system are used in research studies, this can result in nutrient intake data at an individual level.

The prospective dietary assessment methods avoid memory problems, however, keeping a detailed description of food consumed may cause a disturbance to the usual pattern of eating (Bone, 1992).

2.7. Chosen method: three day estimated food diary

The aim of this study was to investigate the effects of usage of domestic appliances on nutrient intake and the objective was to collect macronutrient data, rather than micronutrient data. Thus following critical analysis of all the available methods for studying food consumption in a defined period of time, the three day food diary (Appendices 3 and 5) was considered to be the best method to determine dietary habits as it has been used extensively in nutritional surveys (Crawford et al, 1994, Ricketts, 1997, Coufopoulos, 1997).

Crawford et al (1994) examined the validity of three different dietary assessment methods (24-hour recall, 3-day food record and 5-day food frequency questionnaire) for use in a national (USA) health study. It was found that agreement between observed and reported intakes from 3-day food records had the highest degree of accuracy of reporting and produced less bias. Stuff et al (1983) compared the use of a 7 day record with a 3 day record and showed that a 3 day record is adequate for evaluating the general quality of the diet and is a reasonable approach for getting qualitative nutrient data.

2.8. Procedure using the three day food diary

Following completion of the questionnaire, subjects were asked if they would like to continue being involved in this research project (Appendix 2). A convenience sample for the dietary survey was recruited from those who volunteered; 42 UK adults, aged 25-60years, 32 Cypriot adults, aged 25-60years, 25 UK adults over 60years and 25 Cypriot adults over 60years agreed to complete a dietary diary. It was considered that these numbers of individuals were sufficient to provide the required information concerning usage of kitchen domestic appliances and that it would be feasible to analyse the data collected within the period of time permitted.

Subjects who agreed to participate were given a dietary diary and asked to complete it during two week days and one weekend day because as other studies have shown energy intakes on a weekend are greater than during the week (Hackett et al, 1985, Post et al, 1987). Subjects were asked to write down everything that they ate and drank including any food left and also to comment on their activities and record any illness in that time. They were asked to eat as they would do if they were not keeping a food diary. Following the completion of the three day diary, subjects were interviewed in order to obtain details concerning portion sizes, recipes, cooking methods and to clarify any other information. According to Hackett et al (1983) the interview part of the dietary survey for the above reasons is considered to be very important. Portion sizes were estimated using a commercially available photographic food atlas (Nelson et al, 1997). Food photographs provide a useful and convenient aid in the estimation of food portion sizes (Robinson et al, 1997). The respondents were asked to choose from a series of photographs the portion size of a food that was recorded in their food diary. Nelson et al (1994) showed that using a series of photographs from small to large portions was more accurate than a single 'average' portion photograph. A visual analogue scale (VAS) was not used together with the food atlas in order to minimise the time of the interview that may be an inconvenience for the respondents. Weighing scales were not provided to the respondents. According to Bone (1992) weighing food can be very tedious for the respondent and may influence compliance with the study. Despite the known increases in

the reliability if the number of diaries are increased (Hackett et al, 1983) the probability of collecting more than one diary was low. Hence only one three day diary was completed for each respondent.

2.9. Validity and reproducibility of dietary assessment methods

Despite efforts to develop an accurate method and improve the existing ones to evaluate dietary intake "under-reporting of dietary intakes remains one of the principal hurdles in the disclosure of valid habitual estimates of food eaten" (Macdiarmid and Blundell, 1997) and has been referred to as the 'nutritionist's guilty secret' (Garrow, 1995).

"Validity is an expression of the degree to which a measurement is a true and accurate measure of what it purports to measure" (Nelson, 1998). The test dietary assessment method is compared with a method regarded as highly accurate. In the past the 7-day weighed intake was consider as the best method and FFQs were validated against this.

Under-reporting of energy consumed can be detected using techniques such as measurement of energy expenditure or biomarkers. The accurate measurement of energy expenditure can be used as a marker to assess the validity of energy intakes. Biomarkers (e.g. urinary nitrogen) can be used to detect the accuracy of records of protein intake. When these techniques cannot be used, the ratio of energy intake (EI) to BMR (EI:BMR) (Black et al, 1991, Goldberg et al, 1991, Black, 1996) is often used at the individual and the group level. BMR can be evaluated from standard equations, for example those by Schofield et al (1985) or those by Henry et al (1999).

Reproducibility is the ability of an instrument to give similar values for repeated measurements (Ferraroni et al, 2004). However, if the results are dissimilar on two occasions this could be due to changes in the eating habits of the individual (Fehily, 1983). The reproducibility of 3 day dietary diaries was assessed using 5 different volunteers who completed these diaries on two separate occasions one month apart with similar results being obtained from all subjects.

2.10. Procedure used for Focus Group Discussions

Focus groups were carried out in order to gather more information on ownership and use of domestic kitchen appliances than could be provided by the questionnaire. Focus Group discussions or interviews are research techniques used to gather data based on emotions, experiences and feelings (Denscombe, 1998). The focus group discussions aimed to determine the domestic kitchen appliances importance and usage, the reasons for usage and purchase and general thoughts and views about particular domestic appliances. All participants in the focus groups were familiar with the research topic as they had previously completed a questionnaire and a dietary diary.

In England and Cyprus, females (aged 25-55y) known to the researcher and her colleagues were contacted and divided into three groups according their self-reported cooking skills. It was thought that individuals with different abilities in the kitchen might have different opinions on the value of different domestic appliances. The first group (Excellent Cooks-EC group) consisted of individuals who have excellent cooking skills, they all had obtained academic and/or industrial qualifications in the area of cooking, the second group (Good Cooks-GC group) were individuals who can cook well and have good cooking skills and the third group (Poor Cooks-PC group) consisted of individuals who can cook only for themselves and have poor cooking skills (Appendices 6, 7). It was considered that each group would consist of three to five individuals due to the practical consideration of getting people together and also due to the fact that it is considered that no more that six voices can contribute to a discussion on one occasion (Denscombe, 1998).

In England female employees of the University were contacted and asked to participate. The focus group discussions were held at the University and each group consisted of three women. In the first group of excellent cooks each individual was given a code EC1, EC2 and EC3, in order that they could remain anonymous, similarly the second group of good cooks were coded GC1, GC2 and GC3, and the last group of poor cooks coded PC1, PC2 and PC3 (Appendix 6). In Cyprus, females known to the researcher were contacted and again divided into three groups according to their self-reported cooking

skills. Each focus group consisted of three women, the discussions were held at one of the volunteer's houses (Appendix 7). Individuals were similarly coded, in order to respect their anonymity as those in England. The first group of excellent Cypriot cooks were designated codes GEC1, GEC2 and GEC3, the second group of good Cypriot cooks GGC1, GGC2 and GGC3 and the last group of poor Cypriot cooks GPC1, GPC2 and GPC3 (Appendix 6).

Additionally, in Cyprus, ten female respondents over 60years of age were contacted and asked to participate in focus groups. It was considered that those over 60years in Cyprus were the most likely individuals to continue to use traditional methods of cooking and thus their opinions concerning domestic kitchen appliances could provide a valuable contribution to the investigation since they had been taught to cook without the assistance of any appliance. They were divided into two groups, each group consisted of five women (Appendix 8). The focus group discussions were carried out in the Adult Centre in Paphos (Appendix 8).

During each focus group discussion, individuals were asked to explain why they buy the small domestic kitchen appliances for food preparation, from where they heard about them, how they decide which model to buy, what they think about each of the appliances, why they are important or unimportant to them, if they look for the appearance when they buy appliances, if they look for the appliances to have extra features and where they site them in their kitchen. Permission to tape- record the conversations was requested and given by all respondents. These individuals were designated the codes F1- F5 (first focus group participants) and F6-F10 (second focus group participants) in order to respect their anonymity. U.K. respondents over 60years of age were not contacted for focus group discussion because of time constraints and also because these individuals tended not to be dissimilar in their responses from those in the younger age groups from the U.K. as elucidated by the questionnaire.

2.11. Analysis of the results

Statistical analysis of the data collected from the questionnaire and dietary intake records was conducted using the Statistical Package for Social Scientists (SPSS) for Windows v11. Frequency counts, percentage of responses and cross tabulations were calculated. The Chi-square test and Student's t-test were conducted to test for any significant differences between groups. Significant differences between the subgroups were accepted if $p<0.05$.

Ownership and usage are distinct entities. Usage requires ownership but ownership need not imply usage. Only usage was expected to be related to nutrient intake, thus only usage in respect to nutrient intake was investigated.

Comparisons between the two countries relating to socio-economic groups and age groups were not undertaken, due to the fact that the distribution of the sub groups was unequal. In Cyprus it was difficult to access individuals from the unskilled socio-economic group because this group is represented by a very small percentage of the Cypriot population (Department of Statistics and Research, Ministry of Finance, 2006). It was also difficult to recruit Cypriot subjects aged over 55y since following contact with various organisations, the adult recruitment method available, taking into account the time constraints of the study, was via the Government's researchers who were involved with the parents of primary school children very few of who were over 55y of age.

The diaries were analysed using the Microdiet™ (University of Salford) computer programme to determine nutrient intake for each subject. Microdiet is a nutrient analysis programme based on McCance and Widdowson's The Composition of Foods (Paul et al, 1992) and the supplements (Holland et al, 1988; 1989; 1991; 1992; 1992; Chan, 1992; Chan et al, 1995; 1996). The food tables have been extended to include a large variety of average recipes of cooked dishes commonly eaten in Britain (Dissulduff et al., 1968, Wiles et al., 1980). In Cyprus some foods consumed differ from those in England and thus the nutrient composition of various Cyprus and Greek recipes and dishes based on the Home Economics III - Tables of Food Composition (Neophytou, 2002) were added

to the Microdiet database. These tables of food composition are commonly used in this area.

The recorded information on the food and drink consumed was entered in the Microdiet mainly by the researcher but assistance was provided for the entry of some of the diaries. The resultant macronutrient intake analysis for each individual was entered into the SPSS database in order that they could be related to domestic appliance usage and were compared using the Student's t test.

The focus groups responses were transcribed and framework analysis used to interpret the data collected (Rabiee, 2004), by putting all the main points in themes according to the questions asked.

Chapter 3

The ownership of small kitchen domestic appliances by an adult English population and the effect of their usage in relation to nutrient intake

3.1. Introduction

There has been an increase in the ownership of domestic kitchen appliances over the past 10 years (Mintel, 2000b). Appliances such as microwave ovens and electric steamers have provided the means to alter traditional methods of cooking to provide a more nutritious diet. However the use of other domestic appliances, such as deep fat fryers, may have a detrimental effect on nutrition, providing a diet that contains a higher fat content. This study investigated the extent of kitchen appliance ownership and the effect of their usage on nutrient intake of a female British population.

3.2. Results.

The questionnaire, regarding the ownership and use of various domestic kitchen appliances, was completed by 261 female volunteers (a few respondents failed to answer all the questions). A three day dietary record was completed by 42 volunteers.

3.2.1. Questionnaire

3.2.1.1. Demographics of the respondents

The ages of the respondents ranged from 25-60y (25-34years: 74, 35-44years: 64, 45-54years: 76, 55-60years: 43, non-responders: 4), 24.7% were in professional, 45.2% in partly skilled and 30.1% in unskilled occupations (two respondents failed to answer the question). There were 157 respondents who were either married or living with a partner and 98 living on their own, 51 respondents failed to answer the question. 16.2% were single adult households without any children, 19.5% were single adult households with children, 42.9% of households were composed of a couple without any children and 21.4% of households were composed of a couple with children (Table 3.1). Children lived in 40.7% households; 11.8% of households had children under the age of 5y, 18% had children aged 6-11y, 18.4% had children 12-17y and 17.9% had children over 18y living with them.

Table 3.1. Demographics of the respondents

	Demographics of the respondents	
	No	**%**
Age		
25-34years	74	28.8
35-44years	64	24.9
45-54years	76	29.6
55-60years	43	16.7
Occupational Status		
Professional occupations	64	24.7
Partly skilled occupations	117	45.2
Unskilled occupations	78	30.1
Household Composition		
Single adult no children	34	16.2
Single adult + children	41	19.5
Couple no children	90	42.9
Couple + children	45	21.4

3.2.1.2. Ownership of small domestic kitchen appliances

Table 3.2. shows the ownership of the domestic kitchen appliances. The appliances included those that may have a positive and/or negative effect on diet and nutritional content (further information on the list of the appliances and how this was derived were discussed in Section 2). The majority of respondents owned an electric kettle (95.8%), a microwave oven (89.3%), a toaster (88.5%) and an electric grill (85.1%). Less than 10% owned a breadmaker (9.6%), less than 5% owned an ice-cream maker (4.6%) or a popcorn maker (4.2%).

Table 3.2. Ownership of domestic kitchen appliances

Appliance	Ownership (No)	Ownership (%)
Electric kettle	250	95.8
Microwave oven	233	89.3
Electric toaster	231	88.5
Electric grill	222	85.1
Coffee maker	148	56.7
Hand held electric food mixer	139	53.3
Sandwich maker	134	51.3
Blender	129	49.4
Food processor	122	46.7
Deep fat fryer	76	29.1
Juice maker	46	17.6
Electric steamer	44	16.9
Bread maker	25	9.6
Roaster	25	9.6
Rice cooker	16	6.1
Ice-cream maker	12	4.6
Popcorn maker	11	4.2
Soft drinks machine	6	2.3
Waffle maker	5	1.9
Electric food mixer	5	1.9
Electric crepe and pancake maker	1	.4

Those with a professional occupation were more likely to own a breadmaker (x^2=6.16,df=2, p=0.046), a coffee maker (x^2=22.63, df=2, p=0.000) or a hand held electric food mixer (x^2=15.78, df=2, p=0.000), those with unskilled occupations were more likely to own a deep fat fryer (x^2=6.33, df=2, p=0.042) or a roaster (x^2=7.69, df=2, p=0.021) and least likely to own a blender (x^2=10.30, df=2, p=0.006) or a food processor (x^2=14.77, df=2, p=0.001) (Table 3.3).

Table 3.3. Ownership of kitchen domestic appliances (%) with reference to occupational group.

Appliance	Total	Professional	Partly skilled	Unskilled	p
Electric toaster	88.8	92.2	89.7	84.6	.330
Microwave oven	89.2	90.6	89.7	87.2	.778
Sandwich maker	51.4	48.4	52.1	52.6	.864
Electric grill	85.3	84.4	87.2	83.3	.735
Deep fat fryer	29.0	25.0	23.9	39.7	.042*
Bread maker	9.7	17.2	8.5	5.1	.046*
Electric steamer	17.0	12.5	16.2	21.8	.327
Rice cooker	6.2	6.3	7.7	3.8	.550
Electric kettle	95.8	98.4	96.6	92.3	.165
Coffee maker	57.1	73.4	62.4	35.9	.000*
Food processor	47.1	59.4	52.1	29.5	.001*
Blender	49.8	56.3	56.4	34.6	.006*
Hand held electric food mixer	53.3	71.9	53.0	38.5	.000*
Electric food mixer	1.9	3.1	2.6	0	.322
Juice maker	17.8	21.9	20.5	10.3	.113
Ice cream maker	4.6	9.4	3.4	2.6	.111
Waffle maker	1.9	1.6	.9	3.8	.321
Roaster	9.7	3.1	8.5	16.7	.021*
Popcorn maker	4.2	4.7	2.6	6.4	.418
Electric crepe /pancake maker	.4	1.6	0	0	.217
Soft drink machine	2.3	3.1	.9	3.8	.351

* significant results (p<0.05)

The younger age groups were more likely than the older age groups to own most of the appliances investigated with the exception of the food processor, blender, hand held electric food mixer, coffee maker and juice maker which were more frequently owned by the older groups (Table 3.4), however this difference in ownership was significant only for handheld electric food mixers (x^2=16.98, df=3, p=0.001) and coffee makers (x^2=11.24, df=3, p=0.010). The ownership of coffee makers increased with age (Table 3.4).

Table 3.4. Ownership of kitchen domestic appliances (%) with reference to age group

	Age Groups				
Appliance	**25-34y (n=74)**	**35-44y (n=64)**	**45-54y (n=76)**	**55-60y (n=43)**	**p**
Electric toaster	89.2	92.2	84.2	90.7	.476
Microwave oven	86.5	95.3	89.5	83.7	.225
Sandwich maker	58.1	57.8	48.7	37.2	.108
Electric grill	90.5	81.3	82.9	86.0	.421
Deep fat fryer	29.7	28.1	30.3	27.9	.989
Bread maker	5.4	17.2	6.6	9.3	.082
Electric steamer	18.9	17.2	13.2	18.6	.785
Rice cooker	9.5	4.7	6.6	2.3	.437
Electric kettle	94.6	95.3	97.4	97.7	.761
Coffee maker	41.9	57.8	67.1	65.1	.010*
Food processor	35.1	48.4	55.3	51.2	.085
Blender	41.9	50.0	55.3	51.2	.427
Hand held electric food mixer	33.8	62.5	59.2	65.1	.001*
Electric food mixer	0	0	2.6	4.7	.142
Juice maker	13.5	15.6	18.4	25.6	.398
Ice cream maker	2.7	6.3	3.9	7.0	.658
Waffle maker	1.4	1.6	1.3	4.7	.574
Roaster	10.8	4.7	10.5	14.0	.411
Popcorn maker	1.4	9.4	1.3	7.0	.46
Electric crepe /pancake maker	0	0	1.3	0	.495
Soft drink machine	1.4	3.1	2.6	2.3	.915

* significant results (p<0.05)

In relation to the composition of the household, households comprised of couples with or without children were significantly more likely to own sandwich makers (x^2=12.58, df=3, p=0.006), bread-makers (x^2=8.7, df=3, p=0.034), food processors (x^2=10.7, df=3, p=0.013), hand held electric food mixers (x^2=12.9, df=3, p=0.005) and coffee makers (x^2=10.3, df=3, p=0.016) than single people with or without children (Table 3.5). A sandwich maker was owned by 40.2% of households with children, whereas a greater percentage (60.6%) of households without children owned one (x^2=8.6, df=3, p=0.003).

Table 3.5. Ownership of kitchen domestic appliances (%) with reference to household composition

	Household composition				
Appliance	**Single + children (n=41)**	**Single no children (n=34)**	**Couple no children (n=90)**	**Couple + children (n=45)**	**p**
Electric toaster	87.8	79.4	93.3	95.6	.610
Microwave oven	82.9	91.2	92.2	86.7	.403
Sandwich maker	36.6	47.1	65.6	42.2	.006*
Electric grill	87.8	85.3	83.3	84.4	.930
Deep fat fryer	22.0	26.5	38.9	26.7	.178
Bread maker	4.9	0	13.3	17.8	.034*
Electric steamer	14.6	11.8	18.9	20.0	.723
Rice cooker	2.4	2.9	8.9	8.9	.390
Electric kettle	95.1	97.1	96.7	100.0	.572
Coffee maker	53.7	35.3	62.2	68.9	.016*
Food processor	36.6	32.4	60.0	46.7	.013*
Blender	46.3	58.8	46.7	53.3	.598
Hand held electric food mixer	36.6	44.1	65.6	64.4	.005*
Electric food mixer	2.4	0	1.1	4.4	.461
Juice maker	12.2	14.7	15.6	24.4	.436
Ice cream maker	2.4	2.9	4.4	8.9	.485
Waffle maker	4.9	0	1.1	2.2	.403
Roaster	9.8	20.6	10.0	8.9	.334
Popcorn maker	0	5.9	5.6	6.7	.452
Electric crepe /pancake maker	0	0	1.1	0	.720
Soft drink machine	0	2.9	1.1	2.2	.703

* significant results ($p<0.05$)

The respondents were asked how important they considered their appliances to be. The only appliance that was considered by the majority of respondents to be extremely important was an electric kettle (71.6%). Although the majority of those that owned a microwave oven (64.1%), an electric toaster (62.3%), an electric grill (66.9%), an electric steamer (53.8%) and a rice cooker (61.6%) considered these appliances to be important (Table 3.6).

Table 3.6. The importance of each domestic kitchen appliance to the respondents

Appliance	Not at all Important No. (%)	Slightly Important No. (%)	Moderately Important No. (%)	Important No. (%)	Extremely Important No. (%)
Electric toaster	7 (3.3)	17 (7.9)	57 (26.5)	94 (43.7)	40 (18.6)
Microwave oven	5 (2.3)	14 (6.4)	38 (17.3)	77 (35.0)	86 (39.1)
Sandwich maker	30 (24.2)	47 (37.9)	35 (28.2)	9 (7.3)	3 (2.4)
Electric grill	17 (10.1)	13 (7.7)	26 (15.4)	61 (36.1)	52 (30.8)
Deep fat fryer	21 (33.9)	13 (21.0)	13 (21.0)	11 (17.7)	4 (6.5)
Bread maker	6 (25.0)	5 (20.8)	8 (33.3)	4 (16.7)	1 (4.2)
Electric steamer	4 (10.3)	6 (15.4)	8 (20.5)	10 (25.6)	11 (28.2)
Rice cooker	1 (7.7)	2 (15.4)	2 (15.4)	5 (38.5)	3 (23.1)
Electric kettle	4 (1.7)	5 (2.2)	8 (3.5)	48 (21.0)	164 (71.6)
Coffee maker	12 (9.2)	30 (22.9)	32 (24.4)	38 (29.0)	19 (14.5)
Food processor	8 (7.3)	19 (17.4)	40 (36.7)	33 (30.3)	9 (8.3)
Blender	9 (7,6)	26 (21.8)	48 (40.3)	28 (23.5)	8 (6.7)
Hand held electric food mixer	9 (7.6)	23 (19.3)	41 (34.5)	36 (30.3)	10 (8.4)
Juice maker	1 (2.9)	9 (25.7)	14 (40.0)	8 (22.9)	3 (8.6)
Ice cream maker	1 (9.1)	9 (81.8)	0	1 (9.1)	0
Waffle maker	2 (50.0)	1 (25.0)	0	1 (25.0)	0
Roaster	3 (15.8)	3 (15.8)	4 (21.0)	4 (21.1)	5 (26.3)
Popcorn maker	3 (42.9)	3 (42.9)	1 (14.3)	0	0
Electric crepe and pancake maker	1(100.0)	0	0	0	0
Soft drink machine (soda stream)	2 (100.0)	0	0	0	0
Electric food mixer	0	0	0	1 (100.0)	0

Significant differences were found between age groups and the stated importance of the coffee maker (x^2=28.87, df=12, p=0.004) and the presence of children in the household and the stated importance of the coffee maker (x^2=11.11, d=4, p=0.025) and the food processor (x^2=10.1, df=4, p=0.040). The older respondents considered the coffee maker

to be more important than the younger age groups. Those with children considered both appliances, the coffee maker and the food processor, to be more important than those without children. No group thought the soft drink machine (soda stream) or the electric crepe and pancake maker to be important.

3.2.1.3. Use of small domestic kitchen appliances

Similar numbers of respondents spent 1-2 hours (45.3%) or less than 1 hour cooking each day (46.5 %), the remainder (8.2%) spent more than 2 hours cooking each day. There was a significant association between the respondent's occupational group and the time spent on cooking each day (x^2=9.93, df=4, p=0.042). Those with unskilled occupations spent a longer time cooking each day. As age increased the amount of time spent cooking each day increased (x^2=18.3, df=6, p=0.006) (Table 3.7). Those who spent more than two hours cooking were significantly more likely to own an electric steamer (x^2=7.8, df= 2, p=0.020), a deep fat fryer (x^2=21.4, df= 2, p=0.000) and a rice cooker (x^2=28.7, df= 2, p=0.000). There was no significant association between the time spent on cooking each day and the ownership of any other domestic kitchen appliance (p>0.05).

Table 3.7. Time spent on cooking each day (%) with reference to age groups

Age groups	Less than 1 hour	1-2 hours	More than 2 hours
	No. (%)	No. (%)	No. (%)
25-34years	41 (56.2)	21 (28.8)	11 (15.1)
35-44years	28 (45.2)	31 (50.0)	3 (4.8)
45-54years	36 (48.0)	34 (45.3)	5 (6.7)
55-60years	13 (30.2)	28 (65.1)	2 (4.7)

Microwave cooking was the most frequently used form of cooking, 15.0% used the microwave more than once a day and 20.1% everyday. Boiling, simmering and grilling were cooking methods used by 14.5%, 14.8% and 16.7% respectively at least everyday. Deep fat frying, poaching, baking, steaming and stewing were cooking methods used by the majority of respondents infrequently, less than once a week (Table 3.8). No significant associations were found between age groups and the frequency of use of various methods of cooking. Significantly a higher proportion of those in the unskilled occupation category used stewing (67.2%) and baking (61.8%) less than once a week, than the proportion in the other groups (partly skilled: 56.7%, 50.9%; professional: 56.5%, 46.8%)(x^2=18.9, df=8, p=0.015, x^2=19.65, df=10, p=0.033). No significant association was found between occupational groups and the frequency of use of any other method of cooking (p>0.05).

Table 3.8. The frequency of use of each cooking method

Cooking method	More than once a day	Everyday	3-5 times a week	1-3 times a week	Less than once a week
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Steaming	0	7 (2.9)	25 (10.5)	45 (18.9)	160 (67.2)
Boiling	3 (1.2)	33 (13.3)	82 (32.9)	95 (38.2)	36 (14.5)
Baking	4 (1.7)	11 (4.6)	29 (12.1)	67 (27.9)	128 (53.3)
Deep-frying	4 (1.7)	7 (3.0)	12 (5.2)	18 (7.8)	179 (77.8)
Poaching	2 (.8)	4 (1.7)	9 (3.8)	46 (19.4)	176 (74.3)
Pan-frying	1 (.4)	7 (2.9)	29 (12.2)	88 (37.0)	112 (47.1)
Microwave	38 (15.0)	51 (20.1)	60 (23.6)	51 (20.1)	49 (19.3)
Simmering	5 (2.1)	30 (12.7)	62 (26.2)	94 (39.7)	46 (19.4)
Roasting	3 (1.2)	6 (2.4)	23 (9.2)	126 (50.2)	93 (37.1)
Stewing	3 (1.3)	3 (1.3)	12 (5.1)	76 (32.3)	141 (60.0)
Grilling	14 (5.4)	29 (11.3)	91 (35.4)	81 (31.5)	42 (16.3)

The frequency of use of the individual domestic appliances varied (Table 3.9). The majority of respondents used the electric toaster (71.6%), microwave oven (59.7%) or electric kettle (95.3%) at least once a day. The majority of those that owned a breadmaker (61.9%), an electric steamer (76.5%), rice cooker (72.8%), coffee maker (64.8%), blender (55.6%) or juice maker (60.7%) used them once a week or more,

whereas the majority that owned a sandwich maker (64.0%), deep fat fryer (51.8%), food processor (51.0%) and hand held electric food mixer (59.0%) used these appliances less than once a week and all other appliances were used infrequently. There were significant associations in the use of an electric toaster (x^2=16.12, df=8, p=0.041), a sandwich maker (x^2=21.3, df=8, p=0.006) and a coffee maker (x^2=18.5, df=8, p=0.018) between the occupation groups. The professional groups used those appliances less frequently than the other occupational groups. There was also a significant association in the use of a rice cooker (x^2=13.32, df=6, p=0.038), between the age groups. The youngest age group, 25-34 years, used this appliance more frequently than the other age groups. Significant associations were found in the use of the microwave oven (x^2=16.5, df= 4, p=0.002), the electric toaster (x^2=27.72, df=4, p=0.000), the sandwich maker (x^2=9.51, df=4, p=0.49) and presence of children in the household. Those with children used these appliances more often than those without children. No other significant differences between occupational groups, age groups or the presence of children in the household and the use of any other appliance were found.

Table 3.9. The frequency of use of each domestic kitchen appliance

Appliance	More than once a day	Once a day	3-4 times a week	Once a week	Less than once a week
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Electric toaster	56 (25.7)	100 (45.9)	42 (19.3)	13 (6.0)	7 (3.2)
Microwave oven	78 (37.0)	48 (22.7)	71 (33.6)	10 (4.7)	4 (1.9)
Sandwich maker	2 (1.8)	3 (2.6)	15 (13.2)	21 (18.4)	73 (64.0)
Electric grill	14 (9.4)	23 (15.4)	77 (51.7)	18 (12.1)	17 (11.4)
Deep fat fryer	2 (3.6)	1 (1.8)	14 (25.0)	10 (17.9)	29 (51.8)
Bread maker	0	2 (9.5)	5 (23.8)	6 (28.6)	8 (38.1)
Electric steamer	0	4 (11.8)	18 (52.9)	4 (11.8)	8 (23.5)
Rice cooker	0	0	4 (36.4)	4 (36.4)	3 (27.3)
Electric kettle	200 (93.0)	5 (2.3)	8 (3.7)	1 (0.5)	1 (0.5)
Coffee maker	18 (13.7)	19 (14.5)	27 (20.6)	21 (16.0)	46 (35.1)
Food processor	1 (1.0)	1 (1.0)	20 (20.0)	27 (27.0)	51 (51.0)
Blender	3 (2.6)	5 (4.3)	18 (15.7)	38 (33.0)	51 (44.3)
Hand held electric food mixer	1 (1.0)	2 (1.9)	15 (14.3)	25 (23.8)	62 (59.0)
Electric food mixer	0	0	1 (100.0)	0	0
Juice maker	0	3 (9.1)	12 (36.4)	5 (15.2)	13 (39.4)
Ice cream maker	0	0	0	0	11 (100.0)
Waffle maker	0	0	0	1 (33.3)	2 (66.7)
Roaster	2 (13.3)	0	6 (40.0)	5 (33.3)	2 (13.3)
Popcorn maker	0	0	0	3 (37.5)	5 (62.5)
Electric crepe / pancake maker	0	0	0	0	0
Soft drink machine	0	0	0	0	4 (100.0)

3.2.1.4. Purchase of small domestic kitchen appliances

The most important factors when purchasing a domestic kitchen appliance were considered to be cost (80.8%), durability (55.2%) and easy cleaning (49.0%). Significantly more of those aged 55-60years (79.1%) considered durability to be an important factor compared to the younger age groups (25-34y, 54.1%, 35-44y, 43.8%, 45-54y, 52.6%) (x^2=13.5, df= 3, p=0.004) and the majority of those in age group 45-54years (59.2%) considered easy cleaning to be an important factor compared to the other age groups 25-34y (47.3%), 35-44y (35.9%) and 55-60y (53.5%) (x^2=7.97, df= 3, p=0.047). Brand name was considered important by the majority of those aged 25-34y (52.7%) compared to only 32.8%, 36.8% and 32.6% of those aged 35-44y,

45-54y and 55-60y respectively, but this was not significant (x^2=7.67, df=3, p=0.53). There were no other differences between the age groups and the factors considered to be important when purchasing a domestic kitchen appliance.

A higher proportion of those in the partly skilled occupation category (65.0%) considered durability to be an important factor when purchasing a domestic kitchen appliance than the proportion of the other groups (professional; 50.0% unskilled 46.2%) (x^2=7.78, df=2, p=0.020).

The domestic appliances most recently purchased were an electric kettle (22.5%), an electric toaster (15.3%) and a microwave oven (13.9%). Only a toaster was considered to be a low cost item (48.3%). No significant associations were found between either occupation or age group in how respondents rated the cost of these domestic appliances.

3.2.2. Focus Groups

Transcripts of the focus group discussion can be found in Appendix 6.

The excellent cooks group (EC group) stated that they had purchased several appliances that they used frequently. They stated that they would not buy appliances such as an electric crepe and pancake maker, a soft drinks machine, a waffle maker, a popcorn maker and a roaster because "they did not think that those appliances are useful"(EC1). The excellent cooks group also considered that there was no need to own certain appliances, since they had the skills to achieve the same results using normal kitchen equipment. "I can make popcorn using a pan" (EC2). "There is no need to own a roaster or a grill because I can use my oven" (EC3)

The individuals from the other two groups, the good cooks and the poor cooks (GC and PC groups) indicated that they would buy all available small domestic kitchen appliances because they were affordable and "they wanted to have everything in their house" (GC2). However, they "would not buy a juice maker costing £200" (GC1). A large number of the appliances were bought for their novelty value or from curiosity and were used

infrequently. "I am like a little girl, I want to buy everything in order to play with it"(PC1). "I didn't really need some of the small appliances such as a popcorn maker when I bought them but I was curious and they were cheap, I put them away and forgot about them" (GC3) "These appliances are more like clothes, I don't wear them all the time, I take them out and put them away depending on the fashion and the different occasion" (GC1). The majority of the individuals in the GC and PC groups stated a desire to try new appliances in order that they could save time. "I want to try them to save time and for convenience as I work full time" (PC1).

Table 3.10. Opinions of focus group respondents concerning use of specific appliances

Appliance	Focus Group		
	Excellent cooking skills (EC)	**Good cooking skills (GC)**	**Poor cooking skills (PC)**
Microwave oven	"I use it only for defrosting and reheating, it takes up too much space"	"I cannot live without it"	I am like a little girl, I want to buy everything in order to play with the machines
Electric toaster	"It is very useful, especially for the children"	"I cannot live without it"	"I cannot live without it"
Electric kettle	"This is essential"	"I cannot live without it"	"It is essential"
Sandwich maker	"I use it to prepare snacks for family and friends	"It is difficult to clean"	"Not worth the effort of using it"
Food processor	"This is very important to me"	N/A	"It is expensive"
Hand held food mixer	"I use this a lot"	" It is essential"	N/A
Blender	"I use it a lot especially when the kids were young"	" It is useful to make soups"	N/A
Rice cooker	"I find it important and also use it for cooking vegetables"	N/A	N/A
Bread maker	"I don't need it, but my husband thinks it is important and makes bread in it" " I am considering buying one as the bread tastes better in it"	"I don't have one but want one"	"I would like one "

The stated use of the appliances varied between groups (Table 3.10). The excellent cooks (EC group) found the electric toaster a very useful, durable and an essential item in the kitchen especially for the children to use. The sandwich maker was considered to be a good appliance to own in order to prepare meals or snacks for family and friends. They

all owned an electric kettle and they said that it was an essential item in the kitchen. All excellent cooks, who found them very important and used them a lot, owned a food processor and a hand held electric food mixer. Only one owned an ice-cream maker and rarely used it. With regard to the microwave oven feelings differed two of them used the microwave only for defrosting and re-heating and said that it took up too much space. However, one said that she used it a lot and found it very important. Only one of them owned a breadmaker but did not think that she needed it because she could make bread in less time. However, her husband who did not have the skills to make bread liked it and it was important to him. One other stated that "because the bread tasted better from the bread maker she was considering buying one" (EC3). One of them owned a rice cooker and used it a lot (Chinese husband), she said that "it could also be used for cooking vegetables well, that it was easy to use and she found it a very important appliance" (EC2). One of them used a coffee maker all the time, but another did not own one and stated that it took up too much space. All of them owned a blender and had used it a lot especially when the children were young.

The opinions of the group with good cooking skills (GC group) and those with poor cooking skills (PC group) concerning the use of the individual appliances were similar. Everybody used the microwave oven to defrost/re-heat/cook and steam food and agreed with the statement made by one that "the microwave has become a feature like a television in the house" (PC1). All of them stated that they could not live without a microwave oven and one without a sandwich maker. These individuals stated that they used the small domestic kitchen appliances because they save time and one said she "could not live without an electric kettle, an electric toaster and a microwave oven"(PC2). One other said "this was the situation for her with regard to her microwave oven" (PC1) and another stated, "the kettle and hand held electric food mixer were essential to her" (GC1). A blender was considered very useful, for example to make soups. The individuals who owned a popcorn maker, a deep fat fryer and a sandwich maker agreed that it was difficult to clean them, time consuming and not worth the effort of using them. A breadmaker was the one appliance that those who did not own one wanted to purchase, mainly due to it's novelty value and their curiosity. They did not

consider the soda stream appliance important and would not replace it when it was broken. When they bought an appliance they looked for the price and only considered purchase if it was relatively cheap.

All the groups stated that the kitchen appliances that they used most often, such as the electric toaster, electric kettle, food processor, microwave oven and coffee maker were kept on the top of their kitchen work surfaces. However, the appliances that they did not use regularly were stored in cupboards. It was important for all that the appearance of the appliances on their work surfaces matched with other items in the kitchen.

There was a difference of opinion concerning brand loyalty both within and between groups. The excellent cooks (EC) group would purchase a well-known brand only if they were intending to use all the extra features of that appliance. For example, one of the participants stated that "because she only had limited use for a microwave, used it solely for re-heating and defrosting, she did not need the extra features found on some of the branded products that were also more expensive and would purchase a cheaper item" (EC2). Within the other two groups, the good cooks and poor cooks only one individual stated that "she would look for a brand name and would not buy a small or a big electric appliance that was not a well known name" (GC1). The others would purchase small electric appliances (e.g. toaster, kettle) that were not a well-known brand because they were low in price but for larger appliances they would always look for the brand name. The individuals from good cooking skills group and poor cooking skills group always looked for extra features when purchasing new appliances.

Information concerning different appliances was gained from television advertisements, friends or by searching hyper-markets. The poor cooks (PC) group indicated that if they wanted to buy any domestic kitchen appliance they would carry out prior research, for example one stated that "she would use the "Which" magazine but she would never search the Internet because the information on the Internet was provided by the manufacturers" (EC1). Another said that "if it was an expensive appliance she would look at "Which" magazine but if it was a low cost item (e.g. kettle £10, hand held electric

food mixer £40) she would not bother to investigate" (EC2). Those in the other two groups (GC and PC) stated that when they wanted to buy domestic kitchen appliances, they would search the Internet, read the reports to see what people think of the appliances and where they can get them. However some would do this only for the larger appliances. A variety of reasons were provided for the purchase of small kitchen domestic appliances; such as in order to save time, to add a different taste and texture to the food, for convenience, for health reasons or for Christmas presents.

3.2.3. Dietary Diaries

42 dietary diaries were collected and analysed and the mean macronutrient intake is shown in Tables 3.11,3.12.

Table 3.11. Macronutrient intake

Nutrient	N	Mean	Maximum	Minimum	95% CI
Energy (kcal)	42	1631	3103	876	1497,1765
Protein (g)	42	67.2	110	39	62.2,72.2
CHO (g)	42	197.1	357	108	179.3,214.8
Sugars (g)	42	73.6	180	15	61.0,86.2
Fibre (g)	42	14.1	28	3	12.3,15.8
Fat (g)	42	62.1	146	16	53.9,70.2

Table 3.12. Macronutrient intake as a percentage of energy intake

Nutrient	N	Mean	Maximum	Minimum	95% CI
Carbohydrate (%)	42	45.4	67.8	30.5	42.7,48.1
Sugars (%)	42	17.3	54.6	5.8	14.4,20.3
Protein (%)	42	16.9	24.0	11.5	15.8,18.0
Fat (%)	42	33.4	55.1	17.0	30.8,36.0
SFA (%)	42	10.6	19.0	3.5	9.5,11.7
MUFA (%)	42	10.3	19.1	4.7	9.2,11.4
PUFA (%)	42	5.4	13.4	1.1	4.7,6.2
Alcohol (%)	42	7.3	20.2	1.2	4.8,9.8

Comparison of macronutrient intake and usage of the various domestic kitchen appliances are shown in Table 3.13a,b. Usage was determined in two groups: frequent use (> three times a week) and infrequent use (< three times a week).

Table 3.13a. Macronutrient intake (% energy) compared with usage of small domestic kitchen appliance

Macronutrient Intake																
Appliance	**CHO**		**Sugars**		**Protein**		**Fat**		**SFA**		**MUFA**		**PUFA**		**Alcohol**	
Electric toaster %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No	35	4	33	3	35	4	35	4	33	3	33	3	33	3	35	4
Mean intake	44.8	50.1	16.5	23.6	17.2	15.0	33.9	28.6	10.7	8.5	10.5	9.5	5.5	5.3	3.7	5.8
Microwave oven %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	38	2	36	1	38	2	38	2	36	1	36	1	36	1	38	2
Mean intake	45.5	47.4	17.4	11.9	17.1	14.4	33.5	33.1	10.7	9.8	10.3	12.1	5.4	8.8	3.7	4.2
Sandwich maker %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	5	16	5	15	5	16	5	16	5	15	5	15	5	15	5	16
Mean intake	58.3	43.9	28.9	15.5	17.5	16.5	23.5	36.4	9.5	11.1	7.5	11.2	3.5	5.8	0.0	3.1
Electric grill %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	14	10	14	8	14	10	14	10	14	8	14	8	14	8	14	10
Mean intake	45.4	49.5	17.8	23.4	15.9	16.5	36.7	29.1	11.9	9.7	11.6	8.9	5.1	4.3	1.7	4.1
Deep fat fryer %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	2	9	2	8	2	9	2	9	2	8	2	8	2	8	2	9
Mean intake	43.7	43.3	15.8	17.4	15.3	18.6	40.9	31.2	14.5	10.9	11.8	10.3	5.6	5.6	0.0	7.1
Bread maker %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	2	2	2	1	2	2	2	2	2	1	2	1	2	1	2	2
Mean intake	46.7	53.5	20.7	30.3	16.7	16.3	34.9	25.6	9.2	8.3	9.6	8.5	4.7	3.4	1.5	4.5
Electric steamer %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	7	2	7	1	7	2	7	2	7	1	7	1	7	1	7	2
Mean intake	41.4	50.6	16.1	13.7	16.7	17.6	37.6	29.5	12.8	10.4	12.3	7.5	4.9	2.6	4.3	2.1
Rice cooker %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Mean intake	50.1	35.1	21.1	11.3	11.8	18.8	35.9	33.1	14.2	11.2	7.9	12.2	3.5	5.9	2.3	13.1

* F =frequent use: more than 3-4 times a week**IF= Infrequent use: once a week, less than once a week

Table 3.13b. Macronutrient intake (% energy) compared with usage of small domestic kitchen appliances

	Macronutrient Intake															
	CHO		**Sugars**		**Protein**		**Fat**		**SFA**		**MUFA**		**PUFA**		**Alcohol**	
Appliance																
Coffee maker %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Mean intake	47.6	42.5	17.6	14.4	18.5	18.2	32.3	33.8	10.4	10.2	9.6	10.6	5.2	5.7	1.4	5.3
Food processor %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	4	13	4	12	4	13	4	13	4	12	4	12	4	12	4	13
Mean intake	47.2	44.9	22.9	14.5	15.6	18.7	34.2	28.9	12.1	8.4	11.1	9.5	4.1	5.8	2.5	7.3
Blender %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	7	16	6	15	7	16	7	16	6	15	6	15	6	15	7	16
Mean intake	47.6	43.7	19.3	14.2	16.8	17.2	34.8	32.5	12.6	9.3	10.8	10.1	4.7	5.5	0.3	6.3
Hand held electric food mixer %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	4	20	4	19	4	20	4	20	4	19	4	19	4	19	4	20
Mean intake	46.8	44.1	20.7	15.1	16.5	17.5	32.7	33.3	10.6	10.1	8.7	10.2	3.7	6.1	3.3	4.8
Juice maker %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1	3
Mean intake	55.4	48.4	16.2	19.7	16.2	14.3	28.3	34.7	5.7	11.9	7.7	10.6	6.2	4.8	0.0	2.7

* F =frequent use: more than once a day, once a day, 3-4 times a week

**IF= Infrequent use: once a week, less than once a week

Data were not analysed for the ice cream maker, waffle maker, electric crepe and pancake maker, popcorn maker and the soft drinks machine, electric food mixer due to low numbers owning these items and electric kettle since almost everyone used one frequently.

Significant differences were found between the usage of sandwich maker and mean percentage carbohydrate intake (t=4.157,df 19, p=0.001), sugars (t=3.003, df 18, p=0.008) and total fat (t=-3.331,df 19, p=0.004), the usage of an electric grill and total fat (t=2.367, df 22, p=0.027), the usage of a bread maker and carbohydrate intake (t=-14.235, df 2, p=0.005) and the usage of a blender and saturated fat (t=2.166,df19, p=0.043) and alcohol intakes, (t=-2.474,df 21, p=0.022). Those who used the sandwich maker frequently had a higher intake of carbohydrate and sugars but lower intakes of total fat; used an electric grill frequently had a higher intake of total fat, used a breadmaker had a lower carbohydrate intake, and those who used a blender frequently had a higher intake of saturated fat but a lower intake of alcohol (Table 3.14).

Table 3.14. Macronutrient intake (% energy) compared with usage of small domestic kitchen appliances: significant results

Appliance		**Frequent use**	**Infrequent use**	Significant difference: p
Sandwich maker	%CHO	58.3	43.9	0.001
	%sugars	28.9	15.5	0.008
	%total fat	23.5	36.4	0.004
Electric grill	%total fat	36.7	29.1	0.027
Breadmaker	%CHO	46.7	53.5	0.005
Blender	%SFA	12.6	9.3	0.043
	%alcohol	0.3	6.3	0.022

3.3 Discussion

Ownership of small domestic kitchen appliances

Four appliances were owned by nearly all respondents: an electric kettle (95.8%), a microwave oven (89.3%), an electric toaster (88.5%) and an electric grill (85.1%). The use of two of these appliances in food preparation could have a positive effect on the nutritional content of the diet, the microwave oven, because of retention of water soluble vitamins during this cooking process (Burnett and Rees, 1991), and the electric grill

which could provide food containing less fat that fried food. The electric toaster which could have a negative, potential increase in fat or sugar content from spreads added to toast, or a positive, increase in carbohydrate content, effect on diet and nutritional content, was also owned by nearly all respondents. Those appliances owned by less than 10% of respondents were mainly those which could have a negative effect on the nutritional content of the diet by increasing the sugar and fat content, such as: an ice-cream maker (4.6%) and a popcorn maker (4.2%). However, a bread maker, that could have a positive effect by increasing the fibre and carbohydrate content of the diet, was also owned by less than 10% of respondents.

The overall ownership of most of the small domestic kitchen appliances was similar to that previously reported by Mintel (2000b, 2005a,b,c) (Table 3.15).

Table 3.15. Comparison of the ownership (%) of kitchen domestic appliances in this study with the Mintel surveys (2000b, 2005a,b,c)

Appliance	Ownership (%)		
	This study	Mintel (2000b)	Mintel (2005a,b,c)
Electric kettle	95.8	93	93
Microwave oven	89.3		84
Electric toaster	88.5	83	84
Electric grill	85.1	5	17
Handheld food mixer	53.3	46	51
Sandwich maker	51.3	48	55
Blender	49.4		40
Food processor	46.7		34
Deep fat fryer	29.1	32	28
Juice maker	17.6	11	21
Electric steamer	16.9	17	29
Bread maker	9.6	3	17
Ice cream maker	4.6		7
Popcorn maker	4.2		6
Waffle maker	1.9		3

The exception to this similarity was the electric grill, although Mintel (2005a) reported an increase of 12% in ownership between 2000 and 2004 to 17%, the findings of this study demonstrated an ownership of this appliance at least four times higher, 85.1% of respondents owned an electric grill. Mintel (2005a) attributed the expansion in ownership to the success of the George Foreman Lean Mean Fat Reducing Grilling Machine and the subsequent launch of similar products from other manufacturers. They also reported that the younger, professional and large households were the most likely groups to own this appliance. The sample in this study was not biased towards any of these groups and there is no reason to suggest that the electric grill should be more popular in the area of study, the North West, Mintel (2005a) detected the highest ownership in the North East, Yorkshire and Scotland. The most likely explanation for this finding which is contrary to that of Mintel (2000b) is that the respondents misunderstood the question and thought that the question referred to the grill that is an integral part of their cooker and not an electric grill that was a separate appliance. This misunderstanding was also apparent during the focus group discussions and the fact that only a third of all the focus group respondents owned an electric grill, tends to support an explanation of misunderstanding.

The ownership of bread makers in this study in comparison to the results of Mintel (2000b) was high (Table 3.15). The difference between the two studies may be due to this appliance being relatively new on the market at that time and demonstrated a rapid increase in ownership (Mintel, 2005a). This study was completed towards the end of the year and may reflect the rapid rise in ownership of this item together with the fact that it may have been bought as a Christmas present being a new appliance. Similar to the Mintel (2005a) findings, it was demonstrated that those with a professional occupation had the highest ownership of this appliance compared to the other occupational groups. This is a relatively new domestic appliance and similar to previous findings concerning steamers, professional groups tend to be the first owners (Mintel, 2005a). This may be because individuals with greater income or education levels have more access to nutrition information resulting in a better knowledge of nutrition and healthy eating (Variyam et al., 1998) and they may consider that a breadmaker has the potential to increase both the carbohydrate and fibre content of the diet as recommended by nutritionists (DoH, 1999).

However it is more likely that this difference in ownership between occupational groups is due to the fact that bread is widely available and cheaply purchased thus making it less likely that individuals on a low budget will purchase this type of appliance.

Microwave ovens were first on sale in the UK in 1959 (Microwave Cook, 1999). In 1980 home ownership was just 1% (Microwave Cook, 1999), however, by 1987 ownership levels had increased to 35% (Leatherhead Food RA, 1987), to 50.7% in 1990 (Burnett et al., 1991), to 76% in 1998 (Microwave Cook, 1999), and 84% in 2004 (Mintel, 2005c). This survey also indicates a very high ownership of this appliance (89.3%). This dramatic increase in the ownership of microwave ovens could be explained by the fact that, today people spend less time in the kitchen and have an increased interest in time saving cooking appliances, such as microwave ovens, based on the desire for convenience, time, labour and energy saving, simple and safe operation (Drew and Rhee; 1978, Burnett, 1990). The relative importance of owning a microwave oven was confirmed by the responses of the focus group participants, however there were differences found between the different groups.

The individuals from two of the focus groups, those with good and those with poor cooking skills, the GC and PC groups, used the microwave frequently and agreed with the statement made by one of them that "the microwave has become a feature like a television in the house", all of them used it to defrost/reheat/cook or steam food items and stated that they could not live without a microwave oven. However, there was a lack of consensus in the opinions of the EC group, two of them used the microwave only for defrosting and re-heating and said "that it took up too much space", whereas, the other said that "she used it a lot and found it very important". Another study has also shown that the major uses of the microwave oven is to re-heat leftover food, to defrost food (other than meat) and as a quick means of re-heating drinks such as tea (Mintel 2005c). This suggested that for the majority of consumers, microwaves were useful but not essential (Mintel, 2005c), as confirmed by this study, which demonstrated that only 39% of respondents considered a microwave extremely important.

A previous study (Caraher et al., 1999) has shown that higher income groups were more likely to own a variety of domestic kitchen appliances such as microwaves, steamers, food processors or liquidisers, however, the deep fat fryer was found to be the only appliance that was owned more frequently by lower income groups. Similar findings were found in this study, respondents with a professional occupation were more likely to own a breadmaker, a coffee maker or a hand held electric food mixer, whereas respondents with unskilled occupations were more likely to own a deep fat fryer or a roaster and least likely to own a blender or a food processor. Differences in the percentage ownership of specific appliances such as a handheld food mixer, blender or food processor between the different socio-economic groups may reflect the fact that the high socio-economic groups are more likely to cook food from basic ingredients at the weekend where ownership of these appliances enhances and supplement the traditional methods of cooking (Burnett and Rees, 1991). The differences in ownership may also reflect the fact that individuals with greater income or education levels have more access to nutrition information resulting in a better knowledge of nutrition and healthy eating and in a lower ownership of deep fat fryers which could lead to an increase in the fat content of food consumed providing a less nutritious diet (Variyam et al., 1998). However it was shown that those with an unskilled occupation were more likely (although not significant) to own an electric steamer, which could have a positive effect on nutrient intake, than those in professional occupations. These results may indicate that an interest in healthy eating is not only common in the professional occupation group with greater income or education levels but people in unskilled occupations also have begun to take the healthy eating messages seriously. The continued emphasis that the government is placing on consumption of fruit and vegetables may help to encourage vegetable intake and the awareness of the variety of cooking options such as steaming (Mintel, 2005a). Mintel (2005a), suggested that ownership of certain appliances such as an electric steamer was likely to continue increasing as health awareness grows and consumers continue to ask for tools that will help them to achieve optimal nutrition from their food. Alternatively, the higher ownership of the electric steamer by the unskilled occupational group could be a result of the wish to try out new equipment as indicated by those in the poor cooking skills focus group. The greater ownership of most of the

domestic appliances by those in professional occupations compared to the other groups supports the theory that ownership indicates to consumers their arrival at a higher social level with the accumulation of material possessions (Burnett, 1990).

The domestic kitchen appliances that were considered by a large number of respondents to be extremely important were an electric kettle and a microwave oven and to be important was an electric toaster. These appliances were also the ones that had been most recently purchased by the respondents and the ones with the highest ownership levels. The reasons for usage were convenience, quickness and to give a better result. The focus groups of participants with good cooking skills and poor cooking skills (GC and PC groups) stated that they used small domestic kitchen appliances because they saved time, some of them stated that they could not live without an electric kettle, an electric toaster and a microwave oven. However, the individuals who owned a popcorn maker, a deep fat fryer and a sandwich maker agreed that it was difficult to clean them, time consuming and not worth the effort of using them. This shows that respondents seem to prefer appliances that save them time and effort and are easy to clean and this is reflected in ownership.

The higher percentage of ownership found in the older groups compared with the younger groups with regard to food processors, hand held food mixers and blenders may reflect a lack of cooking skills in these younger individuals (Stitt, 1996). Lately, within in the national curriculum there has been a trend away from the teaching of cookery skills towards an emphasis on the technology of food production (Eiser et al, 1998). Many believe that if cookery skills are removed from the children's curriculum then the ability and the freedom of choice for them in later life to produce home-made healthy meals is diminished (Stitt et al, 1995, Stitt, 1996). It was also found that the amount of time spent cooking each day increased with age.

Previous studies have shown that younger groups were more likely to own sandwich makers and toasters; this was suggested to be due to the presence of children in the household who enjoyed snacks (Mintel 2000b). Although there was a greater tendency

for the younger age groups in this study to own sandwich makers, those without children were more likely to own this appliance than those with children. This may reflect the fact that this item is often given to young people when they leave home for the first time (Mintel, 2005a). Differences in ownership with regard to household composition between this study and that of Mintel (2005a) in respect to ownership of the deep fat fryer and sandwich maker (Table 3.16) may be due to a greater awareness of the population in this area, where the incidence of coronary heart disease is high (DoH, 1999), of the health implications of a high fat diet. The use of these appliances would predispose to an increase in the fat content of the diet of this group. A higher (although not significant) total fat and saturated fat intake were detected in those subjects who used a deep fat fryer frequently compared with those who used it infrequently. However, those that used the sandwich maker frequently had a lower fat intake than those who used it infrequently. The lower fat intake suggests that these subjects are not consuming cheese sandwiches as previously assumed or perhaps have exchanged a cheese sandwich made with bread, butter and cheese with a toasted one prepared without the use of butter thus reducing fat intake. Similarities were found with the findings of Mintel (2005a.b,c) with regard to ownership of all other appliances and the composition of the household (Table 3.16).

Table 3.16. The ownership of kitchen domestic appliances (%) with reference to household composition: A comparison of this study with that of Mintel (2005a,b,c)

	Household composition			
Appliance	This study children	Mintel Children	This study no children	Mintel no children
Electric toaster	91.7	87.3	86.4	83.0
Microwave oven	84.8	87.9	91.7	82.0
Sandwich maker	39.4	65.3	56.4	49.0
Electric grill*	86.1	24.5	84.3	14.0
Deep fat fryer	24.4	40.3	32.7	23.0
Bread maker	11.4	22.5	6.6	15.0
Electric steamer	17.3	32.0	15.4	27.0
Food processor	41.6	35.7	46.2	32.0
Blender	49.8	41.7	52.7	40.0
Hand held electric food mixer	50.5	56.0	54.8	48.0
Juice maker	18.3	16.3	15.2	20.0

* question probably misinterpreted

Time spent on cooking

Few respondents spent more than 2hours (8.2%) cooking each day which reflects the changing lifestyles of the population as a whole. Eating patterns and cooking techniques have undergone dramatic change over the past 50 years, for a number of reasons: an increasing number of single parent households, changing lifestyles, less formal eating and an escalating demand for leisure time activities (DEFRA, 2000; Office of National Statistics, 2002). This change in life styles was also indicated by comments made by participants of the focus groups who stated that they purchased appliances to "save time" as many worked full time, although a survey by Mintel (2005c), indicated that over half (54.2%) disagreed with the statement 'I don't have time to spend preparing and cooking food'. In this study there was significant association between the respondent's occupational group and the time spent on cooking each day. Those with unskilled occupations spent longer time on cooking each day. This group were more likely to stew

and bake than the other two occupational groups but were the least likely to own appliances such as food processors or blenders which would assist them in these tasks which may account for the greater time they spent cooking. Those who spent a greater amount of time cooking were older and had more appliances to assist them with the preparation of the food that may reflect the acquisition of cooking skills at school prior to a change in the National Curriculum (Stitt, 1996). Those who spent more than two hours cooking were significantly more likely to own an electric steamer (33.3%), a deep fat fryer (71.4%) and a rice cooker (33.3%). This suggests that these people had a more diverse cooking repertoire, which may reflect a greater range of skills or the need to meet a more diverse range of lifestyles.

The cooking methods used more frequently by a large number of respondents were microwaving, grilling and boiling. Those cooking methods are the ones that may have a positive effect on diet and nutritional content. This may indicate that these respondents were aware of the healthier cooking options. Previously it was found that older adults were more confident using steaming poaching and stewing/braising techniques than the microwave (Caraher et al., 1999). This study demonstrated no significant associations between age groups and the frequency of use of various methods of cooking, which indicates that cooking using a microwave has become an established technique in the kitchen, as demonstrated by the large ownership and use of this appliance. The cooking methods used have evolved with the technology available.

Use of small domestic kitchen appliances

The individual small domestic kitchen appliances used most frequently by a large number of respondents were the electric toaster, the microwave oven and the electric kettle. These appliances were those that were most frequently owned by the respondents (at least 88% of all respondents). This may infer that ownership reflects usage and thus the low ownership of appliances such as the deep fat fryer could indicate a trend towards healthier eating and the recommendations of the professionals being practised (DoH, 1999). The development of oven chips, which are healthier, more convenient and safer to prepare may also be reflected in the low usage of the deep fat fryer. However, the focus

group participants commented that they like to buy new appliances out of curiosity but may not use them. The appliances that were used frequently are also the ones that are easy to clean, which was one of the factors considered important by nearly half of the respondents when purchasing a small domestic kitchen appliance and thus this might be the reason for the high usage. The individual small domestic kitchen appliances, such as the sandwich maker, deep fat fryer, waffle maker and food processor, that were used infrequently by a large number of respondents are those which can be difficult to clean thus the main reason for ownership and usage is probably whether the use of the appliance saves time, as comments from the focus groups stated "that they want to buy them in order to save time and for convenience as they worked full time".

Mintel (2005a,b), also found that nearly a third of respondents admit that they have some table-top cooking and food preparation appliances such as: toaster, sandwich maker, steamer, deep fat fryer, electric grill, breadmaker, ice-cream maker, popcorn maker, waffle maker kettles, food processor, hand held blender/mixer, blender/mixer, juicer, coffee makers, that they rarely use. It was also important for all the focus group respondents that the appearance of the appliances on show matched other items in the kitchen. In the Mintel (2005a,b), survey some 14% of respondents bought an appliance to match their kitchen décor.

Purchase of small domestic kitchen appliances

The most important factors when purchasing a domestic kitchen appliance were considered to be cost, durability and easy cleaning. In a previous study (Mintel 2000b) the most important factor was easy cleaning (62%) with few indicating, cost or durability as important. This difference between the two studies may be due to the present economic climate and the fact that this study was conducted only in the North West of England. Mintel (2005a) found a difference in responses between respondents from the South and North West of England, 53% of those in the South considered brand name to be an important consideration when purchasing a domestic appliance whereas only 30% of these in the North West shared this opinion. Few questionnaire respondents considered appearance as an important factor however during the focus group interviews it was

found that it was "important for all appliances on show in their kitchens to match the décor". The Mintel survey (2005a,b) also found that only 14% of respondents stated that they bought an appliance to match their kitchen décor. It is recognised that focus groups are a useful way of exploring attitudes and can produce information that might not be produced from other conventional research techniques such as interviews and questionnaires (Denscombe, 1998) and this could account for the differences between the findings from the focus group and questionnaires. The use of a combination of research tools, such as questionnaires and focus groups enables a more complete understanding to be gained (Denscombe, 1998).

Although cost was found to be the most important factor to consider when purchasing a domestic appliance, the questionnaire respondents only considered an electric toaster to be a low cost item although a sandwich maker and an electric kettle can be purchased at a similar price (Table 3.17.). This is possibly because it was an appliance that the majority owned and used regularly and intensively, so it may need replacing relatively often and for that reason the respondents were aware of the price. If they had not considered it to be a cheap item they would have resorted to a more robust method; using the cooker grill. According to Mintel (2005b), replacement purchasing is a key reason for the purchase of small domestic kitchen appliances. There tends to be a "throw-away" culture in society and such cheap, small domestic kitchen appliances tend to be replaced rather than repaired, as in most cases this is the cheapest option (Mintel, 2005b).

Table 3.17. Price List of Domestic Kitchen Appliances

Appliance	Maximum Price	Minimum Price
Electric Kettle	£59.99	£5.48
Electric Toaster	£54.99	£5.75
Microwave Oven	£229.95	£39.95
Sandwich Maker	£49.99	£5.75
Electric Grill	£ 69.99	£39.50
Deep Fat Fryer	£99.99	£19.95
Bread Maker	£99.50	£29.99
Rice cooker	£34.99	£17.99
Food Processor	£147.00	£24.99
Blender	£64.99	£4.99
Hand held electric food mixer	£14.99	£5.75
Food Mixer	£199.99	£24.99
Juice Maker	£99.99	£17.99
Coffee Maker	£129.99	£7.99
Ice Cream Maker	£39.99	£14.99

Argos catalogue, November 2004

Nutrient Intake

The results of this study compared with the National Diet and Nutrition Survey (NDNS) and with the Dietary Reference Values (DRV) indicated that the mean energy intake was very low. Errors in dietary assessment methods can come from food tables used to estimate nutrient intakes, incorrect portion sizes or errors attributed to the actual subjects in the study. In this study food photographs (Nelson et al, 1997) were used to estimate portion sizes, these have been used successfully in other studies (Nelson et al, 1996; Robinson et al, 1997; Frobisher and Maxwell, 2003). Although energy intakes have been decreasing over the past 50years (Bull, 1988), the most likely cause of the low energy intakes in this study were errors attributable to the subjects themselves. Macdiarmid and Blundell (1998) categorised three main forms of under-reporting behaviour which lead to biased nutrient intake; intentional under-reporting (food being eaten but deliberately not reported), intentional alteration of diet (food consumption being reduced or certain foods avoided) and unintentional under-reporting (food being eaten but genuinely forgotten); a

combination of these factors probably led to the low energy intakes reported. Under-reporting of food intake is one of the fundamental obstacles preventing the collection of accurate habitual dietary intake data (Macdiarmid and Blundell, 1998). The prevalence of under-reporting in large nutritional surveys ranges from 18 to 54% of the whole sample, but can be as high as 70% in particular subgroups. This wide variation between studies is partly due to different criteria used to identify under-reporters and also to non-uniformity of under-reporting across populations (Macdiarmid and Blundell, 1998). Women are more likely to under-report than men because as Macdiarmid and Blundell (1998) suggested, women are more concerned with their body weight, image and food than men, thus this could effect the dietary records from women who wish to report a favourable image. Schoeller (1990) suggested that women are more likely to report an intake which they believe to be socially acceptable. The subjects in this study were all women and since this is the group that commonly under-report dietary intake it can be assumed that the energy intake reported by these individuals was under-reported.

The macronutrient contribution to energy intakes was similar to that reported by the NDNS (Gregory et al, 2000) (Table 3.18.). The mean carbohydrate (45%) intake as a percentage of energy was slightly below the dietary reference value (DoH, 1994).

Table 3.18. Average daily intakes from macronutrients (% energy) of this study compared with the National Diet and Nutrition Survey (NDNS) and with the Dietary Reference Values (DRV)

Nutrient	This study	DRV	NDNS
Carbohydrate (%)	45.4	95% DRV	49.1
Sugars (%)	17.3		11.9
Protein (%)	16.9		15.4
Fat (%)	33.4	101% DRV	35.5
SFA (%)	10.6	99% DRV	12.9
MUFA (%)	10.3	79% DRV	12.2
PUFA (%)	5.4	83% DRV	5.6
Alcohol (%)	7.3	183% DRV	4.6

Usage was determined in two groups those with frequent use (greater than three times a week) and those who used the appliances infrequently (less than three times a week). The comparison of macronutrient intake and usage of various domestic kitchen appliances found significant differences between the usage of sandwich maker and mean percentage carbohydrate intake, sugar and total fat. Those who used the sandwich maker frequently had a higher intake of carbohydrate and sugar but lower intakes of total fat. It was previously considered that a sandwich maker would have a negative effect on nutrient intake. The significantly higher intake of carbohydrate is consistent with the production of sandwiches however the lower fat intake indicates that these subjects are not consuming cheese sandwiches as previously assumed or perhaps have exchanged a cheese sandwich made with bread, butter and cheese with a toasted one prepared without the use of butter thus reducing fat intake. Alternatively this lower intake of fat could be the result of under-reporting (Macdiarmid and Blundell, 1998). Comments from the focus group indicated that the respondents agreed that it was difficult to clean the sandwich maker and perhaps during the survey period the respondents avoided using the sandwich maker as it would involve an added task.

It was assumed that the use of an electric grill would reduce the intake of fat, this is also the claim of the manufacturers of these appliances (Mintel, 2005a). In this study those respondents who used an electric grill frequently had a significantly higher intake of total fat. This finding is probably the result of the possible misunderstanding of the term "electric grill" as was commented on in the consideration of the reported high ownership of this appliance.

Contrary to expectations, although only four subjects used a breadmaker, those who used a breadmaker frequently had a lower carbohydrate intake. It was considered that the bread maker has the potential to increase the fibre and carbohydrate content of the diet as recommended by the Committee on Medical Aspects of Food Policy (DoH, 1991). However, the usage of a bread maker may not alter the dietary intake of an individual. Although one of the focus group respondents stated that "the bread tasted better from a bread maker and she was considering buying one" she did not indicate that this would

increase her consumption of bread. One of the excellent cooks (EC group) owned a breadmaker but "did not think that she needed it because she could make bread in less time. However, her husband who did not have the skills to make bread liked it and it was important to him". In the two other focus groups (GC and PC groups) a breadmaker was one appliance that those who did not own one wanted to purchase but mainly due to it's novelty value and their curiosity not any desire to consume more bread.

Significant differences were found between the usage of a blender and saturated fat intake. Those who used a blender frequently had a higher intake of saturated fat. Appliances such as blenders may have either positive or negative effects, however, in this study they appeared to have a negative effect, a higher intake of saturated fat possibly because this appliance was used to produce high fat and sugar products such as desserts although there was no difference in sugar intake between high frequency usage and infrequent usage. In this study individuals from the focus groups considered "the blender a very useful appliance, for example to make soups". This however would not account for the increased saturated fat intake. There was also no difference between the frequency of usage and occupational group, age group of presence of children in the household to account for differences in saturated fat intake.

Overall the ownership of small kitchen domestic appliances was found to be similar to that reported by Mintel (2000b). Those appliances that were owned by the greatest number of individuals had the potential to have a positive effect on nutrient. It was noted from both the questionnaire and the focus groups that several appliances although owned by a substantial number of individuals were used infrequently. However, the frequency of use of these appliances also did not appear to affect the nutrient intake of individuals to any great extent. For these individuals small kitchen appliances were not found to effect nutrient intake, however for the majority of these respondents domestic appliances have always been available and many of them will have learnt to cook using appliances (Lang and Caraher, 1999). There are however other groups, such as the elderly or those in other countries, for whom these appliances may be a recent addition to their kitchens whose nutrient intake may be effected which is addressed in the further studies.

The development of kitchen appliances may help generate an interest in food preparation and a greater willingness to use "raw ingredients". There was no obvious sign of a major impact on nutrient intake. This may in part be due to the influence of the large amount of food now eaten outside the home. Convenience appears to be the major consideration and appliances need to be easy to clean to be used frequently. Kitchen technology will continue to evolve and a longitudinal study tracking the introduction of new technology into households may give a better picture of its influence on eating habits. Perhaps the most important thing is that technology can generate interest in food preparation and hence consumption.

Chapter 4

The ownership of small kitchen domestic appliances by an adult Greek-Cypriot population and the effect of their usage in relation to nutrient intake

4.1. Introduction

Mediterranean countries such as Cyprus traditionally had a low incidence of nutritionally related diseases (Berrino and Muti, 1989). This was related to the food items consumed and the methods used for cooking, which were heavily dependant on the use of olive oil and often used wood fired ovens (Ferro-Luzzi and Sette, 1989). However in the past few years the incidence of coronary heart disease has been increasing to become a major concern of the government (Markidou, 1995, Cyprus Ministry of Health, 1995, Tornarides, 1998). Concomitant with the increase in CHD is the increase in tourism, which has resulted in an increase in affluence for some providing the means to purchase kitchen appliances, which are now readily available in the shops (The World Guide, 1998). However there are still many families in this country with few domestic kitchen appliances, who use traditional methods for cooking. This study aimed to investigate the extent of kitchen appliance ownership and its effect on nutrient intake of a female adult Cypriot population.

4.2. Results

The questionnaire regarding the ownership and use of various domestic kitchen appliances was completed by 300 female volunteers (a few respondents failed to answer all questions) and a three day dietary record by 32 volunteers.

4.2.1. Questionnaire

4.2.1.1. Demographics of the respondents

The ages of the respondents ranged from 25-60y (25-34years: 104, 35-44years: 173, 45-54years: 17, 55-60years: 1, non-respondents: 5), 31.4% were in a professional, 50.7% in a partly skilled and 17.9% in an unskilled occupation (four individuals failed to answer the question). 24 were single, 254 were married, 7 were divorced and 2 were widowed (3 non-respondents). All respondents who answered the question had children living with them, 24.1% had children under the age of 5y, 80.6% had children aged 6-11y, 69.8% had children 12-17y and 19.7% had children over 18y living with them (Table 4.1).

Table 4.1. Demographics of the respondents

	Demographics of the respondents	
	No	**Valid %**
Age		
25-34years	104	35.3
35-44years	173	58.6
45-54years	17	5.8
55-60years	1	0.3
Occupational Status		
Professional occupations	93	31.4
Partly skilled occupations	150	50.7
Unskilled occupations	53	17.9
Household Composition		
Single adult + children	33	11.5
Couple + children	254	88.5

4.2.1.2. Ownership of small domestic kitchen appliances

Table 4.2. shows the ownership of the domestic kitchen appliances. Information concerning why these appliances were selected was discussed in Section 2. Over 75% of the respondents owned an electric toaster (83.9%), a sandwich maker (79.3%), a juice maker (78.7%) and an electric kettle (78.3%). Less than 10% owned an electric crepe/pancake maker (9.0%) and very few owned an ice-cream maker (1.7%) or a bread maker (1.3%).

Table 4.2. Ownership of small domestic kitchen appliances

Appliance	Ownership (No)	Ownership (%)
Electric toaster	251	83.9
Sandwich maker	238	79.3
Juice maker	236	78.7
Electric kettle	235	78.3
Electric grill	184	61.3
Microwave oven	172	57.3
Blender	171	57.0
Food processor	156	52.0
Electric steamer	119	39.7
Electric food mixer	110	36.7
Coffee maker	105	35.0
Deep fat fryer	71	23.7
Electric crepe and pancake maker	27	9.0
Ice-cream maker	5	1.7
Bread maker	4	1.3
Popcorn maker	1	0.3
Waffle maker	1	0.3

Those with a professional occupation were significantly most likely to own a coffee maker (x^2=20.1, df=2, p=0.000), a blender (x^2=17.1, df=2, p=0.000), an electric food mixer (x^2=6.5, df=2, p=0.038) and an electric crepe/pancake maker (x^2=10.7, df=2, p=0.005). Those with unskilled occupations were least likely to own an electric grill (x^2=18.1, df=2, p=0.000). There was a tendency for professionals to be least likely to own a sandwich maker (72% compared to 82.7% and 83.0% for the other two groups) however this association was not significant (Table 4.3).

Table 4.3. Ownership of small domestic kitchen appliances with reference to occupational group (%)

Appliance	Total	Professional	Partly skilled	Unskilled	p
Electric toaster	84.7	90.3	82.7	80.0	.185
Microwave oven	57.4	61.3	55.3	56.6	.653
Sandwich maker	79.4	72.0	82.7	83.0	.107
Electric grill	61.5	68.8	66.0	35.8	.000*
Deep fat fryer	24.1	26.9	24.0	19.2	.586
Bread maker	1.4	3.2	0	1.9	.099
Electric steamer	39.9	39.8	41.3	35.8	.782
Electric kettle	78.7	86.0	76.0	73.6	.108
Coffee maker	34.8	51.6	30.7	17.0	.000*
Food processor	52.0	57.0	50.0	49.1	.509
Blender	57.8	71.0	57.3	35.8	.000*
Electric food mixer	36.8	47.3	32.7	30.2	.038*
Juice maker	79.1	84.9	77.3	73.6	.204
Ice-cream maker	1.7	3.2	0.7	1.9	.320
Waffle maker	0.3	1.1	0	0	.335
Popcorn maker	0.3	1.1	0	0	.335
Electric crepe/pancake maker	9.1	17.2	5.3	5.7	.005*

*** significant results (p<0.05)**

There were no significant associations between age groups and ownership of any of the domestic appliances, however the youngest age group was found to be most likely to own a sandwich maker, electric grill, blender and juice maker, whereas those aged greater than 45 years were more likely to own an electric toaster, electric steamer and electric food mixer (Table 4.4).

Table 4.4. Ownership of small domestic kitchen appliances (%) with reference to age group

	Age Groups			
Appliance	**25-34y (n=104)**	**35-44y (n=173)**	**45+y (n=18)**	**p**
Electric toaster	83.7	83.7	94.4	.477
Microwave oven	53.8	60.7	38.8	.150
Sandwich maker	82.7	78.0	83.3	.602
Electric grill	62.5	62.4	44.4	.315
Deep fat fryer	21.2	25.6	22.2	.695
Bread maker	1.0	1.7	0	N/A
Electric steamer	38.5	40.5	44.4	.875
Electric kettle	78.8	78.6	77.8	.768
Coffee maker	32.7	35.8	38.9	.812
Food processor	51.0	54.3	44.4	.670
Blender	61.5	54.9	55.6	.552
Electric food mixer	38.5	34.7	44.4	.635
Juice maker	81.7	77.5	77.8	.694
Ice-cream maker	0	2.9	0	N/A
Waffle maker	0	0.6	0	N/A
Popcorn maker	0	0.6	0	N/A
Electric crepe/pancake maker	9.6	8.1	11.1	.855

Households comprised of adult couples were more likely to own most of the small domestic kitchen appliances than single adults, however this was only significant in the case of the electric steamer, 12.1% of single adults owned an electric steamer, whereas a greater percentage, 43.7%, of couples owned one (x^2=12.2, df=1, p=0.000) (Table 4.5).

Table 4.5. Ownership of small domestic kitchen appliances with reference to household composition (%)

	Household composition		
Appliance	**Single + children (n=33)**	**Couple + children (n=254)**	**p**
Electric toaster	84.8	84.6	.969
Microwave oven	51.5	58.7	.434
Sandwich maker	75.8	81.1	.466
Electric grill	60.6	62.2	.859
Deep fat fryer	15.2	25.7	.185
Bread maker	0	1.6	.468
Electric steamer	12.1	43.7	.000*
Electric kettle	72.7	79.5	.369
Coffee maker	24.2	37.0	.149
Food processor	60.6	51.6	.328
Blender	51.5	59.1	.409
Electric food mixer	24.2	38.2	.118
Juice maker	78.8	79.1	.963
Ice cream maker	0	2.0	.416
Waffle maker	0	.4	.718
Popcorn maker	0	.4	.718
Electric crepe /pancake maker	3.0	10.2	.182

* significant results (p<0.05)

The appliances considered by a large number of respondents to be extremely important were an electric kettle (32.0%), an electric grill (30.4%) and a juice maker (30.1%). The microwave oven, deep fat fryer, coffee maker, ice cream maker and electric crepe /pancake maker were considered to be of little importance by 29.1%, 51.9%, 48.3, 66.7 and 58.3% of respondents respectively (Table 4.6).

Table 4.6. The importance of each domestic kitchen appliance to the respondents

Appliance	Not at all Important No. (%)	Slightly Important No. (%)	Moderately Important No. (%)	Important No. (%)	Extremely Important No. (%)
Electric toaster	5(2.2)	38(16.4)	68(29.3)	84(36.2)	37(15.9)
Microwave oven	12(7.6)	34(21.5)	40(25.3)	43(27.2)	29(18.4)
Sandwich maker	5(2.3)	31(14.6)	72(33.8)	73(34.3)	32(15.0)
Electric grill	4(2.5)	16(9.9)	30(18.6)	62(38.5)	49(30.4)
Deep fat fryer	13(25.0)	14(26.9)	8(15.4)	10(19.2)	7(13.5)
Bread maker	2(50.0)	0	0	1(25.0)	1(25.0)
Electric steamer	2(1.9)	12(11.3)	19(17.9)	40(37.7)	33(31.1)
Electric kettle	4(1.9)	16(7.8)	45(21.8)	75(36.4)	66(32.0)
Coffee maker	6(6.7)	37(41.6)	18(20.2)	19(21.3)	9(10.1)
Food processor	6(4.5)	19(14.4)	24(18.2)	58(43.9)	25(18.9)
Blender	6(4.3)	33(23.6)	40(28.6)	39(27.9)	22(15.7)
Electric food mixer	4(4.1)	16(16.5)	30(30.9)	26(26.8)	21(21.6)
Juice maker	6(3.1)	22(11.2)	47(24.0)	62(31.6)	59(30.1)
Ice-cream maker	3(50.0)	1(16.7)	0	1(6.7)	0
Waffle maker	0	0	1(100.0)	0	0
Electric crepe/pancake maker	5(20.8)	9(37.5)	6(25.0)	3(12.5)	1(4.2)
Popcorn maker	0	0	0	0	0

4.2.1.3. Use of small domestic kitchen appliances

Most of the respondents (55.5%) spent more than 2 hours cooking each day, 36.1% spent 1-2 hours and the remainder (8.4%) spent less than 1 hour cooking each day. There was a significant association between the respondents' occupational groups and the time spent on cooking each day (x^2=15.2, df=4, p=0.004); those in partly skilled occupations spent the most time on cooking. There was no significant association between the respondents' age groups and the time spent on cooking each day. Those that spent more than two

hours on cooking were significantly more likely to own a sandwich maker (84.9%) (x^2=10.4, df=2, p=0.006) and those that spent less than one hour on cooking each day were most likely to own an electric food mixer (47.8%) (x^2=6.3, df= 2, p=0.043), an ice-cream maker (8.7%) (x^2=7.9, df= 2, p=0.019), an electric crepe/pancake maker (13.0%) (x^2=7.6, df= 2, p=0.022) and a waffle maker (4.3%) (x^2=10.9, df= 2, p=0.004). There was no significant difference between the time spent on cooking each day and the ownership of any other domestic kitchen appliance.

The most frequently used method of cooking was frying, 71.6% of the respondents fried at least 3-5 times a week. A traditional oven was used by 52.8% and barbecuing by 58% 1-3 times a week, however a large number of respondents (76% and 60% respectively) did not answer this question (Table 4.7). No significant associations were found between age groups and the frequency of use of various methods of cooking. A significantly higher proportion of those in the unskilled occupation category used the traditional oven (85.7%) 1-3 times a week than the proportion in the other groups (partly skilled 37.0%, professional 53.3%)(x^2=8.7, df=2, p=0.012).

Table 4.7. The frequency of use of each cooking method

Cooking method	More than once a day	Everyday	3-5 times a week	1-3 times a week	Less than Once a Week
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Steaming	0	5(3.6)	6(4.4)	107(78.1)	11(8.0)
Boiling	3(1.2)	4(1.6)	20(8.2)	204(83.6)	13(5.3)
Baking	1(.4)	1(.4)	10(3.8)	241(90.9)	12(4.5)
Frying	0	4(1.8)	157(69.8)	41(18.2)	19(8.4)
Stewing	1(.4)	5(2.0)	43(17.2)	189(75.6)	11(4.4)
Grilling	2(.8)	2(.8)	19(7.8)	209(86.0)	9(3.7)
Barbecue	0	0	0	69(58.0)	50(42.0)
Traditional oven	0	0	0	38(52.8)	34(47.2)

The frequency of use of the individual domestic appliances varied (Table 4.8). The majority of respondents used the electric kettle (69.5%) and the electric toaster (50.6%) at least once a day. The microwave oven and the juice maker were used at least 3-4 times a week by the majority of respondents (74.2% and 51.9% respectively). The majority of those that owned an electric grill (79.4%), an electric steamer (68.6%), a sandwich maker (57.0%), a blender (50.4%) and an electric food mixer (50.7%) used them once a week or more. All other appliances were used infrequently. There were no significant differences between the occupation group or the age group and the frequency of use of individual domestic appliances.

Table 4.8. The frequency of use of each domestic kitchen appliance

Appliance	More than once a day	Once a day	3-4 times a week	Once a week	Less than once a week
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Electric toaster	31 (13.4)	86 (37.2)	59 (25.5)	38 (16.5)	16 (6.9)
Microwave oven	50 (33.1)	24 (15.9)	38 (25.2)	18 (11.9)	18 (11.9)
Sandwich maker	14(6.7)	44 (21.1)	71 (34.0)	48 (23.0)	31 (14.8)
Electric grill	11 (7.3)	8 (5.3)	64 (42.7)	55 (36.7)	11 (7.3)
Deep fat fryer	1 (2.5)	4 (10.0)	8 (20.0)	11 (27.5)	13 (32.5)
Bread maker	0	0	0	0	1 (0.3)
Electric steamer	7(6.9)	13 (12.7)	41 (40.2)	29 (28.4)	12 (11.8)
Electric kettle	105(52.5)	34(17.0)	32(16.0)	16(8.0)	12(6.0)
Coffee maker	14(16.1)	19(21.8)	16(8.4)	7(8.0)	30(34.5)
Food processor	4(3.4)	3(2.5)	27 (22.9)	31 (26.3)	51 (43.2)
Blender	8 (6.5)	7 (5.7)	23 (18.7)	24 (19.5)	61 (49.6)
Electric food mixer	0	4(5.5)	11 (15.1)	22 (30.1)	36 (49.3)
Juice maker	10 (5.5)	24 (13.3)	60 (33.1)	33 (18.2)	54 (29.8)
Ice-cream maker	0	0	0	0	1 (50.0)
Waffle maker	0	0	0	0	1 (100.0)
Popcorn maker	0	0	0	0	0
Electric crepe/pancake maker	0	0	1 (6.7)	2 (13.3)	12 (80.0)

4.2.1.4. Purchase of small domestic kitchen appliances

The most important factors when purchasing a domestic kitchen appliance were considered to be durability (46.8%), brand name (43.7%), easy cleaning (39.7%) and cost

(39.5%). There was no significant difference between the respondent's age and the factors that influenced their purchase. A significantly higher proportion of those in the professional occupation category (61.3%) considered a well known brand name to be an important factor when purchasing a domestic kitchen appliance than the proportions in the other groups (partly skilled; 36.0%, unskilled; 35.8%) (x^2=16.6, df=2, p=0.000). Also a significantly higher proportion of those in the unskilled occupation category (20.8%) considered easy storage to be an important factor when purchasing a domestic kitchen appliance than the proportions in the other groups (professional; 16.1%, partly skilled; 8.0%) (x^2=7.1, df=2, p=0.030).

The domestic appliances most recently purchased were an electric kettle (14.0%), a microwave oven (12.3%) and an electric toaster (8.0%).

4.2.2. Focus Groups

Transcripts of the focus group discussion can be found in Appendix 7.

The majority of individuals in all three focus groups claimed only purchased small domestic appliances if they needed them. The group of individuals who were excellent cooks (GEC group) stated that they bought appliances when they felt that they needed them and used these appliances very frequently. They said that they did not buy appliances such as the electric crepe and pancake maker, waffle maker and popcorn maker because they do not regard these appliances as useful "there is no need to own those appliances because I can make it with the saucepan and have the same results" (GEC2). This group also indicated they purchased specific appliances if the appliance provided the means to produce a better result, for example for making a sandwich, "because I would have a better result if I made it in the sandwich maker" (GEC1). Both the GEC and GGC groups indicated that many appliances were of no use to them as they could either purchase the food item "I don't own any ice-cream maker or a bread maker because there is no need to have one if you can purchase a good ice cream and good bread" (GGC3) or use a non-specific appliance for the same purpose. Two of the individuals from the GGC group said that if they want to make bread they used "instead

of the bread maker their electric food mixer for kneading the dough" (GGC1). Only one of the individuals with poor cooking skills (GPC group) wanted to buy a bread maker, the others, similar to those in the other two groups, said that they can "buy good bread and there is no need to buy this kind of appliance"(GPC1).

All individuals indicated that they mainly bought small domestic kitchen appliances in order to save them time and effort, for convenience and because they are working mothers. One individual from the GPC group owned several small domestic kitchen appliances which she had purchased because she might need them sometime, but she did not consider them very important, she said "they only over load her kitchen cupboards" (GPC2). Regardless of group, all individuals stated that they had heard about new appliances from the television, advertising leaflets, magazines, from visits to shops and from friends who might suggest a new appliance.

Differences existed between the groups in what influenced their decisions concerning which model was purchased. Brand name was important in their purchasing decisions for all those in the GPC group, "because it is reliable" (GPC1). However it was only considered important by the other two groups in the purchase of larger, more expensive appliances, e.g. a microwave. "For a microwave oven I definitely go on brand name but for a hand held electric food mixer or a blender I don't mind if they are not brand names" (GEC2). Two of the individuals in each focus group of those who can cook well and of those who can cook for themselves agreed that they wanted to own appliances with many extra features, only one of each group did not want extra features "because she won't use them" (GGC1). However, all of the GEC subjects agreed that they did not want to own an appliance with extra features because "it makes it very difficult to clean it and it also can break easily" (GEC2). Only one individual, who was in the GPC group, did not consider appearance of the specific appliance during purchase, the others all agreed that "I look for the appearance when I go to buy an appliance to match with my kitchen décor" (GGC1). All individuals stated that they have their appliances that they use frequently on the top of their kitchen work surfaces, whereas the other appliances are stored in their kitchen cupboards.

The groups were asked to comment on their use of the specific small kitchen appliances (Table 4.9).

Table 4.9. Opinions of focus group respondents concerning the use of specific appliances

Appliance	Focus Groups		
	Excellent Cooking Skills (EC)	Good Cooking skills (GC)	Poor cooking skills (PC)
Electric toaster	"I use it everyday it is very important and useful"	"I use it to make toast for the family especially in the winter"	"It is important but I only use it in the winter"
Deep fat fryer	"I don't own one because you put in a lot of oil and it can be a less healthy way to cook" "you leave this oil in to cook again and again and it can be a less healthy way to cook"	"I don't fry for health reasons"	
Food processor	"It's very complicated, does not save time and effort and difficult to clean"		"It is complicated to use" "I think it is important in the kitchen"
Food mixer	"I use it a lot, find it very convenient and easy to use"	"I use it a lot for making cakes and pastries" " I don't own one because I don't need one"	"I use it very often and find it important and convenient to use" "I own one but rarely use it"
Blender	"It is my favourite appliance" "It is more important to me than the handheld food mixer"	"I find it very useful and use it three times a week"	"It is very important" "I used it more when the children were young"
Microwave	"I find it useful for reheating and defrosting" "I don't like to cook food in it as it can alter the taste when I have used spices"	" It is not important or essential"	"I only use it for reheating. Defrosting in the microwave might be harmful"
Coffee maker	"I only use in the winter"	" I only use it for show when I have visitors"	"It is not important in the kitchen"
Juice maker"	"I use it 3 to 4 times a week because we drink a lot of juices"	"I use it a lot as I have lots of orange and lemon trees in the garden"	"I don't think that it is important"
Sandwich maker	"Sandwiches taste better" "I find it easy to clean"		"It is useful for making a quick hot snack when I am working"

Only one person, from the GGC group, owned a deep fat fryer and used it four times a week to make fried potatoes for her big family. The others commented that they did not own one due to health reasons; they thought that frying (four individuals), or repeated use of oil (two individuals) was bad for their health. Those that owned an electric grill, two in each group, considered that they used it often because "it's healthy and the food tastes good". Health was also mentioned with respect to the electric steamer. Two of the GGC group owned an electric steamer and found it very important, one of them used it for streaming vegetables, and the other one for cooking chicken. They both said that the food in the electric steamer tasted good and was very healthy. The individual in this group who did not own an electric steamer said that was one of the appliances that she wanted to buy.

Only four individuals owned a food processor, one from the GEC group and two from the GPC group, they considered a food processor complicated to use, that it didn't save time or effort and was difficult to clean. Only one individual, with poor cooking skills, thought it an important appliance to own. Six individuals owned electric food mixers, one from the GEC group and two from the GGC group and all of those in the GPC group. Five considered this appliance to be useful and used it frequently whereas one of those in the GPC group rarely used hers and did not think it of importance in her kitchen. All individuals owned a blender, found it useful, that it saved time and was convenient. This appliance was used for chopping onions, parsley or nuts, whisking eggs and making sweets.

A microwave oven was owned by all of the GEC and GPC Groups and two individuals in the GGC group. It was mainly used for reheating and defrosting and not considered important or essential. The one individual who did not own a microwave oven thought that there was no need to own one "because the rhythm of life in Cyprus is not so frustrated and busy as abroad" (GGC2). No one liked to cook meals using the microwave.

The electric kettle was used everyday to save time and for convenience and was considered by all to be an essential item in the kitchen. Although seven individuals owned a coffee maker, in all cases it was rarely used except for visitors in the winter. All but one individual owned a juice maker. Those from the GEC or GGC groups used them regularly making fresh juices for their families, however those in the GPC group used this appliance rarely.

All individuals considered the electric toaster to be useful, especially during the winter months when it was used to make toast for the family breakfast. A sandwich maker was owned by all except one individual from the GPC group and was used regularly. The respondents used this appliance more frequently in the winter for making hot snacks. All of the GEC group owned an electric crepe/pancake maker, but only two of them used it frequently for making sweet and savoury crepes and the other one rarely used hers due to health reasons. Two of the GPC group owned this appliance, they used it only once a year and they did not think that it was an important appliance in the kitchen.

4.2.3. Dietary Diaries

32 dietary diaries were collected and analysed and the mean macronutrient intake is shown in Tables 4.10, 4.11.

Table 4.10 Macronutrient intake

Nutrient	N	Mean	Maximum	Minimum	95% CI
Energy (kcal)	32	2273	3672	1526	2088,2456
Protein (g)	32	96.7	155	48	87.2,106.3
CHO (g)	32	202.2	306	112	185.1,219.4
Sugars (g)	32	72.8	147	11	61.6,84
Fibre (g)	32	21.1	35	9	18.4,23.8
Fat (g)	32	107.4	152	57	97.7,117.1

Table 4.11. Macronutrient intake as a percentage of energy intake

Nutrient	N	Mean	Maximum	Minimum	95% CI
Carbohydrate as % of energy	32	34.5	51.1	22.3	32.2,36.8
Sugars as % of energy	32	13.0	31.6	3.1	10.9,15.1
Protein as % of energy	32	17.5	25.7	9.1	16.3,18.7
Fat as % of energy	32	43.4	52.3	31.5	41.4,45.4
SFA as % of energy	32	11.9	16.9	5.5	10.7,13.2
MUFA as % of energy	32	17.2	24.8	9.4	16.0,18.5
PUFA as % of energy	32	4.7	6.2	2.4	4.5,5.1
Alcohol as % of energy	32	3.1	7.7	1.1	-1.9,8.1

Comparison of macronutrient intake and frequency of usage of various domestic kitchen appliances are shown in Table 4.12a, 4.12b.

Table 4.12a. Macronutrient intake (% energy) compared with usage of small domestic kitchen appliance

Macronutrient Intake																
	CHO		Sugar		Protein		Fat		SFA		MUFA		PUFA		Alcohol	
Ownership																
Electric toaster %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	15	9	15	9	15	9	15	9	15	9	15	9	15	9	15	9
Mean intake	32.8	37.6	12.7	15.1	17.5	17.8	44.8	40.6	13.4	9.9	17.8	15.1	4.8	4.3	0.9	9.7
Microwave oven %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	9	1	9	1	9	1	9	1	9	1	9	1	9	1	9	1
Mean intake	32.3	51.1	11.9	31.6	19.7	15.3	44.6	32.8	12.9	9.6	15.9	14.9	4.5	4.5	0.4	0.0
Sandwich maker %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	11	6	11	6	11	6	11	6	11	6	11	6	11	6	11	6
Mean intake	36.6	30.4	13.8	12.4	17.3	19.5	42.4	43.3	11.8	10.8	16.1	17.3	4.6	4.5	0.4	1.3
Electric grill %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	8	7	8	7	8	7	8	7	8	7	8	7	8	7	8	7
Mean intake	34.1	31.7	12.7	11.3	18.2	19.8	43.3	43.2	10.8	11.8	16.5	15.8	4.5	4.8	0.6	1.1
Electric steamer %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	5	7	5	7	5	7	5	7	5	7	5	7	5	7	5	7
Mean intake	35.1	33.8	12.5	14.2	16.7	18.1	42.9	44.6	9.8	13.3	17.3	17.6	4.9	4.7	0.3	1.8
Electric kettle %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	16	5	16	5	16	5	16	5	16	5	16	5	16	5	16	5
Mean intake	34.5	40.2	13.7	16.2	17.3	17.7	44.3	37.5	13.1	8.8	17.5	13.6	4.8	4.3	0.4	0.0

* F =frequent use: more than once a day, once a day, 3-4 times a week

**IF= Infrequent use: once a week, less than once a week

Table 4.12b. Macronutrient intake (% energy) compared with usage of small domestic kitchen appliance

Macronutrient Intake																
	CHO		Sugars		Protein		Fat		SFA		MUFA		PUFA		Alcohol	
Ownership																
Coffee maker %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Mean intake	32.3	41.7	11.4	20.5	16.8	19.5	45.7	37.3	12.7	9.2	20.6	13.3	5.2	4.4	2.2	0.0
Food processor %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	2	9	2	9	2	9	2	9	2	9	2	9	2	9	2	9
Mean intake	35.5	35.7	12.6	14.2	14.7	17.6	43.6	43.7	11.1	11.4	16.1	18.3	5.3	5.3	0.4	0.4
Blender %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	4	8	4	8	4	8	4	8	4	8	4	8	4	8	4	8
Mean intake	34.7	37.3	11.9	15.6	18.1	18.7	43.3	41.5	9.9	11.5	16.3	15.9	4.5	4.7	0.5	0.3
Juice maker %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	10	5	10	5	10	5	10	5	10	5	10	5	10	5	10	5
Mean intake	34.9	36.2	13.6	13.7	17.2	19.1	43.9	40.1	11.7	10.3	17.4	16.1	4.8	5.1	0.3	0.2
Electric crepe / pancake maker %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Mean intake	41.7	30.1	15.9	12.6	16.6	20.7	40.7	47.3	8.1	12.4	16.1	18.3	4.1	4.2	0.0	0.5

* F =frequent use: more than once a day, once a day, 3-4 times a week

**IF= Infrequent use: once a week, less than once a week

Data were not analysed for the bread maker, deep fat fryer, electric food mixer, ice cream maker and waffle maker due to low numbers owning these items.

Significant differences were found between the usage of a coffee maker and mean percentage saturated fatty acid (t=2.569, df=6, p=0.042) and monounsaturated fat intake (t=3.360, df=6, p=0.015), a sandwich maker and carbohydrate intake (t=2.265, df=15, p=0.039), an electric toaster and saturated fat intake (t=2.77, df=22, p=0.011). Those that frequently used a coffee maker had a higher monounsaturated and saturated fat intake, that frequently used a sandwich maker a higher carbohydrate intake and that frequently used a toaster a higher saturated fat intake (Table 4.15).

Table 4.13. Macronutrient intake (% energy) compared with usage of small domestic kitchen appliances: significant results

Appliance		Frequent use	Infrequent use	Significance p
Coffee maker	% SFA	12.7	9.2	0.042
	%MUFA	20.6	13.3	0.015
Sandwich maker	% CHO	36.6	30.4	0.039
Electric toaster	%SFA	13.4	9.9	0.011

4.3. Discussion

Ownership of small domestic kitchen appliances

This study has documented for the first time the extent of ownership of small domestic kitchen appliances within a Cypriot population. The results demonstrated that ownership of domestic appliances by this population is high and may reflect the increase in affluence of some of this population due to the increase in tourism (The World Guide, 1998). Other studies have shown that the acquisition of certain appliances indicates to consumers their arrival at a higher social level (Burnett, 1990). Four appliances were owned by nearly all respondents, an electric toaster, a sandwich maker, an electric kettle and a juice maker. Three of these, the toaster, sandwich maker and kettle, are low cost appliances, affordable to most consumers. The fact that the juice maker was owned by such a large number of individuals probably reflects the fact that fruit is plentiful and cheap in this country at all seasons of the year, with many homes having their own fruit

trees in the garden. One of the focus group respondents commented on the availability of fresh fruit when asked about her juice maker, "I use it (a juice maker) a lot as I have lots of orange and lemon trees in the garden". The juice maker were considered to be of great importance to a large number of respondents emphasising the value these respondents placed on this appliance in a country which produces a large amount of fresh fruit. It has been noted that the Greeks and other Mediterranean populations have maintained their traditional diet with respect to a high consumption of fruit and vegetables (Simopoulos and Sidossis, 2000).

Relatively new appliances such as the bread maker were owned by few and most of those who owned this appliance had a professional occupation. Other studies (Mintel, 2005a) have also shown that ownership of new appliances initially tends to be highest within the groups of individuals with a professional occupation. Those with a professional occupation were found to be more likely to own an electric grill, a coffee maker, a blender, an electric food mixer and an electric pancake maker which supports the previous finding that high income groups are significantly more likely than lower income groups to own domestic appliances (Caraher et al, 1999). Households comprised of couples were found to be more likely than single women households to own most of the small domestic kitchen appliances, this possibly reflects a higher income in these households, since the average salary of men is higher than that of women (The World Bank, 2005).

Cypriots owned appliances that would complement their cooking methods, for example a hand held food mixer, rather than those that would reduce the time spent in the kitchen and assist the preparation of convenience foods, such as microwave ovens. This may suggest that the younger Cypriots have the skills to prepare their food from raw commodities. In Cyprus, home economics with an emphasis on practical skills is a compulsory National Curriculum subject for all Cypriot school children up to 16years of age. Frobisher et al. (2006) have shown that children, aged 11-12y, undertaking a home economics curriculum have greater practical knowledge concerning nutrition than those being taught design and technology.

Sandwich makers were owned by nearly all respondents in Cypriots. It might be suggested that this was due to the fact that all Cypriot subjects had children living with them, as another study (Mintel, 2000b) has shown that sandwich makers were more frequently owned by those households with children. The great ownership, use and perceived importance of a sandwich maker and use of the toaster by this Cypriot population may have relevance to the increase in CHD as these may increase the fat content of their diet, cheese sandwiches are most commonly made. The saturated fat intake by those who used these appliances frequently was found to be higher than the intake of those who used this appliance infrequently.

The professional occupation group was more likely to own food mixers, coffee makers and blenders, this may be related to the fact that it has been found that higher socio-economic groups are more likely to cook meals from basic ingredients at the weekend where the ownership of these appliances enhance and supplement the traditional methods of cooking (Mintel, 2000b). On the other hand it may support the suggestion that ownership of certain appliances indicates to consumers their arrival at a higher social level that is often associated with material possessions (Burnett, 1990). Other studies have also demonstrated that higher income groups are significantly more likely than lower income groups to own domestic appliances (Caraher et al., 1999, Mintel, 2000b). The focus group participants stated that they rarely used the coffee maker except for visitors, thus the greater ownership of coffee makers by the professional group is probably due to the fact that this group are more likely to entertain visitors. These respondents either intend to impress visitors with "good quality" coffee or on the other hand may use this type of appliance to prepare "European coffee" as opposed to the "Greek coffee" that is normally drunk in this area.

Cyprus has seen a dramatic increase in the ownership of microwave ovens from the 18.6% reported in 1997 (Department of Statistics and Research, Ministry of Finance 1999) to 57.3% as found in this study. This dramatic increase in the ownership of microwave ovens could be related to the observation that today people spend less time in the kitchen and have an increased interest in time saving cooking appliances, such as

microwave ovens, based on the desire for convenience, time, labour and energy saving, simple and safe operation (Drew and Rhee; 1978, Burnett, 1990). This increase is likely to continue with the continuing rise in prosperity of the population leading to a desire to acquire material possessions (Burnett, 1990) and the need for time saving devices by an increasing female work force (ILO, 2005). The rise of women in the labour force has led a move from home cooking to an increase in the consumption of ready to eat meals (Beck, 1992; Ritzer, 2000). However, comments from the focus groups indicated that although they used the microwave oven frequently it was mainly used to re-heat or defrost food and they did not consider it an essential appliance to own. As one individual in the focus group stated, "because the rhythm of life in Cyprus was not so frustrated and busy as abroad".

The ownership of deep fat fryers has been reported to be highest among those in the lowest socio-economic group (Mintel, 2000b) and by younger individuals (Caraher et al, 1999) however in this study, no difference was found in the ownership of this appliance with either age or socio-economic group. This may indicate an increased awareness of the unhealthy consequences of deep fat frying in an area where the incidence of CHD is high. On the other hand if appliances are purchased in order to reduce time spent cooking this item requires considerable cleaning increasing the time spent in the kitchen. Some of the focus group participants stated they did not own a deep fat fryer because "food cooked in this way was bad for health", which tends to support the first explanation. It is also possible that the awareness of the negative health aspects of fat consumption led some respondents to misreport their ownership of this appliance. In dietary surveys food items with a negative health image (e.g. fried food) are likely to be underreported (Macdiarmid and Blundell, 1998) and this might be similar for appliances that produce these items.

Use of small domestic kitchen appliances

These results demonstrated that the majority of Cypriot women spent at least 2 hours cooking each day. This may be due to the fact that only 49% of women are in employment, where the proportion is only 49% (The World Bank, 2005). It has been

suggested that female employment has led to less time being spent in the kitchen and has influenced eating patterns and cooking techniques (DEFRA, 2000). This is supported by the finding that Cypriot women tended to use methods of cooking that take a greater amount of time such as stewing and baking, which would require them to spend more time cooking each day. Convenience food and the technology to prepare it quickly using the microwave oven could be a means of liberating women from domestic chores, as the feminist Gilman stated utopia would be where there were no kitchens in the home but collective restaurants (Lane, 1981). With an increasing number of women in employment in Cyprus, the use of convenience foods and microwave technology is likely to increase and traditional cooking skills, using raw ingredients to prepare complete meals, may diminish.

The most frequently used method of cooking for this Cypriot population was frying which may account for a high intake of fat (43% of energy). According to Varela et al. (1988), the technology of deep fat frying originated and was developed around the Mediterranean area, due to the influence of olive oil. In the focus group discussions many respondents stated that they fried with olive oil, but they also indicated that rarely deep fat fried as they considered it bad for their health. It appears that deep fat frying has decreased in popularity in this area.

The Cypriot population considered the majority of appliances were important to them and used them frequently. In Cyprus the acquisition of cooking skills are considered to be an important part of every child's education, as seen by the fact that home economics is a compulsory subject at school for all children, providing these women with the ability to produce meals from basic ingredients using these appliances to supplement their cooking techniques.

Similarly to the Mintel (2005a,b) study, the Cypriot population indicated in the focus groups that only those appliances that were used regularly were sited on the top of the kitchen work surfaces, other appliances were stored in cupboards and that the fact that the appliances on show matched their kitchen décor was important to the respondents. If,

as suggested (Burnett, 1990), ownership can be related to the arrival of consumers at a higher social level, the fact that it was important that the appliances on show matched the kitchen décor may for these individuals be a sign that they are successful and can afford all these material possessions. Again the importance of appearance as a factor to consider when purchasing a domestic appliance was only mentioned by the focus group respondents and not the questionnaire respondents, emphasising the value of a combination of research techniques to gain information (Denscombe, 1998).

Purchase of small domestic kitchen appliances

The Cypriot questionnaire respondents considered that the most important factors when purchasing a domestic kitchen appliance were durability, brand name, easy cleaning and cost. In a previous study in the UK (Mintel, 2000b), the most important factor was easy cleaning, followed by brand name with few indicating cost or durability as important. In this Cypriot study nearly half of the respondents considered durability to be an important factor when purchasing a domestic kitchen appliance, they want to buy appliances that last and will not need frequent replacement. However, according to Mintel (2005b), replacement purchasing was a key reason for the purchase of small domestic kitchen appliances. This difference may reflect different economic climates between the two countries (The World Bank, 2005). Nearly half of the Cypriot respondents considered easy cleaning to be an important factor when purchasing a domestic appliance possibly because they want to buy appliances that save them time. The focus group comments confirmed that "a working woman needs something that will save her time and effort".

Nutrient Intake

The mean energy intake of these Cypriot women (2273 kcal) was similar to the estimated average requirement for energy (1940kcals) (DoH, 1991). The macronutrient contribution to energy intakes of the Cypriot respondents demonstrated higher protein and saturated fatty acid and lower carbohydrate and monounsaturated fat intake compared to the Mediterranean diet (Trichopoulou et al., 1993) (Table 4.17). It appears that Cypriot female adults are moving away from the traditional Mediterranean diet with an increase in the protein and saturated fatty acids and decrease in the monounsaturated

fat intake. A trend away from the traditional way of eating has also been recognised in other Mediterranean countries (Serra-Majem and Helsing, 1993). The change in dietary intake may be related to the increase in coronary heart disease incidence in Cyprus (Cyprus Ministry of Health, 1995). The low saturated fat intake and high monounsaturated intake from olive oil was thought to be one of the major factors responsible for the low rates of coronary heart disease (De Lorgeril et al., 1998). This increased saturated fat and decreased monounsaturated fat could be due to an increase in the consumption of oils other than olive oil, similar to that noted in Greece (Simopoulos and Sidossis, 2000). Alcohol was found to be drunk in moderation as recommended in the Mediterranean diet (Table 4.17).

Table 4.14. Average daily intakes from macronutrients of this study compared with the National Diet and Nutrition Survey (NDNS) and with the Mediterranean diet

Nutrient	Cyprus Study	Mediterranean Diet*	NDNS
Carbohydrate (%)	34.5	42	48.5
Sugars (%)	13.0		11.9
Protein (%)	17.5	15	16.6
Fat (%)	43.4	42	34.9
SFA (%)	11.9	9	13.2
MUFA (%)	17.2	19	11.5
PUFA (%)	4.7	4	6.3 (n-3+n-6)
Alcohol (%)	3.1	2.5	3.9

* Trichopoulou et al., (1993)

The comparison of macronutrient intake and frequency of usage of various domestic kitchen appliances found significant differences between the usage of a sandwich maker and carbohydrate intake. Those that frequently used a sandwich maker had a higher carbohydrate intake. It was expected that a sandwich maker would increase the fat content of the diet. However, this was not seen in this study. The higher intakes of carbohydrate apparently reflects the increased consumption of bread. The participants of the focus groups confirmed that this appliance was used frequently and thought to be

important to provide quick snacks. However, it is also possible that these respondents who consumed snacks in the form of sandwiches were not consuming other types of snack, for example crisps, that have a very high fat content and this led to the unaltered fat intake.

The frequent use of an electric toaster by the Cypriots resulted in a higher saturated fat intake. The higher intakes of saturated fat could reflect consumption of toast with butter and challoumi cheese or meat products, like traditional sausages and sheftalia (type of traditional burger). Challoumi is the traditional Cyprus cheese which contains more than 50% of its energy as fat, and more than 50% of that is saturated (Tornaritis et al., 2001). Similarly, some popular traditional items such as smoked sausage and sheftalia (type of traditional burger) contain a similar percentage of fat (Tornaritis et al., 2001).

This study has demonstrated that Cypriot females own a considerable number of small kitchen domestic appliances that they use frequently and consider important. The majority of appliances that were owned by a large number were those that would assist in the preparation of meals from basic ingredients. This may reflect the fact in this area that domestic chores including cooking for the family is still considered a major role for women. These women also have the skills to prepare meals from basic ingredients that they were taught in school. The fact that they considered their domestic appliances important to them and that brand name was important when purchasing an appliance would suggest that these appliances play a part in demonstrating that the family is successful. It was stated that some of these appliances (e.g. the coffee maker) were only used when visitors were present, which also may suggest that the ownership of domestic appliances is some kind of success symbol. Those appliances that a large number of Cypriots owned were those that would either provide a healthier diet, such as a juice maker, or those that would assist traditional cooking methods, such as a blender. This may indicate that due to the fact that all Cypriot children are taught home economics, with the emphasis on practical skills, until the age of 16years, these Cypriot individuals have greater cooking skills and nutritional knowledge.

The observed differences in nutrient intake related to ownership of domestic appliances may suggest that this population is moving away from a traditional diet with an increase in the consumption of oils other than olive oil. However, to demonstrate whether domestic kitchen appliances actually affect nutrient intake would require a case control experimental study, which would be very hard to undertake as it would be difficult to obtain a control group. Although it is possible that for the elderly in Cyprus domestic appliances may be a very recent addition and that there may be several who do not own or use this technology. This will be addressed in a later chapter.

Chapter 5

The ownership of small domestic kitchen appliances by an English population aged over 60years and the effect of their usage in relation to nutrient intake

5.1. Introduction

There has been an increase in the ownership of domestic kitchen appliances over the past 10 years (Mintel, 2005a,b,c). Differences between age groups have been noted in the use of different cooking techniques (Caraher et al., 1999). Older adults have been found to be confident in using methods such as steaming, poaching and stewing/braising, however it was noted that they lacked confidence in using the microwave. In contrast the younger generation were more familiar with cooking using the microwave and found steaming, poaching, stewing/braising old fashioned cooking techniques (Caraher et al., 1999). Studies of microwave oven ownership and use showed that microwave owners were younger, had a higher income and bigger families and were more innovative than non-owners (Thompson and Sweaney, 1994b). Different methods of cooking raw ingredients can alter the nutrient content of the food consumed (Severi et al., 1998), for example back bacon rashers grilled contain 1.7g fat less than if they were cooked using a microwave (FSA, 2002). The previous studies have demonstrated that although the ownership of several small domestic kitchen appliances is high in individuals aged 25-60y, few differences in nutrient intake was linked to frequency of use of these appliances. It is however possible that for an older generation, who were taught the skills to cook meals from basic ingredients and tend to use different cooking techniques, these appliances will alter their nutrient intake. This study investigated the extent of kitchen appliance ownership and the effect on dietary intake and nutritional status of an adult UK population aged over 60years.

5.2. Results.

The questionnaire regarding the ownership and use of various domestic kitchen appliances was completed by 36 female volunteers and a three day dietary record by 25 volunteers.

5.2.1. Questionnaire

5.2.1.1. Demographics of the respondents.

The ages of the respondents ranged from 60 to 78 years (60-64years: 7, 65years and over: 29), only 13 stated that they had an occupation, 38.5% were in a professional occupation and all others (61.5%) in partly skilled occupations. There were 25 (69.4%) respondents who were married and 11 living on their own, 5.6% were single, 2.8% were divorced and 22.2% were widowed (Table 5.1).

Table 5.1. Demographics of the respondents

	Demographics of the respondents	
	No	**%**
Age		
60-64years	7	19.4
65years and over	29	80.6
Occupational Status		
Professional occupations	5	38.5
Partly skilled occupations	8	61.5
Household Composition		
Single	11	30.6
Couple	25	69.4

5.2.1.2. Ownership of small domestic kitchen appliances

Table 5.2 shows the ownership of the domestic kitchen appliances. The appliances included those that may have a positive or a negative effect on diet and nutritional content (further information for the list of the appliances and how this was derived were discussed in Chapter 2). The majority of respondents owned an electric kettle (97.2%), a toaster (88.9%), an electric grill (88.9%) and a microwave oven (83.3%). Less than 10% owned an electric steamer (8.3%) and less than 5% owned a popcorn maker (2.8%).

Table 5.2. Ownership of small domestic kitchen appliances

Appliance	Ownership (No)	Ownership (%)
Electric kettle	35	97.2
Toaster	32	88.9
Electric grill	32	88.9
Microwave oven	30	83.3
Coffee maker	27	75.0
Hand held electric food mixer	23	63.9
Food processor	23	63.9
Sandwich maker	17	47.2
Blender	16	44.4
Juice maker	7	19.4
Bread maker	6	16.7
Roaster	5	13.9
Deep fat fryer	4	11.1
Soft drinks machine	4	11.1
Electric steamer	3	8.3
Rice cooker	2	5.6
Ice-cream maker	2	5.6
Waffle maker	2	5.6
Electric crepe and pancake maker	2	5.6
Popcorn maker	1	2.8

The group aged 60-64years were more likely to be the owners of more appliances than the group aged 65years and over, except in the case of a rice cooker, a coffee maker, a blender, and a popcorn maker which those aged 65y and over were more likely to own. The results from the Chi squared tests were not used as the expected frequencies in the 2x2 tables for over 20% of the cells were less than 5. (Table 5.3).

Table 5.3. Ownership of small domestic kitchen appliances (%) with reference to age group

	Age Group	
Appliance	**60-64y (n=7)**	**65y+ (n=29)**
Electric toaster	100.0	86.2
Microwave oven	100.0	79.3
Sandwich maker	71.4	41.4
Electric grill	100.0	86.2
Deep fat fryer	14.3	10.3
Bread maker	28.6	13.8
Electric steamer	28.6	3.4
Rice cooker	0	6.9
Electric kettle	100.0	96.6
Coffee maker	57.1	79.3
Food processor	71.4	62.1
Blender	42.9	44.8
Hand held electric food mixer	85.7	58.6
Juice maker	28.6	17.2
Ice cream maker	14.3	3.4
Waffle maker	14.3	3.4
Roaster	14.3	13.8
Popcorn maker	0	3.4
Electric crepe /pancake maker	14.3	3.4
Soft drink machine	28.6	6.9

Comparisons were made between households that were composed of married couples and of those individuals who lived on their own (single, divorced and widowed). Significant associations were found in the ownership of a sandwich maker (x^2=5.4, df=1, p=0.021), the married group were more likely to own this appliance; a food processor (x^2=8.9,df=1, p=0.003) and a coffee maker (x^2=5.3, df=1, p=0.022), the individuals who lived alone were more likely to own these appliances. Only married couples owned breadmakers, electric steamers and rice cookers (Table 5.4).

Table 5.4. Ownership of small domestic kitchen appliances (%) with reference to household composition

	Household composition		
Appliance	**Married (n=25)**	**Alone (n=11)**	**p**
Electric toaster	92.0	81.8	NA
Microwave oven	88.0	72.7	NA
Sandwich maker	60.0	18.2	.021*
Electric grill	88.0	90.9	NA
Deep fat fryer	16.0	0	NA
Bread maker	24.0	0	NA
Electric steamer	12.0	0	NA
Rice cooker	8.0	0	NA
Electric kettle	96.0	100.0	NA
Coffee maker	64.0	100.0	.022*
Food processor	48.0	100.0	.003*
Blender	36.0	63.6	.124
Hand held electric food mixer	60.0	72.7	.464
Juice maker	12.0	36.4	NA
Ice cream maker	8.0	0	NA
Waffle maker	8.0	0	NA
Roaster	12.0	18.2	NA
Popcorn maker	4.0	0	NA
Electric crepe /pancake maker	8.0	0	NA
Soft drink machine	16.0	0	NA

* significant results (p<0.05)

The respondents were asked how important they considered the appliances to be. The appliances that were considered by a large number of respondents to be extremely important were an electric kettle (85.7%), an electric grill (40.7%) and a coffee maker (39.1%) and to be important were an electric toaster (87.8%), a microwave oven (77.5%), an electric grill (81.4%) and a blender (66.7%) (Table 5.5).

Table 5.5. The importance of each domestic kitchen appliance to the respondents

Appliance	Not at all No. (%)	Slightly Important No. (%)	Moderately Important No. (%)	Important No. (%)	Extremely Important No. (%)
Electric Toaster	0	1(3.0)	3(9.1)	18(54.5)	11(33.3)
Microwave oven	1(3.2)	0	6(19.4)	14(45.2)	10(32.3)
Sandwich maker	4(22.2)	3(16.7)	7(38.9)	4(22.2)	0
Electric grill	0	1(3.7)	4(14.8)	11(40.7)	11(40.7)
Deep fat fryer	3(3.75)	3(37.5)	0	2(25.0)	0
Bread Maker	3(42.9)	2(28.6)	2(28.6)	0	0
Electric steamer	4(57.1)	1(14.3)	0	2(28.6)	0
Rice cooker	5(83.3)	0	0	1(16.7)	0
Electric kettle	0	0	1(2.9)	4(11.4)	30(85.7)
Coffee maker	1(4.3)	2(8.7)	6(26.1)	5(21.7)	9(39.1)
Food processor	2(8.7)	2(8.7)	6(26.1)	10(43.5)	3(13.0)
Blender	1(5.6)	1(5.6)	4(22.2)	10(55.6)	2(11.1)
Hand held electric food mixer	0	0	8(34.8)	11(47.8)	4(17.4)
Juice maker	4(40.0)	2(20.0)	1(10.0)	2(20.0)	1(10.0)
Ice cream maker	5(83.3)	0	1(16.7)	0	0
Waffle maker	5(83.3)	0	1(16.7)	0	0
Roaster	4(50.0)	0	2(25.0)	2(25.0)	0
Popcorn maker	5(100.0)	0	0	0	0
Electric crepe and pancake maker	5(83.3)	0	1(16.7)	0	0
Soft drink machine (soda stream)	6(75.0)	0	2(25.0)	0	0

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5.2.1.3. Use of small domestic kitchen appliances

Most of respondents (69.7 %) spent 1-2 hours cooking each day, 18.2% spent less than 1 hour cooking and the remainder (12.1%) spent more than 2 hours cooking each day. There were no significant associations between the respondents' occupational group or

age group and the time spent cooking each day. There was no significant association between the time spent on cooking each day and the ownership of any domestic kitchen appliance.

The cooking methods that were used by a large number of respondents everyday or more than once a day were boiling (29.4%) and microwaving (26.6%). The cooking method that was used at least 3-5 times a week was grilling (36.2%), whereas deep-frying and poaching were used less than once a week by 77.8% and 54.5% respectively (Table 5.6). Boiling was used more frequently by the group aged 60-64y than the older group (x^2=11.54, df=4, p=0.021). No significant associations were found between occupation groups and the frequency of use of various methods of cooking (p>0.05).

Table 5.6. The frequency of use of each cooking method

Cooking method	More than once a day	Everyday	3-5 times a week	1-3 times a week	Less than once a week
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Steaming	0	0	3(9.7)	13(41.9)	15(48.4)
Boiling	2(5.9)	8(23.5)	13(38.2)	8(23.5)	3(8.8)
Baking	1(3.1)	0	5(15.6)	15(46.9)	11(34.4)
Deep-frying	0	0	1(3.7)	5(18.5)	21(77.8)
Poaching	0	0	1(3.0)	14(42.4)	18(54.5)
Pan-frying	0	1(2.9)	5(14.7)	15(44.1)	13(38.2)
Microwave	2(5.7)	8(22.9)	10(28.6)	6(17.1)	9(25.7)
Simmering	0	5(14.7)	6(17.6)	10(29.4)	13(38.2)
Roasting	0	1(2.9)	1(2.9)	19(54.3)	14(40.0)
Stewing	0	0	1(3.1)	16(50.0)	15(46.9)
Grilling	1(2.8)	2(5.6)	10(27.8)	18(50.0)	5(13.9)

The frequency of use of the individual domestic appliances varied (Table 5.7). The majority of respondents used the electric toaster (91.2%) and the microwave oven (54.8%) at least once a day. The majority of those who owned an electric grill (80.7%) used it at least 3-5times a week. A hand held electric food mixer, a food processor and a blender were used at least once a week by 66.7%, 72.2% and 52.9% respectively, whereas the majority who owned a sandwich maker (50.0%), a deep fat fryer (60.0%) or a bread maker (50.0%) used these appliances less than once a week. All other appliances were used infrequently. There were no significant associations in the use of these appliances between either occupational or age group ($p>0.05$).

Table 5.7. The frequency of use of each domestic kitchen appliance

Appliance	More than once a day	Once a day	3-4 times a week	Once a week	Less than once a week
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Electric toaster	15(44.1)	16(47.1)	3(8.8)	0	0
Microwave oven	9(29.0)	8(25.8)	11(35.5)	2(6.5)	1(3.2)
Sandwich maker	0	1(6.3)	0	7(43.8)	8(50.0)
Electric grill	5(19.2)	2(7.7)	14(53.8)	3(11.5)	2(7.7)
Deep fat fryer	0	0	1(20.0)	1(20.0)	3(60.0)
Bread maker	0	0	0	2(50.0)	2(50.0)
Electric steamer	0	0	1(50.0)	1(50.0)	0
Rice cooker	0	0	1(100.0)	0	0
Electric kettle	31(96.9)	1(3.1)	0	0	0
Coffee maker	2(8.7)	6(26.1)	5(21.7)	5(21.7)	5(21.7)
Food processor	0	0	6(33.3)	7(38.9)	5(27.8)
Blender	0	0	3(17.6)	6(35.3)	8(47.1)
Hand held electric food mixer	0	0	6(28.6)	8(38.1)	7(33.3)
Juice maker	0	2(40.0)	1(20.0)	0	2(40.0)
Ice cream maker	0	0	0	0	1(100.0)
Waffle maker	0	0	0	0	1(100.0)
Roaster	0	0	1(25.0)	2(50.0)	1(25.0)
Popcorn maker	0	0	0	0	0
Electric crepe / pancake maker	0	0	0	0	1(100.0)
Soft drink machine	0	0	0	0	3(100.0)

5.2.1.4. Purchase of small domestic kitchen appliances

The most important factors when purchasing a domestic kitchen appliance were considered to be cost (66.7%), easy cleaning (66.7%), durability (47.2%) and well-known brand name (38.9%). Significantly more of those aged 65+years (58.6%) considered cost to be an important factor when compared with the age group 60-64years (x^2=4.34, df=1, p=0.037). A higher proportion of those in the partly skilled occupation category (37.5%) also considered cost to be an important factor when purchasing a domestic kitchen appliance than the proportion in the professional occupation group (20.0%) (x^2=5.92, df=1, p=0.015).

The domestic appliances most recently purchased were an electric kettle (33.3%), a microwave oven (14.8%) and an electric toaster (11.1%). Only the electric toaster and the microwave oven were considered to be low cost items by 57.6% and 50.0% respectively. The electric steamer was considered to be an expensive item by 30.8% of individuals. No significant associations were found between either occupational group or age in how respondents rated the cost of these domestic appliances (p>0.05).

5.2.2. Dietary Diaries

25 dietary diaries were collected and analysed and the mean macronutrient intake is shown in Tables 5.8 and 5.9.

Table 5.8. Macronutrient intake

Nutrient	N	Mean	Maximum	Minimum	95% CI
Energy (kcal)	25	1860	2273	1085	1738,1983
Protein (g)	25	81.5	104	57	76.4,86.6
CHO (g)	25	209.7	301	110	190.5,229.0
Sugars (g)	25	87.9	148	38	77.2,98.6
Fibre (g)	25	14.3	24	6	12.2,16.3
Fat (g)	25	70.7	111	32	62.7,78.7

Table 5.9. Macronutrient intake as a percentage of energy intake

Nutrient	N	Mean	Maximum	Minimum	95% CI
Carbohydrate as % of energy	25	42.2	53.9	26.3	39.7,44.6
Sugars as % of energy	25	17.8	26.6	8.1	15.9,19.7
Protein as % of energy	25	17.8	23.2	12.3	16.6,19.0
Fat as % of energy	25	33.9	50.1	25.4	31.2,36.6
SFA as % of energy	25	11.8	24.6	4.9	10.1,13.6
MUFA as % of energy	25	9.7	16.4	4.9	8.6,10.7
PUFA as % of energy	25	4.9	10.2	2.0	4.2,5.6
Alcohol as % of energy	25	6.9	19.4	1.2	4.9,8.9

The mean energy intake for these subjects was 1860kcals similar to the estimated average energy requirements for elderly women, 1900kcals (Table 5.8). The mean intake of carbohydrate as a percentage of energy was low 42.2% compared to the dietary reference value, 50%, whereas the mean percentage of sugars, 17.8% and protein were high, 17.8% (Table 5.9). The COMA reference panel recommended that a maximum 10% of food energy should be obtained from non milk extrinsic sugars and 13% from protein

Comparison of macronutrient intake and usage of the various domestic appliances are shown in Table 5.10a, 5.10b.

Table 5.10a. Macronutrient intake (% energy) compared with usage of small domestic kitchen appliance.

Macronutrient Intake																
	CHO		Sugars		Protein		Fat		SFA		MUFA		PUFA		Alcohol	
Ownership																
Microwave oven %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	17	2	17	2	17	2	17	2	17	2	17	2	17	2	17	2
Mean intake	41.8	36.1	17.9	14.2	18.7	17.6	31.8	42.0	10.6	13.8	9.2	13.9	5.2	4.6	7.6	4.4
Sandwich maker %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	1	10	1	10	1	10	1	10	1	10	1	10	1	10	1	10
Mean intake	38.9	40.7	12.8	18.4	18.4	18.5	37.3	33.8	12.4	9.7	12.2	9.9	7.2	5.8	5.4	6.9
Electric Grill %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	13	5	13	5	13	5	13	5	13	5	13	5	13	5	13	5
Mean intake	41.5	42.6	17.7	17.2	17.4	17.9	35.6	30.2	12.9	11.7	10.5	8.5	4.8	3.9	5.5	9.3
Deep Fat Fryer %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1	3
Mean intake	42.6	41.4	19.4	17.7	15.8	18.1	34.4	35.7	8.7	12.7	12.3	11.6	10.2	4.2	7.2	4.8
Electric steamer %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mean intake	42.6	37.7	19.4	14.2	15.8	17.6	34.4	42.1	8.7	10.1	12.3	10.6	10.2	4.6	7.2	2.6
Coffee Maker %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	8	7	8	7	8	7	8	7	8	7	8	7	8	7	8	7
Mean intake	42.5	42.8	16.6	19.7	18.1	18.2	30.6	32.5	10.9	12.4	8.6	9.4	5.1	4.4	8.7	6.6

* F =frequent use: more than once a day, once a day, 3-4 times a week
**IF= Infrequent use: once a week, less than once a week

Table 5.10b. Macronutrient intake (% energy) compared with usage of small domestic kitchen appliance

	Macronutrient Intake															
	CHO		Sugars		Protein		Fat		SFA		MUFA		PUFA		Alcohol	
Ownership																
Food Processor%	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	4	11	4	11	4	11	4	11	4	11	4	11	4	11	4	11
Mean intake	43.4	41.5	19.2	17.6	18.4	17.7	33.3	33.2	10.2	12.4	9.2	9.2	5.9	4.2	4.9	7.6
Blender %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	2	11	2	11	2	11	2	11	2	11	2	11	2	11	2	11
Mean intake	46.4	42.5	19.8	18.9	18.9	17.9	30.7	32.4	9.9	12.3	6.9	9.7	4.1	4.7	4.1	7.1
Hand Held Electric Food Mixer %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	5	12	5	12	5	12	5	12	5	12	5	12	5	12	5	12
Mean intake	42.2	42.7	18.1	18.5	18.5	17.4	30.7	34.3	11.9	11.0	8.5	9.6	4.2	5.2	8.5	5.5
Juice Maker %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean intake	40.5	43.7	18.6	18.7	17.9	18.4	35.8	34.6	10.6	13.7	11.5	9.7	7.8	4.6	5.7	3.3
Roaster %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Mean intake	38.4	43.3	17.8	18.6	20.0	15.8	37.2	34.1	12.4	12.5	10.7	11.4	5.4	6.7	4.3	6.9

* F =frequent use: more than once a day, once a day, 3-4 times a week

**IF= Infrequent use: once a week, less than once a week

Data were not analysed for the breadmaker, rice cooker, ice-cream maker, waffle maker, popcorn maker, electric crepe and pancake maker, electric food mixer, soft drinks machine due to low numbers owning these items and for the electric kettle and toaster as everyone used them frequently.

Significant differences were found between the usage of microwave oven and mean percentage of total fat (t=-2.474, df=17, p=0.024), MUFA (t=-3.047, df=17, p=0.007) (Table 5.11). Those that frequently used a microwave oven had lower total fat and monounsaturated fat intakes.

Table 5.11. Macronutrient intake (% energy) compared with usage of small domestic kitchen appliances: significant results.

Appliance		Frequent use	Infrequent Use	Significance p
Microwave	% Total fat	31.8	42	0.024
	%MUFA	9.2	13.9	0.007

5.3. Discussion

Limitations

The questionnaire was completed by 36 female volunteers and a three day dietary record by 25 volunteers. Based on their age they were placed into two groups, those aged 60-64y (7 subjects) and those aged 65y and over (29 subjects). The sample size for this study was smaller than other studies concerned with diet (Saini, 2000; Finch et al, 1998). Elderly people are known to be cautious of answering questions on confidential issues such as diet and health (Kelsey et al, 1989), in this study several individuals failed to return the questionnaire (approximately one third of those approached). In this study there were more married than single women, the National Diet and Nutrition Survey (NDNS) (Finch et al, 1998) also reported a better response rate from elderly people who were married than those who were single. These differences may possibly be due to the type of organisation targeted.

Ownership of small domestic kitchen appliances

Four appliances were owned by nearly all respondents, the electric kettle, electric grill, electric toaster and the microwave oven. However it is likely that these respondents misinterpreted the question concerning electric grills and assumed that this question referred to the grill that was an integral part of their cooker. The other three appliances

were also those owned by at least 80% of those aged 65 years and over in the Mintel (2005a,b,c) survey which would appear to indicate that these appliances have become a necessary part of kitchen equipment. The high proportion of respondents who owned these items is probably due to their ability to provide convenience and quickness as stated by these respondents as two of the reasons for owning domestic appliances.

Handheld electric food mixers and food processors were owned by 64% of these older individuals. All the respondents came from a professional or semiskilled occupation, those in high socio–economic groups have been found to be more likely to cook food from basic ingredients where the ownership of these appliances could enhance and supplement the traditional methods of cooking (Burnett and Rees, 1991).

In the past elderly people have reported lower rates of ownership of freezers, microwave ovens and refrigerators than many other population groups, limiting options for cooking, storage and shopping behaviors (Office of Population Censuses and Surveys Social Survey Division, 1985). The elderly have also been found to be less confident using a microwave to cook than younger individuals (Caraher et al, 1999). However in this study the ownership and frequency of use of microwave ovens was high (83.3%). This dramatic increase in the ownership of microwave ovens suggests that even for this elderly group microwaving has become an established cooking method, indicating that technological change effects cooking methods.

Differences between the findings of this study and that of the Mintel (2005a,b) survey of those aged over 55years were seen in the ownership of sandwich makers, electric grills, deep fat fryers, electric steamers, food processors, hand held electric food mixers and juice makers (Table 5.12).

Table 5.12. Comparison of the ownership (%) of kitchen domestic appliances in this study with the Mintel survey (2005a,b,c)

	Age Groups			
Appliances	**This Study 60-64years**	**Mintel 55-64years**	**This Study 65years+**	**Mintel 65years+**
Electric toaster	**100.0**	83.0	**86.2**	79.0
Microwave oven	**100.0**	86.2	**79.3**	80.1
Sandwich maker	**71.4**	48.0	**41.4**	39.0
Electric grill	**100.0**	15.0	**86.2**	12.0
Deep fat fryer	**14.3**	24.0	**10.3**	23.0
Bread maker	**28.6**	22.0	**13.8**	13.0
Electric steamer	**28.6**	26.0	**3.4**	24.0
Food processor	**71.4**	37.0	**62.1**	30.0
Blender	**42.9**	44.0	**44.8**	43.0
Hand held electric food mixer	**85.7**	56.0	**58.6**	59.0
Juice maker	**28.6**	18.0	**17.2**	16.0

The high ownership of electric grills in this study, compared with the results of Mintel (2005a), is probably due to a misunderstanding concerning this appliance.

It has been found that retired respondents are least likely to own a sandwich maker compared with those in work (Mintel, 2005a), which may partly explain the high extent of ownership by those aged 60-64y compared with the older group in this study. According to Mintel (2005a) this demonstrates quite clearly that in terms of appliance ownership, there is a divide between the generations with regard to those appliances that facilitate snacking and those that facilitate cooking. However, this does not explain the difference found between those aged 60-64 years in this study and those aged 55-64 in the Mintel survey. It should however be taken into account that there were few respondents in this age group which may have affected the results. The majority of

respondents in this study were married, it has been demonstrated that marital status in the elderly was a significant determinant of the number of hot meals eaten per day (Brockington and Lempert, 1966). These respondents may be using the sandwich maker to produce a hot meal.

The low ownership of deep fat fryers in this study, compared with the results of Mintel (2005a), is likely to be a reflection of several factors. This study was carried out in the Northwest of England where the incidence of coronary heart disease is high (DoH, 1999) and these respondents are likely to be aware of the health implications of a high fat diet. The use of this appliance would encourage a high fat diet and thus, perhaps, they do not own one. It has been shown that individuals with a greater income or educational levels have more access to nutritional knowledge and healthy eating (Variyam et al, 1998); the elderly people who participated in this study had either a professional or partly skilled occupation. It has also been shown that elderly people in higher social classes were more likely to grill meat rather than fry it (Horwath, 1988, Bennett, et al., 1995). If health is of concern to these respondents this may also explain their higher ownership of juice makers compared to the findings of the Mintel survey (2005a). It has been reported that the majority of people over the age of 66years consider their diet to be healthy (Whichelow, 1993). Government campaigns regarding the negative health consequences of a high fat diet and the positive consequences of the inclusion of fruit and vegetables (DoH, 2005b) may have led to low ownership of deep fat fryers and high ownership of juice makers by these respondents. It has been shown that the elderly, although they consider their diet to be healthy are prepared to alter their diet to include, but not exclude, food items (McKay and Bolton-Smith, 1995; Saini, 2000). It is therefore possible that following the government messages concerning consumption of five portions of fruit and vegetables these individuals have purchased, and use, the relatively new addition to the market, the juice maker. Advertisements for these appliances state "As we now know we are being encouraged to eat 5 different portions of fruit and vegetables per day – juicing is an excellent way to get these nutrients in to our bodies" (Juiceland UK, 2006).

It has been demonstrated that elderly people in higher social classes were more likely to steam their vegetables (Horwath, 1988, Bennett, et al., 1995). However in this study of the elderly aged 65years and over, all of who had a professional or partly skilled occupation, the ownership of electric steamers was low, and lower than that found by Mintel (2005a). An explanation for this may not be that these respondents do not steam food but that they do not use an electric steamer. It was also found in the study of those aged 25-60y from this area that the unskilled were more likely to own an electric steamer than the other two occupational groups. The Northwest has a high Chinese population, who frequently steam food, resulting in the fact that non-electric steamers are readily available in the retail outlets in this area and may be used by this population. It was noted that the majority of respondents stated that they steamed at least once a week and since few of them owned an electric steamer it is likely that they are using non-electric steamers or the microwave oven.

According to Mintel (2005a) food processors are perceived by many to be bulkier and less convenient to use than a hand-held mixer. In this study the ownership of both food processors and hand held food mixers was higher that that found by Mintel (2005a). This is probably due to the fact that the majority of people in this study were from the higher occupational groups and were married. According to Mintel (2005a) the ownership of hand held electric food mixers, as with most food preparation products, increased with age and socio-economic status. These two appliances would facilitate cooking from basic ingredients; another study has shown that married people are more likely to cook from scratch than those living on their own (Saini, 2000).

The married group in this study were more likely to own a sandwich maker, also only married couples owned breadmakers, electric steamers and rice cookers. All these appliances can help to prepare a hot meal. Marital status in the elderly has been found to be a significant determinant of the number of hot meals eaten per week. Elderly people sharing accommodation (including married couples) generally ate more hot meals than those living alone (Brockington and Lempert, 1966). However, the individuals who lived

alone in this study were more likely to own a food processor, a coffee maker and an electric grill. In this research the majority of individuals living on their own were widowed. Previous research (Brockington and Lempert, 1966) has shown that widowed and divorced people living alone do not eat as well as single people. This was suggested to be because single people have adapted to living alone whereas widowed and divorced people have had social isolation forced on them by a significant life event. Elderly widows have reported fewer material resources, lack of support networks and adequate transport all of which may act to limit their food choice (Fengler et al., 1983). This may explain the finding that only married couples owned breadmakers, electric steamers and rice cookers, all appliances that are relatively new arrivals on the market. According to Bransby and Osborne. (1953) living alone was associated with a lower income and less flexibility in the food budget than married people, as a result, both men and women living alone ate less foods which required some preparation than married couples. However it was found that the respondents in this study who lived alone were more likely to own a food processor, this is possibly due to the fact it was purchased before the respondent was widowed and not used now, an explanation supported by the fact that food processors were used by a large number of individuals less that once a week. The finding that married couples were significantly more likely to own a sandwich maker may reflect the probability that these individuals had children and grandchildren, a previous study has suggested that this appliance is more likely to be owned by households where children are present (Mintel, 2000b).

The respondents were asked how important they considered these appliances to be. The domestic kitchen appliances that were considered by a large number of respondents to be extremely important were an electric kettle, an electric grill, and a coffee maker and considered to be important were a blender and an electric toaster. Those appliances except for the blender were also the ones with the highest ownership levels and the ones that are easy to clean, one of the factors stated to be important when purchasing domestic appliances. This indicates that respondents prefer appliances that are convenient and easy to clean. The reasons of usage were for convenience, quickness and to give a better result.

Use of small domestic kitchen appliances

Seventeen per cent of British people eat in a fast food outlet weekly and thirty-three per cent of women express the belief that cooking and preparing food is too time consuming (Novartis, 2000). Domestic work time has been declining for women and this is attributed to three causes: the desire to reduce unsatisfying low status activity, the women's movement generating normative support for reducing women's responsibility for housework and the time-saving features of new household appliances such as the dishwasher and the microwave (Gershuny and Robinson, 1988). However, as found in another study despite the microwave oven's capacity to cook food in a fraction of the time needed by conventional stoves, owning a microwave has no significant effect on the time use patterns of women, even when the number of meals eaten out is held constant (Bittman et al., 2004).

A study by Caraher et al. (1998) found out that women spend less time in the kitchen preparing meals, however, they appear to spend some of this time saved travelling to supermarkets and shopping (Caraher et al., 1998). Other studies also support this, according to Vanek (1974), while food preparation time had declined, time spent in childcare, shopping and household management had expanded substantially. Others developed these ideas, arguing that rising standards of cleanliness, greater output, fewer servants, the extra transport involved in consuming substitutes and the addition of new tasks had all combined to neutralize any time saving delivered by the new domestic machines (Cowan, 1985, Wajcman, 1991).

Most of the respondents in this study spent 1-2 hours on cooking each day, others spent less than 1 hour on cooking each day with few respondents spending more than 2hours on cooking. It might be assumed that an increase in the length of time spent on cooking would reflect a likelihood of cooking using basic ingredients. However, while this approach to cooking may characterise affluent social groups, most people do not cook from basic ingredients everyday (Lang and Caraher, 2001). Mintel (2000a) found that while most people rely on ready meals or quick recipes on their working days, they do

try and cook meals from basic ingredients at the weekend. This research also found that this type of cooking was more prevalent amongst the higher socio-economic groups (Mintel, 2000a). A recent pan-European study found that the time needed for food preparation was identified by the young and those with higher levels of education as a barrier to healthy eating (Institute of European Food Studies, 1996).

Over thirty-six per cent of British adults now cook at least once a week for pleasure, implying that most cooking is still perceived as a duty (Henley Centre, 1994). Another survey showed that the British public spent less time in the kitchen than their European neighbours, with forty-two per cent viewing cooking as an enjoyable occupation, fourteen per cent seeing it as a creative activity and eleven per cent using it as a 'de-stressing activity' (National Opinion Polls, 1997). Differences between age groups have been noted in the use of different cooking techniques. It has been found that older adults were more confident using steaming, poaching and stewing/braising techniques than the microwave (Caraher et al., 1999). It has been suggested that elderly people may be resistant to introducing changes. The Scottish Heart health Survey (McKay and Bolton-Smith, 1995) found that 33% of men and 26% of women claimed that they would not change their diet even when faced with a major life threatening illness. A further study in the UK showed that resistance to change in dietary practises of the elderly was primarily due to taste, habit and price (Bilderbeck et al., 1981).

This, however, was not found in this study, the cooking methods that were used by a large number of respondents, over the age of 60 years, frequently were boiling, microwaving and grilling. These cooking methods are those that can have a positive effect on the nutritional content of the diet. These elderly respondents appear not to be resistant to change and have become well versed in the new technology of the microwave oven. It may be that in this area where the incidence of chronic nutrition related disease, such as CHD, is high the respondents have heeded the advice of the professionals (DoH, 1999) and altered the way they cook their food to use the more healthy options. On the other hand confidence with cooking techniques has been found to be greatest in higher social and educational groups and the trend is particularly strong for stir frying and using

a microwave oven (Caraher et al., 1999). This group who were all from professional or semi-skilled occupational groups have been using these techniques for some time.

The individual small domestic kitchen appliances used most frequently by a large number of respondents were the electric toaster, the electric kettle the microwave oven, electric grill and the coffee maker. Those appliances are also the ones with the greatest ownership levels, which infers that ownership reflects usage.

Purchase of small domestic kitchen appliances

The most important factors when purchasing a domestic kitchen appliance were considered to be cost, easy cleaning, durability and well-known brand. Similar to this study, a previous survey by Mintel (2000b) stated that the most important factor was easy cleaning, however, in contrast with this study few indicated, cost or durability as important. This difference between the two studies may be due to the present economic climate and the fact that this study was conducted only in the North West of England. Significantly more of those aged 65+years considered cost to be an important factor when compared with the age group 60-64years, this may reflect a difference between the two age groups with regard to income. The vast majority of those over 65y will be living on a pension whereas some of the younger group may have an income from the employment of themselves or their partner. The older age group are more likely to be those who are widowed and have limited income. Income is also likely to be the reason for more of those from partly skilled occupations compared to those from professional occupations considering cost as an important factor when purchasing a domestic appliance. It was thus surprising to find that the majority of these respondents considered an electric toaster and a microwave oven to be cheap items. The electric toaster is a low priced item and could be purchased for less than £6 (Argos, 2004). The knowledge of the cost of this item is likely to reflect replacement purchase, 11% had purchased a toaster recently, Mintel (2005b) suggest replacement purchase is a key reason for the purchase of small domestic appliances. However, the microwave oven priced between £39.95 and £229.95 (Argos, 2004), was the most expensive of all domestic kitchen appliances under consideration and it is difficult to find any explanation as to why this item was

considered to be low cost (compared with the minimum price of other appliances such as: a blender, £4.99, an electric kettle, £5.48, an electric toaster, a sandwich maker and a hand held electric food mixer, £5.75) (Argos, 2004) other than a misinterpretation of the question, it is possible that they interpreted the question as enquiring whether the microwave was value for money. Since some of the respondents had recently purchased a microwave, they may have understood the question to ask whether they consider these items to be less expensive than in the past.

Nutrient Intake

The results of this study compared with the National Diet and Nutrition Survey (NDNS) and with the Dietary Reference Values (DRV) indicated that the energy intake was similar.

Table 5.13. Average daily intakes from macronutrients (% energy) of this study compared with the National Diet and Nutrition Survey (NDNS), with the Dietary Reference Values (DRV) and with the study of Saini (2000)

Nutrient	This study	DRV	NDNS	Saini (2000)
Carbohydrate (%)	**42.2**	78%	**47.5**	46.5
Sugars (%)	**17.8**		**11.9**	22.3
Protein (%)	**17.8**	147%	**16.5**	17.2
Fat (%)	**33.9**	100%	**36.1**	34.5
SFA (%)	**11.8**	109%	**15.3**	13.1
MUFA (%)	**9.7**	78%	**11.5**	
PUFA (%)	**4.9**	89%		
Alcohol (%)	**6.9**	208%		1.4

The macronutrient intake (% energy) was compared with the Dietary Reference Values (DoH, 1991), the National Diet and Nutrition Survey (Finch et al, 1998) and a study of the free living elderly over the age of 65y carried out in the same geographical area (Saini, 2000) (Table 5.13). Similarities were seen in all mean macronutrient intakes

between this study and the study of Saini, (2000) and the NDNS survey with exceptions for the intakes of sugars, saturated fatty acids and monounsaturated fatty acids as a percentage of energy. The macronutrient intake, as a percentage of energy, demonstrated higher sugars intake compared with the NDNS survey and lower sugars intake compared with the Saini (2000) and lower saturated fatty acids and monounsaturated fatty acids intake than both studies. It could be suggested that these differences are likely to be due to under reporting of dietary intake by this population. Under reporting by women is common (Macdiarmid and Blundell, 1998) and it has been shown that women are more likely to report an intake which they believe is socially acceptable (Schoeller, 1990). It is however surprising that if these women were reporting an intake that they considered socially acceptable, they reported the consumption of such high levels of sugars compared with the results of NDNS survey. Another explanation for this dietary intake is that the researcher misinterpreted the comments of the respondents since she is unfamiliar with some of the eating habits of the British.

Although this suspected under reporting imposes a limitation on this study, it was considered realistic to compare the macronutrient intake between frequency of usage of small domestic kitchen appliances owned by this population to provide an indication of whether domestic appliances affect intake. It could be assumed that within the population there are similar discrepancies.

Comparison of macronutrient intake and frequency of usage of various domestic kitchen appliances found significantly lower mean percentage total fat and MUFA for those that frequently used a microwave oven compared to those who used this appliance infrequently. It was expected that the use of a microwave oven might have a positive effect on the nutritional content of the diet, because of retention of water soluble vitamins (Burnett and Rees, 1991), however nutrient analysis has demonstrated that the use of a microwave to cook bacon results in a higher fat content than if the bacon was grilled (FSA, 2002). This finding may suggest that the elderly, who are now confident using the microwave oven, use this appliance instead of any other due to its convenience and speed

of cooking food. However, only very small numbers used this appliance infrequently so firm conclusions cannot be drawn from this finding.

Overall the results of this study of the elderly have shown that the ownership and use of small kitchen domestic appliances by this population is high, which tend to suggest that the elderly are not totally resistant to change and have incorporated new methods of cooking, such as use of the microwave oven, into their cooking skills. Some of the appliances, such as the juice maker, that a large number of these individuals owned would lead to a healthier diet so health concerns may be a factor in their ownership and use of domestic appliances. However it is probable that many of these appliances (for example the electric food mixer) are used by the elderly to compensate for physical problems and assist them in food preparation. Musculo-skeletal disorders and arthritis can affect the mobility and ability of the elderly to handle food (OPCS, 1994). The elderly living on their own can suffer from depression and loneliness following the loss of a life long partner and a meal time companion resulting in a lack of motivation to cook (Howarth, 1993). The extensive ownership of microwave ovens and the mastery of this technology to provide meals as seen in this study could provide the elderly who live alone with the means to prepare meals easily and thus improve the nutrition of the elderly.

Chapter 6

The ownership of small kitchen domestic appliances by a Greek-Cypriot population aged over 60years and the effect of their usage in relation to nutrient intake.

6.1. Introduction

During the last decade there has been a trend in Mediterranean countries away from the traditional way of eating suggested to be due to urbanisation and the adoption of a North American way of eating and lifestyle (Serra-Majam and Helsing, 1993). The Greeks have increased their intake of meat and dairy products and decreased their intake of olive oil (Simopoulous and Sidossis, 2000). Traditional methods of cooking are perhaps being influenced by the ownership of small kitchen domestic appliances such as microwaves and electric steamers.

It has been suggested that elderly people may be resistant to introducing changes. The Scottish Health Heart Survey (McKay and Bolton-Smith, 1995) of elderly people found that 33% of men and 26% of women claimed that they would not change their diet even when faced with a major life threatening illness. A further study in the UK showed the dietary practises of the elderly were primarily governed by taste, habit and price (Bilderbeck et al, 1981).

The Cypriot population aged over 65 years has increased from 5.8% in 1881 to 6.4% in 1960 and 11% in 1992 (Department of Statistics and Research, Ministry of Finance of Cyprus, 1998). In the UK the majority of kitchen appliances have been available from retailers for many years, the microwave was first on sale in the UK in 1959 (Microwave cook, 1999). However, in Cyprus the rise in tourism has only recently provided some of the population with an increase in affluence and the means to purchase domestic appliances (The World Guide, 1998). It was considered that the elderly in this country would have been least affected by tourism and could provide a group who used traditional methods of meal preparation with minimal use of domestic appliances.

This study of an older group of females in Cyprus (over the age of 60y) was designed to investigate the ownership of small kitchen domestic appliances and to compare the nutritional intake of individuals who used different methods of preparing food from similar raw commodities. It provides evidence of the extent to which kitchen appliances have altered the diet.

6.2. Results

The questionnaire regarding the ownership and use of various domestic kitchen appliances was completed by 36 female volunteers and a three day dietary record by 25 volunteers.

6.2.1. Questionnaire

6.2.1.1. Demographics of the respondents

The ages of the respondents were 60y and over (60-64years:4, 65years and over:32), all had been in partly skilled occupations. There were 25 respondents who were married and 11 living on their own, one was divorced and the others (10) were widowed (Table 6.1).

Table 6.1. Demographics of the respondents

	Demographics of the respondents	
	No	**Valid %**
Age		
60-64years	4	11.1
65years and over	32	88.9
Occupational Status		
Partly skilled occupations	36	100
Household Composition		
Singles	11	30.6
Couples	25	69.4

6.2.1.2. Ownership of small domestic kitchen appliances

Table 6.2. shows the ownership of small domestic kitchen appliances. The appliances included those that may have a positive or a negative effect on diet and nutritional content (further information for the list of the appliances and how this was derived were discussed in Chapter 2). The largest proportion (but a minority) of respondents owned an electric toaster (44.4%), an electric grill (38.9%), an electric steamer (36.1%), an electric kettle (33.3%) and/or an electric food mixer (33.3%). Less than 5% owned a deep fat fryer (2.8%) and/or a blender (2.8%).

Table 6.2. Ownership of small domestic kitchen appliances (%) with reference to age group

	Age groups		
Appliance	**60-64y (n=4)**	**65y+ (n=32)**	**Total**
Electric Toaster	100.0	37.5	44.4
Electric Grill	25.0	40.6	38.9
Electric Steamer	75.0	28.1	36.1
Electric Kettle	75.0	28.1	33.3
Electric Food Mixer	75.0	28.1	33.3
Hand Held Electric Food Mixer	50.0	18.8	22.2
Microwave oven	25.0	18.8	19.4
Sandwich Maker	0.0	21.9	19.4
Juice Maker	25.0	9.4	11.1
Deep fat fryer	0.0	3.1	2.8
Blender	25.0	0.0	2.8

The age group 60-64years were more likely to own most of the appliances than the age group 65years and over except in the case of a sandwich maker (Table 6.2). Statistical tests between age groups were not applicable due to the small number of subjects in the younger age group.

There were no significant associations found between those who were married and those who lived on their own (the composition of the household) with ownership of domestic appliances. However, a microwave oven was only owned by those who were married. Those who lived alone were more likely to own a sandwich maker, an electric grill, an electric steamer and a electric kettle whereas those who were married were more likely to own a hand held electric food mixer (Table 6.3).

Table 6.3. Ownership of small domestic kitchen appliances (%) with reference to household composition

	Household composition		
Appliance	**Married (n=25)**	**Alone (n=11)**	**P**
Electric Toaster	44.4	45.5	.936
Microwave oven	28.0	0	.051
Sandwich maker	12.0	36.4	.089
Electric grill	36.0	45.5	.592
Deep fat fryer	4.0	0	NA
Electric steamer	28.0	54.5	.127
Electric kettle	24.0	54.5	.073
Blender	4.0	0	NA
Hand held electric food mixer	24.0	18.2	.699
Electric food mixer	36.0	27.3	.609
Juice maker	12.0	9.1	NA

The respondents were asked how important they considered their appliances to be. All items were considered to be either important or extremely important to the majority of respondents with exceptions for the deep fat fryer, electric kettle and blender (Table 6.4).

Table 6.4. The importance of each domestic kitchen appliance to the respondents

Appliance	Not at all No. (%)	Slightly Important No. (%)	Moderately Important No. (%)	Important No. (%)	Extremely Important No. (%)
Electric Toaster	2(12.5)	2(12.5)	1(6.3)	7(43.8)	4(25.0)
Microwave oven	0	1(14.3)	1(14.3)	5(71.4)	0
Sandwich maker	0	0	0	3(42.9)	4(57.1)
Electric grill	0	0	1(7.1)	11(78.6)	2(14.3)
Deep fat fryer	0	1(100.0)	0	0	0
Electric steamer	0	2(15.4)	2(15.4)	9(69.2)	0
Electric kettle	0	3(25.0)	4(33.3)	2(16.7)	3(25.0)
Blender	0	0	1(100.0)	0	0
Hand held electric food mixer	0	2(5.6)	0	6(16.7)	0
Electric food mixer	0	4(33.3)	2(16.7)	6(50.0)	0
Juice maker	0	0	2(50.0)	2(50.0)	0

6.2.1.3. Use of small domestic kitchen appliances

Most of the respondents spent either more than 2 hours on cooking each day (48.6 %) or 1-2 hours (40.0%), the remainder (11.4%) spent less than 1 hour cooking each day. There was no significant association between the time spent on cooking each day and the ownership of any domestic kitchen appliance (all $p>0.05$).

A large proportion of respondents used all cooking methods 1-3 times a week. A few used boiling, baking, frying and stewing more frequently. Steaming was the least frequently used method (Table 6.5). Boiling, frying and using a traditional oven were used more frequently by the older group, however, statistical tests were not applicable.

Table 6.5. The frequency of use of each cooking method

Cooking method	More than once a day	Everyday	3-5 times a week	1-3 times a week	Less than once a week
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Steaming	0	0	0	11(55.0)	5(25.0)
Boiling	1(3.1)	1(3.1)	2(6.3)	26(81.3)	0
Baking	0	1(2.9)	0	31(88.6)	1(2.9)
Frying	1(4.2)	0	0	17(70.8)	1(4.2)
Stewing	0	1(3.0)	1(3.0)	29(87.9)	0
Grilling	0	0	0	26(92.9)	0
Barbecue	0	0	0	16(84.2)	1(5.3)
Traditional oven	0	0	0	17(85.0)	1(5.0)

The frequency of use of the individual domestic appliances is shown in Table 6.6. The majority of respondents used the electric toaster (54.5%), the sandwich maker (71.4%), the microwave oven (50%) and the electric kettle (50.0%) at least once a day. Other appliances were used less frequently.

Table 6.6. The frequency of use of each small domestic kitchen appliance

Appliance	More than once a day	Once a day	3-4 times a week	Once a week	Less than once a week
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Electric Toaster	2(18.2)	4(36.4)	0	2(18.2)	3(27.3)
Microwave oven	2(33.3)	1(16.7)	0	2(33.3)	1(16.7)
Sandwich maker	0	5(71.4)	1(14.3)	1(14.3)	0
Electric grill	0	2(15.4)	1(7.6)	7(53.8)	3(23.0)
Deep fat fryer	0	0	0	0	1(100.0)
Electric steamer	0	1(7.7)	1(7.7)	4(30.8)	7(53.8)
Electric kettle	0	4(50.0)	1(12.5)	3(37.5)	0
Blender	0	0	0	0	1(100.0)
Hand held electric food mixer	0	0	0	3(50.0)	3(50.0)
Electric food mixer	0	0	1(11.1)	1(11.1)	7(77.7)
Juice maker	0	0	1(33.3)	1(33.3)	1(33.3)

6.2.1.4. Purchase of small domestic kitchen appliances

The most important factors when purchasing a domestic kitchen appliance were considered to be cost (47.2%), appearance (11.1%), durability (8.3%) and health reasons (8.3%).

6.2.2. Focus Groups

Transcripts of the focus group discussions can be found in Appendix 8.

Four of the elderly ladies had never bought, did not own and had never used any small kitchen domestic appliances. They stated that they "continued to cook, using the traditional utensils, traditional Mediterranean dishes in the way that they had learnt from their parents with the only difference being that today they have a gas or an electric cooker"(F5). Two individuals commented that "they could not afford to buy any domestic appliances"(F9), a statement corroborated by the fact that the appliances owned

by five out of six participants were all purchased by their children. They all considered that these appliances were important and essential for the modern housewife but not necessary for them, as one stated "there is no need to buy an electric food mixer in order to help me make cakes as I can make them by hand"(F5).

Overall very few appliances were owned by these participants. Four owned an electric grill, one of whom never used it, the others however used it at least once a week and considered it important for health reasons. Statements such as "I bought it for myself in order to cook healthy and look after my diet"(F1), "I own this appliance for health reasons and I use it instead of frying for health reasons"(F3) were made. One participant owned a microwave oven that was "used to grill and re-heat food, once a week or once every two weeks"(F7). One lady owned several appliances, an electric kettle, a food mixer, a juice maker and a blender that she "only used when her children visit her"(F8). The appliances were all sited on top of their kitchen work surfaces. Since most of the small domestic kitchen appliances were bought by their children, the participants never looked for price, brand names, extra features or the appearance of the few appliances that they owned.

Cooking methods used in the past were mentioned by the participants (Appendix 9). All the respondents agreed that in the past "life was very difficult, lots of poverty, the people used to work very hard in the fields in order to feed their family" (F4). The majority of participants remembered the cooking methods used by their parents or relatives from whom they learnt to cook. In their houses for a cooker, they had a fireplace with wood or coals underneath and upon which a "niskia"- an iron instrument was placed in order to put the "magirissa"-casserole on when they were cooking a meal. They remembered that, when they were young, the casserole pot was earthenware, stoneware or iron but later in their lives these were made of aluminium and copper. They did not have any appliances, only pans and saucepans made of iron, aluminium and copper. Most of them, both the women and the men, used to work in the fields from early in the morning until late in the evening and they cooked their lunch there. They used two stones to stand the casserole on and with wood underneath they cooked a meal.

6.2.3. Dietary Diaries

Twenty five dietary diaries were collected and analysed and the mean macronutrient intake is shown in Tables 6.7 and 6.8.

Table 6.7. Macronutrient intake

Nutrient	N	Mean	Maximum	Minimum	95% CI
Energy (kcal)	25	2108	3347	1441	1924,2292
Protein (g)	25	82.68	142	52	74.65,90.71
CHO (g)	25	191.1	364	113	164.4,217.7
Sugars (g)	25	84.6	167	34	69.1,100.2
Fibre (g)	25	23.5	51	12	19.2,27.8
Fat (g)	25	107.1	157	69	97.6,116.5

Table 6.8. Macronutrient intake as a percentage of energy intake

Nutrient	N	Mean	Maximum	Minimum	95% CI
Carbohydrate as % of energy	25	33.7	54.1	20.4	30.7, 36.8
Sugars as % of energy	25	14.3	25.2	6.3	12.2, 16.4
Protein as % of energy	25	15.9	20.8	11.4	14.7, 17.2
Fat as % of energy	25	46.1	59.5	34.9	44.0, 48.2
SFA as % of energy	25	11.7	20.5	5.9	10.4, 13.2
MUFA as % of energy	25	19.4	28.6	9.8	17.5, 21.3
PUFA as % of energy	25	4.8	8.1	2.5	4.3, 5.4

No one stated that they consumed any alcohol thus it has been omitted

Comparisons of macronutrient intake with usage of various domestic kitchen appliances are shown in Table 6.9. No significant differences were found between the usage of any domestic kitchen appliance and macronutrient intake (all $p>0.05$).

Table 6.9. Macronutrient intake (% energy) compared with usage of small domestic kitchen appliance

	CHO		Sugars		Protein		Fat		SFA		MUFA		PUFA	
Electric Toaster %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	6	3	6	3	6	3	6	3	6	3	6	3	6	3
Mean intake	35.5	31.6	12.5	14.2	16.2	14.6	43.9	48.2	11.1	10.3	18.5	22.3	5.6	5.2
Microwave Oven %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	1	3	1	3	1	3	1	3	1	3	1	3	1	3
Mean intake	40.8	31.9	11.2	14.1	13.1	16.8	40.5	43.8	9.4	11.7	14.9	19.4	6.5	4.4
Sandwich Maker %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	6	1	6	1	6	1	6	1	6	1	6	1	6	1
Mean intake	35.7	30.3	17.1	12.3	16.0	13.9	43.7	45.4	10.6	11.2	16.9	22.6	4.6	4.7
% Electric Grill	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	1	8	1	8	1	8	1	8	1	8	1	8	1	8
Mean intake	31.1	36.1	16.7	14.3	15.7	14.8	43.7	45.1	13.9	12.7	21.2	19.6	4.9	5.4
Electric steamer %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	1	10	1	10	1	10	1	10	1	10	1	10	1	10
Mean intake	42.6	31.9	20.4	14.5	12.3	15.5	43.7	47.7	8.4	11.2	19.2	20.9	5.7	5.5
Electric Food Mixer %	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	1	7	1	7	1	7	1	7	1	7	1	7	1	7
Mean intake	35.1	32.7	20.2	11.7	18.3	17.4	45.3	45.1	13.6	10.2	18.5	18.7	4.7	4.6
Electric Kettle%	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**	F*	IF**
No.	5	3	5	3	5	3	5	3	5	3	5	3	5	3
Mean intake	31.5	31.5	15.7	12.1	15.5	17.7	48.2	45.2	10.7	10.2	21.9	18.3	5.3	3.8

*F= Frequent use: more than 3-4 times a week

**IF= Infrequent use: once a week or less than once a week

Data were not analysed for the deep fat fryer, blender, hand held electric food mixer or juice maker due to low numbers owning these items

6.3. Discussion

Limitations

The questionnaire was completed by 36 female volunteers and a three day dietary diary by 25 volunteers, which may limit the generalisability of the results. Based on their age they were placed into two groups, those aged 60-64y (4 subjects) and those aged 65y and over (32 subjects). The sample size for this study was smaller than other studies concerned with diet (Saini, 2000; Finch et al, 1998). Elderly people are known to be cautious of answering questions on confidential issues such as diet and health (Kelsey et al, 1989), in this study several individuals failed to return the questionnaire (approximately one third of those approached). In this study there were more married than single women, the National Diet and Nutrition Survey (NDNS) (Finch et al, 1998) also reported a better response rate from elderly people who were married than those who were single. These differences may possibly be due to the type of organization targeted.

Ownership of small domestic kitchen appliances

In Cyprus the elderly owned few domestic appliances. The appliance that was owned by the largest proportion of respondents, only 44%, was an electric toaster. Similar findings were reported during the focus group discussions, where four out of the ten participants did not own any small kitchen domestic appliance. An inability to afford appliances, but more importantly the fact that they continued to use the traditional methods of cooking, were the reasons given for either them not owning and not using kitchen appliances. This indicates that for these respondents habit and tradition are major influences on food choice and preparation. Studies in the UK have shown that the dietary practises of the elderly are influenced by habit and price (Bilderbeck et al, 1981; Saini, 2000) and that this group of individuals are resistant to changing their dietary practices (McKay and Bolton-Smith, 1995). In the focus group discussions most participants agreed with the statement that "they continued to cook using the traditional utensils, the traditional Mediterranean dishes in the way they had learnt from their mothers" emphasising the fact that tradition is important to these individuals. These individuals must have a range of cooking skills in order that they can follow traditional practises.

The five appliances that over one third of these elderly Cypriot adults owned, the electric toaster, electric grill, electric steamer, electric kettle and electric food mixer were those that are at the lower end of the price range of small kitchen domestic appliances (Argos, 2004) and probably were purchased as gifts by family members as the focus group participants indicated. The Mintel (2005a,b) survey in the UK demonstrated that many appliances are purchased as gifts. These appliances were also those that the younger adults in Cyprus considered the most important, indicating that they purchased for their elderly relatives only those appliances they thought important. It appears however that the appliances were not always used, except, in some cases, when the children visited. This underlines the symbolic nature of appliances as gifts and as a token of love. It may also suggest concern by children that their parent(s) are eating properly.

In this study the questionnaire was completed by the researcher in a face-to-face interview and thus the high reported ownership of electric grills is likely to be a valid finding. This was also confirmed in the focus group discussions where this appliance was the one owned by the majority of respondents. This appliance is marketed as a means of providing a diet containing less fat for example "the George Foreman Lean Mean Fat Reducing Grilling machine"(Cleanh, 2006). In the UK Mintel (2005a) has reported an increase in ownership of 12% between 2000-2004 to 17%. The percentage ownership in Cyprus was found to be much higher than this and may be attributable to this population's or their families (since appliances were mainly purchased for the elderly by their children) concerns about their health. One member of the focus group discussions concurred with this and stated "I bought it (an electric grill) to cook healthy and look after my diet".

It has been previously shown that although the elderly are resistant to dietary change even when faced with a major life threatening disease (McKay and Bolton-Smith, 1995), they are more susceptible to positive health messages, adding items to their diet, than negative messages which exclude items (McKay and Bolton-Smith, 1995). These individuals may be aware of the increase in the incidence of CHD in this country possibly from Government campaigns or reports in the newspapers (Cyprus Ministry of

Health, 1995; Tornarides, 1998) and when provided with a means of producing traditional dishes using an appliance which is said to reduce the fat content of their food, are willing to change their practices. The description of one of these appliances states "For health-conscious cooks. Decrease the fat and create great-tasting, healthier meals in minutes" (Cleanh, 2006). It has been shown in a study in the UK that elderly people in Nottingham not only had knowledge about dietary fats but also had made dietary changes to incorporate low fat alternatives to high fat food (Lilley and Johnson, 1996). The relatively high ownership of an electric steamer by this elderly Cypriot population may also reflect a concern about health, however this appliance was used infrequently by most individuals.

It was surprising to find that the questionnaire respondents considered the majority of items that were owned by at least 15% of them, with the exception of the electric kettle, to be important to them; whereas the focus group discussion participants stated that all appliances that they owned with the exception of the electric grill and the microwave were used only when their children came to visit. The apparent difference in these two findings may be due to the fact that although the focus group participants did not use the appliances they may still consider them important. This may be a reflection of their symbolic importance as gifts. One of them did state that she considered the appliances a valuable asset for housewives today.

Elderly people have reported lower rates of ownership of freezers, microwave ovens and refrigerators than many other population groups (Office of Population Censuses and Surveys Social Survey Division, 1985). In this study the ownership of microwave ovens was also considerably lower in the older group which reflects the comments made about preparing traditional meals. These elderly individuals stated that they "continue to cook, using traditional utensils, traditional Mediterranean dishes in the way that they had learnt from their parents" Studies of microwave oven ownership and use have shown that microwave owners were younger, had a higher income and bigger families than non-owners (Thompson and Sweaney, 1994b).

The appliances that were owned by a substantial number of the elderly such as the electric steamer and electric grill are able to produce food that could have a positive influence on diet and health. However, there was no significant difference in the intake of any macronutrient with the frequency of usage of any appliance. Others have found that the elderly have good levels of nutritional knowledge but that this is not put into practice (Lilley and Johnson, 1996). Information concerning health and nutrition is obtained by the elderly mainly from newspapers, magazines and television (Davies et al, 1985; Saini, 2000), the electric steamer and grill are relatively recent additions to the domestic appliance market and may have been frequently advertised.

The relatively high proportion of elderly who owned electric food mixers could reflect the purchase of appliances for the elderly by others who considered that the elderly would mainly cook food from basic commodities (Mintel, 2000b). However although several of them owned food mixers, the focus group participants indicated that it was only used when "the children visit" and that "there is no need to own a food mixer ….. as I can make them (cakes) by hand".

Usage of small domestic kitchen appliances

Seventeen per cent of British people eat in a fast food outlet weekly and thirty-three per cent of women expressed the belief that cooking and preparing food is too time consuming (Novartis, 2000). According to Gershuny and Robinson (1988), domestic work time has been declining for women and that this is attributed to three causes: the desire to reduce unsatisfying low status activity, the women's movement generating normative support for reducing women's responsibility for housework and the time-saving features of new household appliances such as the dishwasher and the microwave. It has been demonstrated that women spend less time in the kitchen preparing meals (Vanek, 1974; Caraher et al, 1998). This change in life style of the population did not appear to be true for those in Cyprus, the majority of whom spent more that two hours on cooking each day. This might suggest that these people had a more diverse cooking repertoire which may reflect a greater range of skills obtained during compulsory home economics lessons at school where the emphasis is on practical techniques (Frobisher et

al, 2006). On the other hand it is more likely to reflect a maintenance of tradition as expressed by the participants of the focus groups. It may also be a result of the different values held by this population. Domestic work, specifically cooking, may be more valued in Cyprus, at least amongst the older residents, who are unlikely to have ever been in paid employment. This female age group is not in the workforce and it has been suggested that female employment has led to less time being spent in the kitchen and influenced eating patterns and cooking techniques (Department for Environment, Food and Rural Affairs, 2000).

Previously it has been found that older adults were more confident using steaming poaching and stewing/braising techniques than the microwave oven (Caraher et al., 1999). The elderly in Cyprus used boiling, stewing, grilling and the traditional oven, which tends to support the fact that they are still cooking from basic ingredients in a traditional manner. The focus groups stated that stewing (casseroles) was the traditional way of cooking. A traditional oven was used by most of the elderly Cypriot population at least once a week which again tends to reflect a tendency of this population to continue using traditional methods, and the fact that they have a range of skills to cook in this way.

Purchase of small domestic kitchen appliances

Health, although by only a few, was again cited as one of the factors to consider when purchasing an electric domestic appliance. Although, easy cleaning was the most important factor to be considered when purchasing an in the Mintel (2000b) survey, this was not mentioned by the Cypriot elderly. This may be a reflection of the fact that they spend a considerable amount of time in the kitchen and easy cleaning would not alter this, or, that they have few appliances. The questionnaire respondents considered their appliances important to them and the majority that they owned were used frequently indicating that time saving was not a consideration. The items that these individuals did not use frequently were those which could have assisted them in the preparation of meals from raw commodities such as the food mixers, this may indicate having a greater variety of cooking skills which do not require appliances. One of the focus group participants

stated that she had no need to use an electric mixer as she could complete the task by hand.

Nutrient Intake

Although recently there has been a trend in Mediterranean countries away from the traditional way of eating (Serra-Majem et al, 1993), it was considered that this elderly population in Cyprus would still be consuming a traditional Mediterranean diet (Trichopoulou et al., 1993), since it has been demonstrated that the food choice of the elderly is governed principally by habit and taste and that they are resistant to change (Bilderbeck et al, 1981). A comparison of the dietary intake of the Cypriot elderly with the Mediterranean diet demonstrated a lower intake of carbohydrates as a percentage of energy intake and a higher intake of fats and saturated fats (Table 6.10). However, their nutrient intake is high in monounsaturated fats and polyunsaturated fats and thus probably still providing some health benefits (De Lorgeril et al., 1998). The macronutrient intake, as a percentage of energy, demonstrated lower carbohydrate intake, higher intake of fats and sugars and lower saturated fats intake compared with the NDNS survey. It could be suggested that these differences are likely to be due to under reporting of dietary intake by this population. Under reporting by women is common (Macdiarmid and Blundell, 1998) and it has been shown that women are more likely to report an intake which they believe is socially acceptable (Schoeller, 1990). It is however surprising that if these women were reporting an intake that they considered socially acceptable, they reported the consumption of such high levels of sugars compared with the results of NDNS survey.

Table 6.10. Average daily intakes from macronutrients (% energy) of this study compared with the National Diet and Nutrition Survey (NDNS) and with the Mediterranean diet

Nutrient	Cyprus Study Over 60y	Mediterranean Diet*	NDNS
Carbohydrate (%)*	33.7	42	47.5
Sugars (%)*	14.3		11.9
Protein (%)	15.9	15	16.5
Fat (%)*	46.1	42	36.1
SFA (%)	11.7	9	15.3
MUFA (%)*	19.4	19	11.5
PUFA (%)	4.8	4	
Alcohol (%)*	0	2.5	

* Trichopoulou et al., (1993)

The usage of small kitchen domestic appliances was not associated with the macronutrient intake of these individuals, which may be due to the fact that these appliances were purchased for the elderly by family members and were rarely used, as indicated by the focus group participants, thus not affecting their dietary intake. However no differences were found between frequency of usage and intake of macronutrients, which tends to suggest that these appliances are being used to assist in the traditional preparation of meals rather than to provide an alternative method of preparing food. However usage of any appliance may not have a predictable influence on nutrient intake. Many appliances could lead to healthier or unhealthier food depending on choice. Others such as the deep fat fryer which can only prepare less healthy foods, could paradoxically, lead to a reduction in fat intake if the frequency of consumption is reduced, for example if the work caused using the fryer outweighs the advantages.

Overall the elderly in Cyprus were found to own few small domestic kitchen appliances compared to the other groups studied. Two re-occurring themes appeared to influence the ownership and use of these appliances: the respondent's concerns about their health and a wish to continue to use traditional ways of food preparation.

Mediterranean countries such as Cyprus traditionally had a low incidence of nutritionally related disease (Berrino and Muti, 1989). This related to the food items consumed and the methods used for cooking which were heavily dependent on the use of olive oil and open wood fires (Ferro-Luzzi and Sette, 1989). The healthy aspects of the Mediterranean diet are emphasised in the schools in Cyprus and due to the alarming increase in CHD, various government initiatives are well publicised (Cyprus Ministry of Health, 1995). Thus it is probable that these elderly individuals consider the ways that they have always prepared their food to be healthy and are unlikely to change their habits except in the case of an appliance such as an electric grill, which is widely advertised to lower fat intake. For these people habit is a major influence on food preparation. These individuals, who considered that the ways they prepared food using few domestic appliances were healthy, were found to have a very high fat intake. This tends to support previous findings that the elderly believe they have a healthy diet but do not know what a healthy diet is (Griffiths et al, 1994). Unfortunately the sample for this study was small and few used any appliance frequently, it would be of interest to continue this investigation of the elderly with a greater number of respondents to determine if differences in nutrient intake are influenced by small domestic appliances. Also since there are a large percentage who own no appliances it would be possible to carry out a further study whereby one specific appliance was given to an individual and their diet monitored to determine the effect of a specific appliance on nutrient intake.

Chapter 7

Comparison between Cypriots and English in the ownership and usage of small domestic kitchen appliances and the effect of their usage on macronutrient intake.

This study aimed to determine the extent of ownership of small domestic kitchen appliances and the influence their usage has on dietary macronutrient intake in two different countries, England and Cyprus. The way in which food is prepared may contribute to the nutritional content of the diet (FSA, 2002). Traditional methods of cooking are influenced by kitchen domestic appliances. A previous study (Burnett, 1990) has suggested that the ownership of domestic appliances signifies to some their arrival at a higher social level which is associated with the acquisition of material possessions. High income groups are significantly more likely than low income groups to own domestic appliances (Caraher et al, 1999).

Cyprus is a country that over the past few decades has undergone epidemiological transition; many of the population are involved in employment in businesses and professions resulting from the increase in tourism. There has been a steady increase in female employment with many women having their own careers, although it has not as yet reached the level of female employment in the UK. The increased affluence of the younger women in Cyprus could provide the means to liberate them from domestic chores by providing them with the ability to purchase domestic kitchen appliances that will assist them in the preparation of meals and reduce the time spent on these tasks. It is realistic to suggest that the increase in tourism and its resultant increase in female employment liberating women from the domestic environment mimics the situation seen in the UK during World War II when women were employed in active service both in the armed services and on the domestic front (Minns, 1980). In time the preparation of food from basic ingredients in Cyprus could become obsolete and the social trend follow that of the UK where there has over the past decades been a rapid growth in eating outside the home and ready prepared foods (Lupton, 1996; Ritzer, 2000). This situation is likely to result in a change in the traditional dietary intake and a continued increase in the incidence of nutritionally related disease in this country.

7.1. The ownership of small domestic kitchen appliances.

Differences were found in the ownership of most of the domestic appliances under consideration between those respondents in Cyprus and those in Britain aged 25-55y (Table 7.1).

Table 7.1. Comparison of the ownership (%) of small domestic kitchen appliances by the Cypriot and English female respondents.

	Cypriots 25-55y	English 25-55y	Cypriots over 60y	English over 60y
Appliance				
Electric toaster	83.9	86	44.4	88.9
Sandwich maker*	79.3	69.3	19.4	47.2
Juice maker*	78.7	52.4	11.1	19.4
Electric kettle*	78.3	85.8	33.3	97.2
Electric grill*	61.3	71.3	38.9	88.9
Microwave oven*	57.3	70.9	19.4	83.3
Blender	57	53.7	2.8	44.4
Food processor	52	49.8	0	63.9
Electric steamer*	39.7	30.1	36.1	8.3
Electric food mixer*	36.7	21.7	33.3	63.9
Coffee maker*	35	43.5	0	75
Deep fat fryer	23.7	26.2	2.9	11.1
Electric crepe and pancake maker*	9	5.1	0	5.6
Ice cream maker	1.7	2.8	0	5.6
Bread maker*	1.3	4.7	0	16.7
Popcorn maker	0.3	4.2	0	2.8
Waffle maker	0.3	0.8	0	5.6

*Significant differences between Cypriot and English respondents (aged 25-55y) ($p<0.05$)

Those appliances owned by more Cypriot than English women aged 25-55y were those that would complement their cooking methods, for example a hand held food mixer, rather than those that would reduce the time spent in the kitchen and assist the

preparation of convenience foods, such as microwave ovens, that were owned by more British women. The appliances that assisted/complemented cooking methods were also those more likely to be owned by the older group of the English population (food processors and hand held mixers). This may suggest that the younger English population have not acquired the cooking skills to be able to produce meals from raw commodities and thus do not know what to use these appliances for, whereas the Cypriots and older English subjects still have the skills to prepare their food from raw commodities. Many believe that nutrition education in England is inadequate and insufficient attention is paid to cookery skills (Eiser et al, 1998). In Cyprus, home economics with an emphasis on practical skills is a compulsory National Curriculum subject for all Cypriot school children up to 16years of age. In England home economics has been replaced by Design and Technology in the National Curriculum where pupils are taught to "develop their design and technology capability through combining their designing and making skills with knowledge and understanding in order to design and make products" (School Curriculum and Assessment Authority, 1996). Although food still features as a commodity in Design and Technology the emphasis is theoretical rather than practical and focused towards industry rather than the home, the handling of food is not a priority (Lang and Caraher, 2001). Frobisher et al (2006) have shown that children, aged 11-12y, undertaking a home economics curriculum have greater practical knowledge concerning nutrition than those being taught design and technology.

This greater ownership by the English elderly group may also reflect societal changes in that older people are more likely to be able to cook and have more spare time, whereas younger people are consuming increasing amounts of fast food and convenience meals, and have poorer cooking skills (Lang and Caraher, 2001). All the respondents in England came from a professional or semiskilled occupation, high socio –economic groups have been found to be more likely to cook food from basic ingredients where the ownership of these appliances could enhance and supplement the traditional methods of cooking (Burnett and Rees, 1991). It has also been suggested that there is a divide between generations with regard to those appliances that facilitate snacking and those that facilitate cooking (Mintel, 2005a).

Two appliances that could improve the nutrient content of the diet are an electric steamer (increase in water soluble vitamins) and a juice maker (increase fruit consumption). These were owned by more younger Cypriots than younger English women. This probably reflects the difference between the two countries in traditional diets and the availability of fresh fruit and vegetables at low cost. It has been noted that the Greeks and other Mediterranean populations have maintained their traditional diet with respect to a high consumption of fruit and vegetables (Simopoulos and Sidossis, 2000). One of the Cypriot focus group participants commented on the availability of fresh fruit, stating "I use it (a juice maker) a lot as I have lots of oranges and lemon trees in the garden". There is in the Western countries of the world an increasing body of people who advocate the consumption of local produce that can help restore rural areas and return fresh and wholesome food to cities (Halwell, 2002). In the UK, farmers' markets and the 5 a day campaign (DoH, 2005) are initiatives that could provide the British consumer with more locally grown food and perhaps a more nutritious diet.

Comparison of the ownership of appliances by the elderly and younger groups in Cyprus showed that the five appliances owned by the greatest number of elderly (i.e. the most popular) were the electric toaster, electric grill, electric steamer, electric kettle and electric food mixer, whereas the four appliances owned by the greatest number of younger Cypriots were the electric toaster, electric kettle, sandwich maker and juice maker. The difference between which items were owned by the most individuals in the older and younger generations in Cyprus could be due to several reasons: that the elderly did not choose the appliances they owned, but the younger groups did; that the appliances could assist with the preparation of traditional meals; that the elderly are concerned about healthy eating and that the elderly are on a limited income and can only afford the cheaper appliances. The majority of the elderly indicated that they had not bought any appliances but those that they owned were purchased, and given to them, by their children. The items that the elderly owned tended to be those that the younger group found most important to them (Chapter 4) and thus did not reflect either a need or use for these appliances by the elderly. Many of the focus group participants did state that they

did not use some of the appliances that they owned. During the focus group discussions one participant stated that she could used her electric grill "to cook traditional Mediterranean style dishes" thus this is a possible explanation for the elderly owning certain appliances. On the other hand, the appliances that were owned by a substantial number of the elderly such as the electric steamer and electric grill are able to produce food that could have a positive influence on diet and health. Others have found that the elderly have good levels of nutritional knowledge but that this is not put into practice (Lilley and Johnson, 1996). Information concerning health and nutrition is obtained by the elderly mainly from newspapers, magazines and television (Davies et al., 1985; Saini, 2000), the electric steamer and grill are relatively recent additions to the domestic appliance market and may have been frequently advertised.

The relatively high proportion of Cypriot elderly who owned electric food mixers and the low proportion who owned microwave ovens compared with the younger individuals could reflect the purchase of appliances for the elderly by others who considered that the elderly would mainly cook food from basic commodities (Mintel, 2000b). However although several of them owned food mixers, the focus group participants indicated that it was only used when "the children visit" and that "there is no need to own a food mixer ..... as I can make them (cakes) by hand". The differences in relative ownership of appliances such as the blender, juice maker, and sandwich maker possibly reflects a difference in family composition, the younger respondents all had children and these items have previously been found to be owned by a larger number of those with children in the household (Mintel, 2000b). Studies of microwave oven ownership and use have shown that microwave owners were younger, had a higher income and bigger families than non-owners (Thompson and Sweaney, 1994b).

Differences were found in the relative proportions of those who owned an electric steamer, microwave oven, sandwich maker and blender between the elderly in Cyprus and those in England. The electric steamer was owned by a greater number of Cypriot elderly whereas the other appliances were owned by more of the English elderly. These differences could also reflect a difference in affluence and/or a difference in cooking

techniques between the two groups. Domestic appliances are more likely to be owned by those in higher income groups (Caraher et al, 1999), in this study all those from Cyprus were in the partly skilled occupation group whereas in England more than half of the respondents were in the professional occupational group. The difference in the ownership of the microwave between the groups from the two different countries is similar to the differences reported in the ownership of this appliance from surveys by others in the two countries. The Department of Statistics and Research, Family Budget Survey 1996/1997 (1999) reported 18.6% of households in Cyprus owning a microwave oven, whereas in the UK at a similar time 76% owned a microwave oven (Microwave Cook, 1999), similar findings of ownership to the results of this study.

The two groups of English adults and the younger group of Cypriots adults were found to own a considerable number of small domestic kitchen appliances. In the case of the English adults the extent of ownership was similar to that found by the studies of Mintel (2000a,b,c, 2005a,b,c). Cyprus on the other hand is a rapidly changing society, moving from a rural to a more affluent and urban society, more focused on paid employment, especially for women (The World Bank, 2005). The high ownership of domestic appliances by the young women in Cyprus may reflect increased affluence as a result of employment. It had been previously suggested (Burnett, 1990) that the ownership of domestic appliances indicates to some their attainment at a higher level of society, and this may be the situation for these Cypriot women who with their new affluence from employment are acquiring material possessions. The focus group discussions with the English participants who were not professional cooks, elucidated the fact that curiosity rather than a need often influenced their purchase of appliances and that ownership did not necessarily reflect use as they owned many appliances that were very rarely used. This also tends to suggest that for the younger English group ownership of domestic appliances is related to their level of society and the acquisition of material possessions.

7.2. The usage of small domestic kitchen appliances

Similar to the findings concerning ownership, the appliances that were used more frequently by the Cypriot population were those that would compliment their cooking

skills and those used more frequently by the English were those that would reduce the time spent in the kitchen (Table 7.2).

Table 7.2 Comparison of the frequent usage (>3 times a week) of small domestic kitchen appliances by the Cypriot and English respondents.

	Cypriots 25-55y	English 25-60y	Cypriots over 60y	English over 60y
Appliance				
Electric toaster	76.1	80.9	56.6	100
Sandwich maker	61.8	17.6	85.7	6.3
Juice maker	51.9	45.5	33.3	60
Electric kettle	85.5	99	62.5	100
Electric grill	55.3	76.5	23	80.7
Microwave oven	74.2	93.3	50	90.3
Food processor	28.8	22	0	33.3
Electric steamer	59.8	64.7	15.4	50
Electric food mixer	20.6	17.2	0	28.6
Coffee maker	46.3	48.8	0	56.5
Deep fat fryer	32.5	30.4	0	20
Bread maker	0	33.3	0	0

Sandwich makers were owned and used by more Cypriots than English females. It might be suggested that this was due to the fact that all Cypriot subjects aged 25-55y had children living with them, as another study (Mintel, 2000b) has shown that sandwich makers were more frequently owned by those households with children. The greater ownership, use and perceived importance of a sandwich maker by the Cypriot population compared to the English subjects may reflect a difference in eating patterns. Cypriots normally consume their evening meal later at night than the British and may require these appliances to produce snacks at, for example 5-7pm. The consumption of snacks produced by these two appliances may have relevance to the increase in CHD in this population as these may increase the fat content of their diet; cheese sandwiches are most commonly made. The frequent use of this appliance by the elderly Cypriots may also reflect the presence of children and/or grandchildren. In the Cypriot matriarchal society many Cypriot grandchildren will spend a considerable time in their grand parents' houses, especially if their mother is in employment.

In the past elderly people have reported lower rates of ownership of freezers, microwave ovens and refrigerators than many other population groups, limiting options for cooking, storage and shopping behaviors (Office of Population Censuses and Surveys Social Survey Division, 1985). The elderly have also been found to be less confident using the microwave than younger individuals (Caraher et al, 1999). However in this study, in English aged 60y+ the ownership and frequency of use of microwave ovens was similar to that of the younger age groups in England. This dramatic increase in the ownership of microwave ovens suggests that even for this English elderly group cooking using the microwave has become an established cooking method, indicating that technological change affects cooking methods and may be adopted by older people. However the use of microwave ovens was considerably lower in the elderly Cypriots, which reflects the comments made about preparing traditional meals. These elderly individuals stated that they "continue to cook, using traditional utensils, traditional Mediterranean dishes in the way that they had learnt from their parents.

The low usage of domestic appliances by the Cypriot elderly compared with those in England probably reflects a difference in affluence and hence ownership between the two groups (The World Guide, 1998) and/or the fact that the Cypriots use the traditional methods of cooking more frequently. The Cypriots were found to spend more time cooking each day compared to their English counterparts (Chapters 5 and 6) and the cooking methods they used most frequently were boiling, baking, frying and stewing which tends to support the fact that they are still cooking from basic ingredients in a traditional manner. The focus groups stated that stewing (casseroles) was the traditional way of cooking. A traditional oven was used by most of the elderly Cypriot population at least once a week which again tends to reflect a tendency for this population to continue using traditional methods, and the fact that they have a range of skills to cook in this way.

7.3. The effect of usage of small domestic kitchen appliances in relation to nutrient intake.

The macronutrient contribution to energy intakes of the Cypriot respondents demonstrated higher protein and saturated fatty acid and lower carbohydrate and monounsaturated fat intake compared to the Mediterranean diet (Trichopoulou et al., 1993) (Table 7.3). It appears that Cypriot female adults are moving away from the traditional Mediterranean diet with an increase in the protein and saturated fatty acids and decrease in the monounsaturated fat intake. A trend away from the traditional way of eating has also been recognised in other Mediterranean countries (Serra-Majem and Helsing, 1993). The change in dietary intake may be related to the increase in coronary heart disease incidence in Cyprus (Cyprus Ministry of Health, 1995). The low saturated fat intake and high monosaturated intake from olive oil was thought to be one of the major factors responsible for the low rates of coronary heart disease (De Lorgeril, 1998). This increased saturated fat and decreased monosaturated fat could be due to an increase in the consumption of oils other than olive oil, similar to that noted in Greece (Simopoulos and Sidossis, 2000). Alcohol was found to be drunk in moderation as recommended in the Mediterranean diet (Table 7.3).

Table 7.3. Average daily intakes from macronutrients (% energy) of this study of younger Cypriots and English individuals aged 25-55y compared with the National Diet and Nutrition Survey (NDNS) and with the Mediterranean diet

Nutrient	Cyprus Study 25-55y	English Study 25-55y	NDNS	Mediterranean Diet**
Carbohydrate (%)*	**34.5**	45.4	**48.5**	42
Sugars (%)*	**13.0**	17.3	**11.9**	
Protein (%)	**17.5**	16.9	**16.6**	15
Fat (%)*	**43.4**	33.4	**34.9**	42
SFA (%)	**11.9**	10.6	**13.2**	9
MUFA (%)*	**17.2**	10.3	**11.5**	19
PUFA (%)	**4.7**	5.4	**6.3 (n-3+n-6)**	4
Alcohol (%)*	**3.1**	7.3	**3.9**	2.5

* significant differences between Cypriot and English mean nutrient intakes ($p<0.05$)

** Trichopoulou et al., (1993)

Differences were seen in all mean macronutrient intakes between younger English and Cypriot subjects with the exceptions being the intakes of protein, saturated fatty acids and polyunsaturated fatty acids as a percentage of energy. The macronutrient intake, as a percentage of energy, of the younger Cypriot subjects demonstrated lower carbohydrate, sugar and alcohol intakes and higher fat and monounsaturated fatty acids compared to English adults. This is similar to differences between the Mediterranean diet (Trichopoulou et al., 1993) and the British diet (Henderson et al., 2003). Although the younger Cypriots appear to be moving away from the traditional Mediterranean diet, their nutrient intake is lower in saturated fats and higher in monounsaturated fats than a Western diet thus probably still providing some health benefits (De Lorgeril et al., 1998).

Although recently there has been a trend in Mediterranean countries away from the traditional way of eating (Serra-Majem et al, 1993), it was considered that the elderly population in Cyprus would still be consuming a traditional Mediterranean diet (Trichopoulou et al., 1993), since it has been demonstrated that the food choice of the elderly is governed principally by habit and taste and that they are resistant to change (Bilderbeck et al, 1981). A comparison of the dietary intake of the Cypriot elderly with the Mediterranean diet demonstrated a lower intake of carbohydrates as a percentage of energy intake and a higher intake of fats and saturated fats (Table 7.4).

Table 7.4. Average daily intakes from macronutrients (% energy) of this study of the elderly Cypriots with the elderly English individuals, the younger Cypriot individuals and the Mediterranean Diet.

Nutrient	Cyprus Study Over 60y	Cyprus Study 25-55y	England Study Over 60y	Mediterranean Diet *
Carbohydrate (%)	33.7	34.5	38.8	42
Sugars (%)	14.3	13.0	18.4	
Protein (%)	15.9	17.5	19.1	15
Fat (%)	46.1	43.4	35.1	42
SFA (%)	11.7	11.9	12.0	9
MUFA (%)	19.4	17.2	10.1	19
PUFA (%)	4.8	4.7	4.5	4
Alcohol (%)	0	3.1	8.3	2.5

*Trichopoulou et al (1993)

It was also found that there was little difference between the macronutrient intake of these elderly individuals when compared with the younger Cypriot individuals (Table 7.4). The slightly higher monounsaturated fat intake by the elderly may reflect a higher olive oil consumption. However there were major differences observed when the macronutrient intake was compared to the English elderly population. The Cypriots had a lower carbohydrate and protein and higher fat intake than their English counterparts. This reflects the difference between the Mediterranean diet and the Northern European diet.

Appliances such as microwave ovens and electric steamers have provided the means to alter traditional methods of cooking to provide a more nutritious diet. However other appliances such as the deep fat fryer can be used to produce less healthy meals but in an easier and safer way than with the use of a pan of very hot oil on the top of the cooker hob.

The usage of any domestic appliance was found to have little consistent effect on the macronutrient intake, in other words a difference in macronutrient intake with respect to frequency of use of an individual appliance that was detected in one group was not found in all other groups (Table 7.5). This may have been the result of the methodology used in this study, which was not sufficiently robust to detect changes.

Table 7.5 Significant differences in macronutrient intake with frequent use of small domestic kitchen appliances

	Cypriots 25-55y	English 25-60y	Cypriots over 60y	English over 60y
Appliance				
Electric toaster	> %SFA	NS	NS	NS
Sandwich maker	> %CHO	>%CHO, %sugars, <%total fat	NS	NS
Electric grill	NS	>%total fat	NS	NS
Microwave oven	NS	NS	NS	< %total fat,%MUFA
Blender	NS	> %SFA	NS	NS
Coffee maker	> %SFA,%MUFA	NS	NS	NS
Bread maker	NS	<%CHO	NS	NS

Although from the questionnaire results it was suggested that ownership reflected usage, the focus groups discussions indicated that a significant number of respondents purchased appliances for curiosity value but failed to use them. Usage was classified into two groups; those with frequent use (greater than three times a week) and those who used the appliances infrequently (less than three times a week). The comparison of macronutrient intake and usage of various domestic kitchen appliances found no significant differences in the usage of any appliance and nutrient intake by the elderly in Cyprus, a lower intake of total and monounsaturated fat with the frequent use of the microwave by the English elderly and little difference in nutrient intake with frequency of domestic appliance usage by the younger age groups. An increase in percentage carbohydrate intake and sugars and a decrease in total fats were noted with the frequent use of a sandwich maker for the younger English group (Table 7.5). These respondents also demonstrated a decrease in carbohydrate intake with frequent use of a bread maker and an increase in saturated fats with the frequent use of the blender whereas the younger

Cypriot group demonstrated an increase in saturated fat with frequent use of the toaster. Some of these results were contrary to expectations and could reflect a methodological issue with this study. The dietary data were collected over three days and this may not have been a sufficient time period for significant differences in macronutrient intake to be reliably detected if many of these appliances were used only once during the period of dietary data collection. It would however have been impractical to suggest to respondents that they collect dietary data for a longer time, for example seven days although this might have provided more reliable results. Other studies have shown that the use of a longer period of time to collect dietary data results in a low volunteer rate and/or high drop out rate (Livingstone and Robson, 2000) or that the records lack detail towards the end of long recording periods as the respondents find recording food intake time consuming (Gersovitz et al, 1978).

There is also a possibility that these respondents altered their eating habits and use of their domestic appliances during the period of recording dietary intake. This change of habitual food intake during observation is known as the 'Hawthorn' effect (Rosenthal and Rosnow, 1991). The subjects were told to eat normally but may have changed their dietary habits in the wish to appear to consume a healthy diet. The low energy intakes observed in the younger English group suggest that under reporting is a possible explanation. However, regardless of these problems, if there were marked differences in macronutrient intake as a result of the use of kitchen domestic appliances some sign of this would have been demonstrated in the results obtained.

It can be suggested that small kitchen domestic appliances do not influence a change in nutrient intake but reflect the change. A person who for example attains a certain social status may alter their diet to reflect their position in life and in order to produce this diet may need to purchase various appliances. An illustration of this could be the stated coffee maker usage by the Cypriots, who during the focus group discussions stated that their coffee maker was only used for visitors. It could be speculated that only those of a higher socio-economic group would be prepared to entertain visitors in their home who would be offered coffee prepared in this way. These individuals have purchased and use

this appliance as a result of a life style change, the ownership of the appliance did not occur first. This may also be why the elderly Cypriots have few appliances. One of the themes that ran through their study was that they wished to maintain their traditional way of eating and did not want appliances. They are satisfied with their way of life and do not envisage any change. For the English participants it is also probable that small kitchen domestic appliances have little influence on nutrient intake, the focus group participants stated they own a number of appliances that they do not use.

The results suggest that it is unlikely that the use of small kitchen domestic appliances has influenced the change in nutrient intake of the Cypriots from the traditional Mediterranean diet and these appliances appear not to be a contributing factor to the increase in the incidence of nutritionally related disease in this country.

7.4 Recommendations of the study

Kitchen technology will continue to evolve and a longitudinal study tracking the introduction of new technology into households may give a better picture of its influence on eating habits. Perhaps the most important thing is that technology can generate interest in food preparation and hence consumption.

Demonstration of whether domestic kitchen appliances actually effect nutrient intake would require a case control experimental study, which would be very hard to undertake as it would be difficult to obtain a control group.

Unfortunately the sample of elderly respondents in both countries was small and few used any appliance frequently, it would be of interest to continue this investigation of the elderly with a greater number of respondents to determine if differences in nutrient intake are influenced by small domestic appliances. Also since there are a large percentage, especially in Cyprus, who own few appliances it would be possible to carry out a further study whereby one specific appliance was given to an individual and their diet monitored to determine the effect of a specific appliance on nutrient intake.

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Appendices

Appendix 1

JMU

Liverpool John Moores University

Participant Information Sheet

Name of experimenter: Aglaia Efstathiou

Supervisors: Dr SM Maxwell, Dr A Hackett and Dr Diane Grant

Title of study/project: The influence of domestic appliances on nutrition and eating habits.

Purpose of study: Is to find out whether the ownership and use of domestic appliances such as deep fat fryer affect the health of people. It will also look at the nutrition and dietary habits of participants and compare this with the use of domestic appliances to prepare food.

Procedures and Participants Role:

1. Completion of a **questionnaire.**

If the participant would like to continue further with the research it would require completion of:

2. **A record of diet:** you will be given a diary to keep for three days in which you should write down everything you eat and drink.
3. Following completion a **short interview** will take place, together for the details on your eating habits.

You only need to complete the questionnaire if that is all you want to do

Please Note: All participants have the right to withdraw from the project/study at any time without prejudice to access of services which are already being provided or may subsequently be provided to the participant.

Appendix 2

Questionnaire on Ownership and use of Domestic Appliances for Food Preparation

This Questionnaire is designed to determine your use of domestic appliances. I would be grateful if you could spend a few minutes completing the questionnaire.

Please answer all of the following questions.

1. How much time do you spend on cooking each day?
   Please **tick the box** that represent your answer

Less than 1 hour	☐
1-2 hours	☐
More than 2 hours	☐

2. How often do you use the cooking methods which are listed below?

A: Less than once a week
B: 1-3 times a week
C: 3-5 times a week
D: Every day
E: More than once a day

Please circle the one that applies

Steaming	A	B	C	D	E
Boiling	A	B	C	D	E
Baking	A	B	C	D	E
Deep-frying	A	B	C	D	E
Poaching	A	B	C	D	E
Pan-frying	A	B	C	D	E
Microwave	A	B	C	D	E
Simmering	A	B	C	D	E
Roasting	A	B	C	D	E
Stewing	A	B	C	D	E
Grilling	A	B	C	D	E

3. In which of the following age groups do you belong?

25-34years	☐	55-64years	☐
35-44years	☐	65+years	☐
45-54years	☐		

4. To which of the following groups listed below do you consider you belong?

White	☐	Indian	☐	
Black-African	☐	Bangladeshi	☐	Other
Black-Caribbean	☐	Pakistani	☐	(please state)
Black-Other	☐	Chinese	☐	_____

5. What is your occupation? _____

6. What is the occupation of your partner/spouse? _____

7. What type of home residence do you live in?

Detached	☐	Terrace	☐	Other	☐
Semi-detached	☐	Flat	☐		

8. Is the property Rented ☐ or Privately owned ☐

9. What is your marital status?

Single	☐
Married	☐
Divorced	☐
Widowed	☐

10. Do you have any children living with you? Please state their ages.

_____

11. Which of the following food preparation domestic appliances do you have in your house?

Please circle all the ones that you have.

Toaster (electric/pop up)

Sandwich maker

Deep fat fryer

Electric steamer

Electric kettle

Food Processor

Hand held electric food mixer

Ice-cream maker

Roaster

Electric Crepe and Pancake maker

Microwave oven

Grill

Bread maker

Rice cooker

Coffee maker (filter/ percolator)

Blender

Juice maker

Waffle maker

Popcorn maker

Other (please state) _____

Soft drinks machine (e.g. Soda stream)

12. Do you find the domestic appliances which are listed below helpful in preparing food?

If yes please specify why? (write only for the <u>ones</u> that you own)

Toaster ----------

Microwave oven----------

Sandwich maker ----------

Grill ----------

Deep fat fryer ----------

Bread maker ----------

Electric steamer ----------

Rice cooker ----------

Electric kettle ----------

Coffee maker ----------

Food Processor ----------

Blender ----------

Electric food Mixer ----------

Juice maker ----------

Ice-cream maker ----------

Waffle maker ----------

Roaster ----------

Popcorn maker ----------

Electric Crepes and Pancakes maker ----------

Soft drinks machine (eg soda stream) _____

13. Please state on how important is it for you to have each of the domestic appliances listed below in your kitchen.
Tick only the ones that you own

	Importance				
Appliance	Not at all	Slightly	Moderately	Important	Extremely Important
Electric Toaster					
Microwave oven					
Sandwich maker					
Electric grill					
Deep fat fryer					
Bread Maker					
Electric steamer					
Rice cooker					
Electric kettle					
Coffeee maker					
Food processor					
Blender					
Hand held electric food mixer					
Juice maker					
Ice cream maker					
Waffle maker					
Roaster					
Popcorn maker					
Electric crepe and pancake maker					
Soft drink machine (soda stream)					

14. What is the main reason you use each of the domestic appliances?
Tick only the ones that you own

Appliance	**Reason for use**			
	Better result	Convenience	Saves time	Other please state
Electric Toaster				
Microwave oven				
Sandwich maker				
Electric grill				
Deep fat fryer				
Bread Maker				
Electric steamer				
Rice cooker				
Electric kettle				
Coffeee maker				
Food processor				
Blender				
Hand held electric food mixer				
Juice maker				
Ice cream maker				
Waffle maker				
Roaster				
Popcorn maker				
Electric crepe and pancake maker				
Soft drink machine (soda stream)				

15. How often do you use each of the domestic appliances?
Tick only the ones that you own

	How often do you use each appliance				
Appliance	More than once a day	once a day	3-4 times a week	once a week	Less than once a week
Electric Toaster					
Microwave oven					
Sandwich maker					
Electric grill					
Deep fat fryer					
Bread Maker					
Electric steamer					
Rice cooker					
Electric kettle					
Coffeee maker					
Food processor					
Blender					
Hand held electric food mixer					
Juice maker					
Ice cream maker					
Waffle maker					
Roaster					
Popcorn maker					
Electric crepe and pancake maker					
Soft drink machine (soda stream)					

16. Which is the single most important appliance in your kitchen? Please state

_____

17. Do you try and find out about new features of domestic appliances or new appliances?

No ☐ Yes ☐ If yes please state why

_____

_____

18. Which factors do you consider important when purchasing a domestic appliance?

Cost ☐
Well known brand name ☐
Easy cleaning ☐
Preparation time ☐
Durability ☐
Easy storage ☐
Appearance ☐

19. When did you last buy a food preparation domestic appliance?

_____

20. What was it? _____

21. What did it cost? _____

22. In terms of **PRICE** how do you rate the following domestic appliances?

	Very Expensive	**Expensive**	**Neither**	**Low In Price**	**Very Low In Price**
Sandwich maker	☐	☐	☐	☐	☐
Toaster	☐	☐	☐	☐	☐
Deep fat fryer	☐	☐	☐	☐	☐
Electric Steamer	☐	☐	☐	☐	☐
Microwave oven	☐	☐	☐	☐	☐
Grill	☐	☐	☐	☐	☐

23. Have you ever given a domestic appliance as a present?

No ☐ Yes ☐ **If yes please state which one and why** _____

_____

24. Have you ever received a domestic appliance for present?

No ☐ go to qu27 Yes ☐ go to qu25,26

25. If yes which ones?_____

_____

26. Have you use it/them several times?
For each domestic appliance received as a gift please state the appliance and how often you have used it.

_____

_____

_____

27. In terms of **HEALTHY EATING** how do you rate the following cooking methods?

Cooking method	Very Unhealthy	Unhealthy	Neither healthy nor unhealthy	Healthy	Very healthy
Grilling					
Boiling					
Roasting					
Baking					
Microwaving					
Steaming					
Deep-frying					
Pan frying					

28. Is there an appliance you would really like to have? Please state.

_____

29. Any further comments or thoughts you wish to make

_____

_____

_____

_____

IF YOU WOULD LIKE TO CONTINUE BEING INVOLVED IN THIS RESEARCH PLEASE LET US KNOW, YOUR NAME AND ADDRESS OR TELEPHONE NUMBER

PARTICIPANTS NAME:……..

ADDRESS:……..

……...

……

……...

TELEPHONE NO……..

Appendix 3

Were you unwell for any of the survey days? or Was there any other factor(s) that you feel affected and changed your appetite during the survey days? If yes, please report illness or factor(s) below giving as much detail as possible as to how your eating behaviour changed.

Day 1

Day 2

Day 3

Thank you for taking the time to fulfill this booklet. If you have any problems or queries please contact

Litsa Efstathiou

Tel. 0151 285 7046

Email: ecsaefst@livjm.ac.uk

Liverpool *John Moores University*

Dietary Diary

Name_____

Address _____

_____

Tel No _____

Survey Days

1. _____

2. _____

3. _____

Example Day

Time	Food or Drink	Amount	Left Overs	Activities/ Comments
9.30am	Kellogs with Skimmed milk Wholemeal bread with Margarine and jam	A bowl 2 slices Thick spread 2 tsp strawberry jam	None	Got up at 9.00am
10.00am				Walked to catch the shuttle bus Fast pace 10mins
11.30am	Cup of Coffee Semi-skimmed Milk Fruit crumble	Mug Dash Medium	Left half Of fruit crumble	Walked to canteen and back Made 2 trips to the Library
1.30pm	Jacked potato with cheddar Cheese tomato cucumber green olives	Medium 2 grams 4 slices 5 slices 8 olives	Left 2 slices of tomato and 2 olives	Walk to catch the shuttle Walked home medium pace 15 mins

Day ______________________

Please remember to write the amount of the food or drink, the manufacturer, the way of cooking, any leftovers and also your activities.

Example Day Continuous

Time	**Food or Drink**	**Amount**	**Left Overs**	**Activities/ Comments**
3.00pm	Grany Smiths apple	Large	Core	Walked to photocopier (200 yards)
5.45pm	Homemade Steak Diana with white sauce (see recipe book) and mushrooms Sweetcorn Carrots	Average size steak (grilled) 5 full spoons 4 Baby 4 Baby	Left 2 Carrots and about 2 spoons of white sauce	Did some housework for about 1hour (dusting, hovering) Made the meal
9.30pm	Hot Chocolate (Caldburys cocoa powder) semi-skimmed milk	Mug 2 heaped teaspoons ¼ pint		Watched T.V for 1 hour
11.30pm				Went to bed

Before you complete this booklet is important to read the instructions below:

Please Remember To

- **Carry this booklet with you everywhere you go during the three days.**

- **Complete this booklet one day during the weekend and two days during the week.**

- **Give as much detail about the food as possible (e.g. brand names, low fat etc.). Specify the time, amount and description of ALL foods and drink that you consume during the survey days (including sweets and snacks etc, whether they are eaten at home, work or on the bus etc.).**

- **Record any leftovers (e.g. if you don't finish a drink or if you left half of your lasagne record how much is left).**

- **During the survey days if you are unwell, write down the factor(s) that affected your appetite (in the back page of this booklet).**

Day _____

Please remember to write the amount of the food or drink, the manufacturer, the way of cooking, any leftovers and also your activities.

- **Don't forget to write down your main activities (e.g. what the activity was and how long you did the activity for).**

- **If you take any vitamin supplements please write it down including the sort of vitamins, brand name, number of vitamins you take and how often you take them.**

If you take supplements, please give details of all the supplements that you currently use.

What sort of supplements do you take? (e.g. Iron and Vitamin C)

_____

What make or brand is the supplement(s)? (e.g. Boots, Seven Seas)

_____

How often do you take supplements? (e.g. once a day)

_____

How many of the supplement(s) do you take? (e.g.1 tablet)

_____

Day _____

Please remember to write the amount of the food or drink, the manufacturer, the way of cooking, any leftovers and also your activities.

Appendix 4

JMU

Liverpool John Moores University

Εκπαιδευτικό Ερευνητικό Πρόγραμμα Υγεία του Παιδιού

Ερωτηματολόγιο για την Κατοχή και Χρήση Μικροσυσκευών Κουζίνας
Παρακαλούμε να συμπληρωθεί απο τον γονέα που ασχολείται με τα οικιακά

1. Πόση ώρα ξοδεύετε στην κουζίνα καθημερινά;
   Λιγότερο απο μια ώρα ☐ 1-2 ώρες ☐ Περισσότερο απο 2 ώρες ☐

2. Πόσο συχνά την **Εβδομάδα** χρησιμοποιείτε τους πιο κάτω μεθόδους μαγειρέματος;

Ψήσιμο στο Φούρνο ----------	**Ψήσιμο στον Ατμό ----------**	**Μαγείρεμα στην κατσαρόλα-------**
Βράσιμο ----------	**Σχάρα ----------**	**Τηγάνισμα ----------**

Άλλη μέθοδο ----------

3. Σε ποια απο τις πιο κάτω ομάδες ηλικίας ανήκετε;

   25-34χρόνων ☐ 35-44χρόνων ☐ 45-54χρόνων☐ 55-64χρόνων ☐ 65+χρόνων ☐

4. Φύλον Άρρεν ☐ Θήλυ ☐

5. Ποιο είναι το επάγγελμα σας; _____

6. Ποιο είναι το επάγγελμα του συντρόφου/συζύγου σας; _____

7. Ειστε Άγαμος ☐ Έγγαμος ☐ Διαζευγμένος ☐ Χήρος ☐

8. Αναφέρεται τις ηλικίες των παιδιών σας

   _____

9. Ποιες απο τις πιο κάτω μικροσυσκευές έχετε στο σπίτι σας ;
   Κυκλώστε αυτές που έχετε

Φρυγανιέρα (Toaster)	**Φούρνος μικροκυμάτων (microwave)**
Φριτέζα (deep fat fryer)	**Ατμομάγειρας (electric steamer)**
Βραστήρας (Kettle)	**Γκριλιέρα (electric grill)**
Πολυμίξερ (food processor)	**Σαντουιτσιέρα (sandwich maker)**
Μίξερ με κάδο (food mixer)	**Παγωτομηχανή (ice-cream maker)**
Μπλέντερ (blender)	**Μηχανή κατασκευής ψωμιού(bread maker)**
Καφετιέρα (φίλτρου κτλ)	**Μηχανή κατασκευής κρέπας (Crepe maker)**
Εκχυμωτής	**Άλλη μικροσυσκευή** _____

10. Θεωρείτε τις μικροσυσκευές που αναγράφονται πιο κάτω βοηθητικές στην προετοιμασία φαγητού; **Αν ναι, αναφέρετε τους λόγους γι' αυτές που έχετε**

Φρυγανιέρα----------

Φούρνος μικροκυμάτων----------

Σαντουιτσιέρα --- ----------

Γκριλιέρα ----------

Φριτέζα ----------

Μηχανή κατασκευής ψωμιού----------

Ατμομάγειρας ----------

Βραστήρας----------

Καφετιέρα ----------

Πολυμίξερ ----------

Μπλέντερ ----------

Μίξερ με κάδο ----------

Εκχυμωτής ----------

Παγωτομηχανή----------

Μηχανή κατασκευής κρέπας----------

11. Πόσο σημαντικό είναι να έχετε κάθε μια απο τις πιο κάτω μικροσυσκευές;
Βάλτε √ σ' αυτές που έχετε

Μικροσυσκευές	Καθόλου	Λίγο	Μέτρια	Σημαντικό	Πολύ σημαντικό
Φρυγανιέρα					
Φούρνος μικροκυμάτων					
Σαντουιτσιέρα (sandwich maker)					
Γκριλιέρα (electric grill)					
Φριτέζα (deep fat fryer)					
Μηχανή κατασκευής ψωμιού					
Ατμομάγειρας (electric steamer)					
Βραστήρας (Kettle)					
Καφετιέρα (coffee maker)					
Πολυμίξερ (food processor)					
Μπλέντερ (blender)					
Μίξερ με κάδο (food mixer)					
Εκχυμωτής					
Παγωτομηχανή					
Μηχανή κατασκευής κρέπας					

12. Ποιος είναι ο κυριώτερος λόγος που χρησιμοποιείτε κάθε μια απο τις πιο κάτω μικροσυσκευές; **Βάλτε √ σ' αυτές που έχετε**

Μικροσυσκευές	Καλύτερο αποτέλεσμα	Ευκολία	Κερδίζεις χρόνο	Κάποιος άλλος λόγος
Φρυγανιέρα				
Φούρνος μικροκυμάτων				
Σαντουιτσιέρα				
Γκριλιέρα (electric grill)				
Φριτέζα (deep fat fryer)				
Μηχανή κατασκευής ψωμιού				
Ατμομάγειρας (steamer)				
Βραστήρας (Kettle)				
Καφετιέρα (coffee maker)				
Πολυμίξερ (food processor)				
Μπλέντερ (blender)				
Μίξερ με κάδο (food mixer)				
Εκχυμωτής				
Παγωτομηχανή				
Μηχανή κατασκευής κρέπας				

13. Πόσο συχνά χρησιμοποιείτε κάθε μια απο τις πιο κάτω μικροσυσκευές; **Βάλτε √ σ' αυτές που έχετε**

Μικροσυσκευές	Περισσότερο απο μια φορα την μέρα	Μια φορά την μέρα	3-4 φορές την εβδομάδα	Μια φορά την εβδομάδα	Λιγότερο απο μια φορά την εβδομάδα
Φρυγανιέρα					
Φούρνος μικροκυμάτων					
Σαντουιτσιέρα					
Γκριλιέρα (electric grill)					
Φριτέζα (deep fat fryer)					
Μηχανή κατασκευής ψωμιού					
Ατμομάγειρας (steamer)					
Βραστήρας (Kettle)					
Καφετιέρα (coffee maker)					
Πολυμίξερ (food processor)					
Μπλέντερ (blender)					
Μίξερ με κάδο (food mixer)					
Εκχυμωτής					
Παγωτομηχανή					
Μηχανή κατασκευής κρέπας					

14. Ποια θεωρείτε ως την πιο σημαντική μικροσυσκευή στην κουζίνα σας;

_____

15. Επιδιώκετε να ενημερώνεστε για καινούριες μικροσυσκευές;

Όχι ☐ Ναι ☐ Αν ναι, αναφέρετε το γιατί----------

16. Ποιους απο τους πιο κάτω παράγοντες θεωρείτε σημαντικούς όταν αγοράζετε μια μικροσυσκευή;

Κόστος ☐ Καλό όνομα της εταιρείας ☐ Εύκολο καθάρισμα ☐ Διάρκεια ☐ Εύκολη αποθήκευση ☐ Εμφάνιση ☐

17. Πότε ήταν η τελευταία φορά που αγοράσατε μια μικροσυσκευή;_____

18. Τι είδους μικροσυσκευή ηταν; και Πόσο κόστισε; _____

19. Έχετε δώσει ποτέ μικροσυσκευή ως δώρο

Όχι ☐ Ναι ☐ Αν ναι αναφέρετε ποια και γιατί

_____

20. Έχετε πάρει ποτέ μικροσυσκευή ως δώρο

Όχι ☐ Ναι ☐ Αν ναι ποιά και πόσο συχνά την έχετε χρησιμοποιήσει

_____

21. Αξιολογήστε τους πιο κάτω μεθόδους μαγειρέματος

Μεθόδοι μαγειρέματος	Πολύ ανθυγιεινό	Ανθυγιεινό	Ούτε ανθυγιεινό ούτε υγιεινό	Υγιεινό	Πολ υγιει
Σχάρα					
Βράσιμο					
Τηγάνισμα					
Ψήσιμο στο φούρνο του σπιτιού					
Ψήσιμο σε χωριάτικο φούρνο					
Ψήσιμο σε φούρνο μικροκυμάτων					
Ψήσιμο στον ατμό					

22. Είναι κάποια μικροσυσκευή που θα θέλατε ν' αποκτήσετε;

_____

23. Κάποιο σχόλιο που θέλετε να κάνετε

_____

_____

Σας ευχαριστούμε θερμά που συμπληρώσατε το πιο πάνω ερωτηματολόγιο Αν θέλετε να συνεχίσετε να λαμβάνετε μέρος σ' αυτή την έρευνα, αφήστε τα στοιχεία σας για να επικοινωνήσουμε μαζί σας

Ονοματεπώνυμο:----------

Διεύθυνση: ----------

Τηλέφωνο:----------

Θα σας ζητηθεί να γράψετε για τρείς μέρες το φαγητό και ποτό που καταναλώνετε (Food diary). Στην συνέχεια θα ακολουθήσει μικρή συνέντευξη με ερωτήσεις που θα αφορούν τις διατροφικές σας συνήθειες.

Appendix 5

Υπήρξε οποιοσδήποτε λόγος υγείας που επηρέασε την όρεξη σας κατά την διάρκεια των τριών ημερών (π.χ. πόνος στο στομάχι)?
Άν ναι, αναφέρετε τον λόγο ή τους λόγους υγείας που σας επηρέασαν

Ημέρα 1

Ημέρα 2

Ημέρα 3

Σας ευχαριστούμε θερμά για την συμμετοχή και το χρόνο σας στην παρούσα έρευνα.

Παρακαλείσθε όπως αποστείλετε
Το διαιτολόγιο ταχυδρομικώς στην
Διεύθυνση ***Αρχ. Μακαρίου Γ'66 8200 Γεροσκήπου, Πάφος***
Για πληροφορίες παρακαλώ όπως απευθύνεστε στην
Λίτσα Ευσταθίου
Τηλ. 99 45 88 28 και 26 913 622

Liverpool **John Moores University**
"Πρόγραμμα Υγεία του Παιδιού"

ΗΜΕΡΟΛΟΓΙΟ ΔΙΑΤΡΟΦΗΣ

Όνομα: _____

Διεύθυνση: _____

_____

_____

Τηλέφωνο: _____

Ημέρες
1. _____
2. _____
3. _____

Για ερευνητικούς σκοπούς παρακαλείσθε όπως αναφέρετε το
Σωματικό σας Βάρος (Kg) _____
Και το **Υψος σας (cm)** _____

Παράδειγμα:

Ώρα	Φαγητό/Ποτό	Ποσότητα	Δραστηριότητα	
8:00 πμ	Τσάι χαμομίλη με μέλι Ψωμί με μαργαρίνη και μαρμελάδα φράουλας	1 φλυτζάνι 1 κουταλάκι 1 φέτα παχύ στρώμα 1 κουταλάκι	Ξύπνησα στις 7:30πμ ετοίμασα πρωινό, έστρωσα τα κρεβάτια Ξεκίνησα για την δουλειά στις 8:15πμ	
10:00 πμ	1 Μήλο 2 Πορτοκάλια	μέτριο μικρά	Ανεβοκατέβηκα τις σκάλες στην δουλειά για 15 λεπτά	
11:00 πμ	Καφές φίλτρου με γάλα 1 τυρόπιττα τρίγωνη	1 φλυντζάνι λίγο κανονικό μέγεθος		

Μέρα _____

<u>Παρακαλώ αναφέρετε το φαγητό και ποτό που καταναλώσατε τις 3 μέρες της έρευνας, τον τρόπο μαγειρέματος καθώς επίσης και τις δραστηριοτητες σας.</u>

Παράδειγμα Συνεχίζεται

Ώρα	**Φαγητό/Ποτό**	**Ποσότητα**	**Δραστηριότητα**	
1:30μμ	Φασολάκι στο φούρνο με κοτόπουλο μαύρο ψωμί ελιές πράσινες (τσακιστές) αναψυκτικό	5 κουταλιές μεγάλες 2 κομμάτια 2 φέτες περίπου 10 diet coke 1 ποτήρι	Στρώσιμο του τραπεζιού Πλύσιμο των πιάτων, ξεσκόνισμα για περίπου μισή ώρα	
3:00μμ	Κέικ γεωγραφίας χυμό πορτοκαλιού	1 κομμάτι 1 ποτήρι	Καθάρισμα του σπιτιού (σκούπισμα, σφουγγάρισμα κ.τ.λ) για 4 ώρες	
7:30μμ	Σάντουιτς με μαύρο ψωμί μαργαρίνη χάμ τομάτα αγγουράκι	2μέτριες φέτες παχιά στρώση 2 φέτες 4 φέτες 4 φέτες	Παρακολούθησα τηλεόραση για 2 ώρες	
9:30μμ 11:00	Ζεστή σοκολάτα γάλα άπαχο	2 κουταλάκια σοκολάτα Caldburys 1 φλυτζάνι	Διάβασμα περιοδικού για 1 ώρα Πήγα για ύπνο	

Παρακαλώ διαβάστε με προσοχή τις πιο κάτω οδηγίες:

- **<u>Να συμπληρώσετε αυτό το διαιτολόγιο σε 2 μέρες καθημερινές και 1 μέρα του σαββατοκυρίακου (π.χ Πέμπτη –Παρασκευή – Σάββατο ή Κυριακή – Δευτέρα – Τρίτη).</u>**

- **<u>Αναφέρετε λεπτομερώς όλες τις ποσότητες φαγητού και ποτού που καταναλώσατε, τον τρόπο μαγειρέματος καθώς επίσης και τις δραστηριότητες σας</u>.**

- **<u>Άν κατά την διάρκεια των τριών ημερών, παρουσιαστεί οποιοσδήποτε λόγος υγείας που επηρεάσει την όρεξη σας, παρακαλώ να τον αναφέρετε στην πίσω σελίδα του διαιτολογίου.</u>**

- **<u>Μην ξεχάσετε να γράψετε τις δραστηριότητες σας - το είδος της δραστηριότητας καθώς και τη διάρκεια της (π.χ. περπάτημα για 20 λεπτα).</u>**

Μέρα_____

<u>Παρακαλώ αναφέρετε το φαγητό και ποτό που καταναλώσατε τις 3 μέρες της έρευνας, τον τρόπο μαγειρέματος καθώς επίσης και τις δραστηριοτητες σας.</u>

Συμπληρώματα Διατροφής

Τι είδους συμπλήρωμα παίρνετε; (π.χ. Σίδηρο, Βιταμίνη C)

____

Ποιό είναι το όνομα του συμπληρώματος;

____

Πόσο συχνά παίρνετε το συμπλήρωμα; (π.χ. μια φορά την μέρα)

____

Πόσα συμπληρώματα παίρνετε;

____

Μέρα ____________________

<u>Παρακαλώ αναφέρετε το φαγητό και ποτό που καταναλώσατε τις 3 μέρες της έρευνας, τον τρόπο μαγειρέματος καθώς επίσης και τις δραστηριοτητες σας.</u>

Appendix 6 - Focus Group Discussions carried out in UK-Adults

Focus groups were carried out in order to gather more information on ownership and use of domestic kitchen appliances. In UK females were contacted and divided into three groups according their self-reported cooking skills. The first group consisted of individuals who are professionals in the cooking field, the second group were individuals who can cook well and the third group consisted of individuals that can cook only for themselves.

1st Focus group of individuals who are professionals in the cooking field

Why do you buy the small domestic kitchen appliances and from where have you heard about them?

One of them said that she buys the small domestic kitchen appliances from hypermarkets simply because they are at reduced price (on offer) or another said that she either buys when they are recommended or for Christmas presents.

One of them said that if she want to buy a small or a big domestic kitchen appliance will research it first. For example she may look into the "Which magazine" but she will never search into the internet because its manufacturers who sell these appliances. And another said that if the appliance its expensive she will look it up on "Which magazine" but if it's of a low cost item she won't bother (e.g. kettle £10, hand held electric food mixer £40).

How do you decide which model to buy?

One of them said that will buy it because of its brand name (reliable), one other said that she doesn't want an appliance with extra features because she knows what she wants it for and if it has lots of extra features will make it difficult for her because she won't used it (e.g. bread maker-lots of uses cakes etc).

One other said that she depends on the appliance, for example for a microwave oven she want to have a combination of uses reheating, grill, defrosting also to be brand loyal because she uses all of the other extra features (won't buy a microwave that cost £60).

One other said that will do limited things on the microwave oven and she doesn't want it to have extra features. She doesn't care for expensive or brand loyal one because she uses it only for reheating and defrosting and she doesn't need the grill (because she don't cook on it).

One has a microwave oven with a combination of extra features and a brand name but has never used the grill because she had her oven. When her oven broke down she used it more often and even cooked pizza. In contrast with the past where she used it only for defrosting and reheating.

What is you are opinion about appliances?

Electric Toaster: One has said that she had a toaster for Christmas present its the pop-off figure that helps, its very durable and has it on the top of the kitchen working surface.

One other said that she had a toaster with different settings. Its an essential item in the kitchen. The children loved it and used it everyday several times, its an essential item for them, its durable, to have it on the top of the kitchen she tried to match its appearance with everything else in the kitchen.

Sandwich Maker: One of them who owned a sandwich maker said that its an appliance that its great to have for family and friends and when they first bought it was used a lot, especially by the children (for a hot snack) and it was on top of the kitchen but now is used less frequently (comes in and out).

Electric Kettle: They all owned an electric kettle, they have it in the top of the kitchen out all the time, they look for appearance in order to match with the kitchen and its an essential item in the kitchen. On holidays they also use it a lot if they have it in theirs hotels or some of them they used to take it with them.

Food Processor: They all owned a food processor and find it very important and used it a lot, two have it in the top of the kitchen and they look for the appearance to match with everything in the kitchen. One of them stored it away and used to take it

out when it was needed and didn't think that the appearance was important but only looked its practicality and easy cleaning.

Hand Held Electric Food Mixer: They all owned a hand held electric food mixer, they used it a lot and they have it all stored away and take it out when is needed. One of them have an expensive one in order to last longer and others had a low in price one (replaceable).

Ice-cream Maker: One of them owned an ice-cream maker but used it rarely and stored it in the freezer. Before she bought it she searched it in order to find a reasonable price and didn't look for extra figures.

Electric Grill: No one seems to owned an electric grill because they have the oven.

Microwave Oven: Two of them said that they used the microwave only for defrosting and reheating and the one of them said that, only when her oven sometimes broke used it more and also said that it takes a lot of space. One other said that she use the microwave oven a lot and find it very important, cant live without it, used it a lot for professional reason and she looked for extra figures when she first bought it.

Bread Maker: One of them have a bread maker but don't think she need it because she can make bread in less time. However, her husband who don't have the skills to make bread likes it and its important to him. One other said that she don't want to buy a bread maker because she like bread to be hot and buy everyday bread. One other said that she wants to buy a bread maker because she can't find easily to buy a good bread and she thinks that the bread taste better in the bread maker.

Rice Cooker: One of them owned a rice cooker and used it a lot (Chinese husband), can cook the vegetables very good, easy to used, very important, eat a lot of rice.

Coffee Maker: One of them used the coffee maker all the time, no one else owned it and they said that takes too much space.

***Blender*:** All of them owned a blender and used it a lot especially when the children were young.

Popcorn Maker: Only one owned a popcorn maker who someone else gave it to her but never used it.

Professionals buy the appliance who need it and used it very often. They don't buy appliances such as electric crepe and pancake maker, soft drinks machine, waffle maker, popcorn maker and roaster because they don't seem the usefulness of those appliances. As stated by the professionals there is no need to owned a roaster or a grill because they can used instead the oven. Also there is no need to owned an electric crepe/pancake maker because they can used instead the saucepan and have the same results. They preferred the pan than the popcorn maker because they have the cooking skills to make it in the saucepan.

They all have in the top of the kitchen the domestic kitchen appliances that they used more often.

2nd Focus group of individuals who can cook well

Why they go and buy those appliances? From where?

They used to hear about a domestic kitchen appliance from the T.V.- adverts (e.g. electric grill), one said someone else suggested it (e.g. electric mixer), one other said by searching the hypermarkets stock and offers.

How they decide which model to buy?

One of them look at the brand name and she wouldn't buy a small or a big electric appliance that wasn't well known name, others would go and buy only a small electric appliance (e.g. toaster, kettle) doesn't matter if is not a brand name because they are low in price and they look for the brand name for big domestic kitchen appliances (e.g. dishwasher). Also for the small domestic kitchen appliances which are low in price (e.g.toaster £5) they don't look for extra figures.

They all look for the appearance of the domestic kitchen appliances, the price and the family size

One of them when she wants to buy a big domestic kitchen appliance, she search on the internet, read the reports to see what people think of the appliances and where they can get them, no matter if there is a small or a big domestic kitchen appliance, others they don't do that for a small domestic kitchen appliances because they are cheaper. They buy the small appliances for curiosity, novelty, they walked into the shop see them and just say "I like them I would have one of them".

Do you have the appliances, in the top of the kitchen?

The appliances that they have them in the top of the kitchen are the one's that they use them day to day (e.g. kettle, coffee maker, microwave oven, toaster). The one's that they don't use them regular they stored them away (e.g. mixer) to use them sometime after or they forgot about them. They look for appearance but they don't have them in show, they have only the one's that they used.

When you buy them, you look for extra features?

For the small appliances, they don't look for extra figures because they are low in price.

What they think about the small appliances? Why they are important to them?

They used the small domestic kitchen appliances because they are saving time and one said she can't lived without an electric kettle, an electric toaster and a microwave oven. One other said the microwave oven and someone else stated the kettle and hand held electric food mixer.

Why you owned a variety of appliances in your house, when they are not so important for you?

Blender considered very useful, for example to get rid off the banana, make soups. The one's that they owned a popcorn maker, a deep fat fryer and a sandwich maker agreed that is difficult to clean them, time consuming, is not worth it. The one's that they don't own a bread maker they want to go and buy one for novelty, curiosity.

They don't considered the soda stream machine important that's why wouldn't go and replace it when broken.

When they buy an appliance they look for price. They go and buy all of the small domestic kitchen appliances because they are low in price and they won't go and buy a juice maker for a £200.

Because they want to have everything in their houses, they go and buy all of the small domestic kitchen appliances just for novelty and in order to treat their curiosity. They said that "like a little girl they want to buy everything in order to play with the machine".

3rd Focus group of individuals that can cook for themselves

Why you buy the domestic kitchen appliances? From where?

One of them she buy the appliances in order to save time and she used to buy them on christmas time for present, one other said that she add a different taste and texture on the food (electric toaster differ from electric grill), one said for convenience (e.g. microwave oven, electric kettle, electric toaster- switch off automatically) and one other for health reasons (electric steamers and electric grill) and practicality.

They go and buy small domestic kitchen appliances for novelty and for curiosity (like the sandwich maker). They want to buy everything for curiosity but they don't use them all the time. They said that these small appliances are more like clothes they don't wear them all the time, they take them out and put them away depending on the fashion and different occasion. They want to have everything in the house in order to play with the machine, its like food. They want to tried a lot of them in order to save time, for convenience because lots of women work full time.

They used to hear about a new domestic kitchen appliance from someone else who suggested it, from T.V and when passing from the shops to see what it's on offer and if they like them, they buy them.

How they decide which model to buy?

When they go to buy a low in price domestic kitchen appliance (e.g. an electric toaster) they don't look for brand names only if it's an expensive one they look for brand names (especially for an electric toaster) and also they look for novelty.

Do you look for the appearance?

They look for the appearance, the colour to match with everything in the kitchen, they look for the appearance more than the model.

Do you look for extra features?

When they go and buy a domestic kitchen appliance most of them they don't look for extra features but for microwave and grill they want to have a combination of uses especially for Christmas.

What do you think about each of the appliances?

Everybody use the microwave and agreed with the statement that "the microwave has become a figure like a television in the house". The television of the kitchen is the microwave everybody use it to defrost/reheat/cook or steam. All of them they can't lived without a microwave oven and one other the without a sandwich maker.

They don't go and buy some of the small domestic kitchen appliances such as: popcorn maker, waffle maker, electric crepe and pancake maker because they really need them except for microwave, the grill, kettle and the toaster. They buy them for curiosity, novelty because they are cheap and after forgot about them and put them away.

When you buy them you want to have them in the top of the kitchen?

The domestic kitchen appliances that they used them most of the time they have them on the top of the kitchen on displayed like the microwave oven, the electric kettle, the toaster and the grill and the others they stored it away.

Appendix 7 - Focus Group Discussions carried out in Cyprus-Adults

Focus groups were carried out in order to gather more information on ownership and use of domestic kitchen appliances. In Cyprus females were contacted and divided into three groups according their self-reported cooking skills. The first group consisted of individuals who are professionals in the cooking field, the second group were individuals who can cook well and the third group consisted of individuals that can cook only for themselves.

1st Focus group of individuals who are professionals in the cooking field

Why they buy the small domestic kitchen appliances, from where they hear about them?

They go and buy the small domestic kitchen appliances in order to save them time, effort, for convenience. If they need an appliance if its useful for them they go and buy it and also to make something unusual, for example for making a sandwich, because won't have the same result if they don't make it in the sandwich maker. They hear about new appliances from the T.V., advertising leaflets, from friends who might suggest a new appliance.

How they decide what model to buy?

All of them go on brand name because it's reliable, but depends from the appliance e.g. for a microwave oven they definitely go on brand name but for a hand held electric food mixer or a blender they don't mind if they are not brand names. For big appliances-expensive ones they go for brand names for small appliances-cheap ones they don't go for brand names. All of them agreed that they don't want to own an appliance with lots of extra features because after it makes it very difficult for them to clean it and also can break easily. Also they agreed that a working woman needs something that will save her time and effort.

Do you look for the appearance?

All of them look for the appearance when they go to buy an appliance because they have them in the top of their kitchen

What they think about the appliances?

Electric Toaster: One of them said that she have one and that her son used it a lot everyday and her very often and that its very important and useful, item in her kitchen. One other said that she also used it everyday especially in the morning for the breakfast and also she found it very important and useful item in her kitchen. One other said that she used it only in the weekends to make breakfast because she don't eat breakfast everyday.

Deep fat fryer: No one seems to own this appliance. One of them said that she don't own a deep fat fryer because she don't fry food for health reasons, one other said that she don't own this appliance also for health reasons and because you put a lot of oil on it and can be a less healthy way to cook food. Also because you leave this oil in order to cook again and again and that could be harmful for the health. For that reason she use her small frying pan that use less oil and because she have a small family-only one child and also for convenience.

Electric Kettle: They all owned an electric kettle, they used everyday for saving time, for convenience and its an essential item in the kitchen.

Food Processor: One of them own this appliance but she don't used it because she thinks that it's very complicated and also it's not saving time or effort and it's very difficult to clean it.

Electric Food Mixer: One of them own a food mixer and used it a lot and find it very convenient and easy to use.

Hand Held Electric Food Mixer: They all owned a hand held electric food mixer. Two of them used it a lot and the other one not so often but they all found it very convenient and easy to clean.

Blender: They all own a blender and used it a lot and its one of their favourite appliance. They all finds it very useful, saves time, convenient. For chopping onion, parsley, nuts, whisk the eggs. One of them stated that it's more important for her the blender than the hand held electric food mixer. They used it one or twice a week.

During the winter time they all agree that they used it more often for making sweets.

Microwave Oven: They all own a microwave oven and they used it a lot for reheating and defrosting. They don't seem to like to cook food on it e.g. one of them stated that because she put spices in the food that she cooks the microwave can alter it's taste and for that reason she don't used it. Also everybody agreed that cooking on the microwave can make the food dried and if you have a small family you can't used it.

Coffee Maker: Two of them own this appliance. One of them don't used it, because she prefers the small mixer for making frappe during the summer time and both used it only during the winter. They don't think that it's an essential item in the kitchen. One of them stored it away during the summer time.

Juice Maker: Two of them used it very often. One of them used it one or twice the week because she have a lot of oranges and also because her son and husband drinks a lot of juices. One other used it three or four times a week because she drinks a lot of juices and the other one maybe never.

Electric grill: Two of them used it very often because it's a healthy and because the food taste good.

Sandwich Maker: One of them used it everyday the others sometimes during the week. They stated that they used this appliance more often during the winter for making a quick hot snack. They said that the sandwiches taste better on the sandwich maker and they were excited for this kind of appliance, they find it very useful. And also they find it very easy to clean it.

Professionals buy the appliance who need and used it very often. They don't own any ice-cream maker or a bread maker because they said that there is no need to have one if you can purchase a good ice cream and a good bread. Also they don't buy appliances such as electric crepe and pancake maker, waffle maker, popcorn

maker because they don't see the usefulness of those appliances. As stated by them there is no need to owned those appliances because they can make it with the saucepan and have the same results. They all have in the top of the kitchen the domestic kitchen appliances that they used more often.

2rd Focus group of individuals who can cook well

Why they buy the small domestic kitchen appliances, from where they hear about them?

They go and buy the small domestic kitchen appliances in order to save them time, effort, for convenience, because they are working mothers. Two of them they hear about new appliances from the T.V., magazines, from the shops and one of them from shops who sell electrical appliances.

How they decide what model to buy?

One of them go always on brand name because its reliable, the other two also most of the time go on brand name but sometime they don't. All of them usually they go on brand name because it's reliable, but depends from the appliance. Two of them agreed that they want to own an appliance with lots of extra features and one of them don't prefer an appliance with extra features because she won't used them.

Do you look for the appearance?

All of them look for the appearance when they go to buy an appliance to match with their kitchen décor because they have them in the top of their kitchen the ones that they used more often.

What they think about the appliances?

Electric Toaster: They all used the electric toaster, to make toast bread for their families. One of them used it more than once a day especially in winter, one other once a day and the last one she used it only during the winter, three times a week. They all agreed that it's a very important appliance in the kitchen.

Deep fat fryer: Only one of them seems to owned this appliance and finds it very convenient because she have a big family and used it four times during the week for

making e.g. fried potatoes. One of them said that she don't own a deep fat fryer because she don't fry food for health reasons, and the third one said that she don't own this appliance because she prefer her frying pan that use less oil and you don't need to keep the oil.

Electric Kettle: They all owned an electric kettle, they used everyday for saving time, for convenience and its an essential item in the kitchen.

Electric Food Mixer: Two of them owned a food mixer and used it a lot for making cakes, pastries etc and found it very convenient, important and easy to use and the third one she don't owned one because she don't need it.

Blender: Two of them owned a blender and used it a lot for chopping onion, parsley. They both found it very useful, saves time, convenient. One of them stated that she used it three times during the week. One other prefer the electric food mixer than the blender and she used a knife for chopping the onion and the parsley instead of a blender.

Microwave Oven: Two of them owned a microwave oven, one of them used it daily for reheating and defrosting, the other one used it only for reheating and she said that defrosting in the microwave might be harmful. All of them they agreed that the microwave oven is not an important and an essential appliance in the kitchen. The one that don't owned a microwave oven thought that there is no need to owned it because
the rhythm of life in Cyprus is not so frustrated and busy as in abroad.

Coffee Maker: All of them own this appliance. One of them don't used it very often and she don't think that it's an essential appliance in the kitchen. One other don't used it and stored it away. The third one used it only when she have visitors in the house, for show.

Juice Maker: Two of them owned it and used it very often and found it very important. One of them used it a lot for making fresh lemon and orange juice for her

family and used it three times a day. The other one also used it a lot because she have lots of orange and lemon trees in her field.

Electric steamer: Two of them owned it and found it very important, one of them used it for making steamed vegetables, and the other one for cooking a chicken. They both said that the food in the electric steamer taste good and its very healthy. The one that don't owned an electric steamer, said that is one of the appliances that she wanted to buy one.

Electric grill: Two of them owned this appliance, but only one of them used it very often and found it very important and healthy appliance in her kitchen. The one that don't owned this appliance said that she used the grill in her oven and found it very important.

Sandwich Maker: All of them owned a sandwich maker and found it very important appliance in their kitchen and they used it more often during the winter. One of them used it three times a week in order to prepared a quick hot snack for her family, the others sometimes during the week.

Electric crepe and pancake maker: They all owned this appliance but only the two of them used it a lot for making sweet and savoury crepes and the other one don't used it a lot, for health reasons.

They don't owned an ice-cream maker or a bread maker because they said that there is no need to have one if you can purchase a good ice cream and a good bread. Two of them they said that if they want to make a bread they used instead of the bread maker their electric food mixer. They all have in the top of the kitchen the domestic kitchen appliances that they used more often and the others they stored them in their kitchen cupboards. Two of them have in the top of the kitchen, the electric kettle, the electric toaster, the juice maker and the electric food mixer because they used them more often.

3nd Focus group of individuals that can cook for themselves

Why they buy the small domestic kitchen appliances, from where they hear about them?

The two of them they go and buy the small domestic kitchen appliances because they need them to save them time, effort, for convenience, because they are working women. The other one owned those small domestic kitchen appliances maybe because sometime she might need them and she don't considered them very important because as she said they are only for loading her kitchen cupboards. They hear about new appliances from the T.V., from visits in the shops, from advertising leaflets, from friends who might suggest a new appliance.

How they decide what model to buy?

All of them go on brand name because it's reliable. Two of them agreed that they want to own an appliance with lots of extra features, and only one of them don't want the appliance to have extra features because she won't used them.

Do you have those small domestic kitchen appliances, in the top of the kitchen?

They all have in the top of the kitchen the domestic kitchen appliances that they used more often and the others they stored them away. One of them said that she have the electric toaster and the electric kettle in the top of the kitchen.

Do you look for the appearance?

One of them look always the appearance when she go and buy an appliance because she have them in the top of her kitchen, one other sometimes she look for the appearance in order to match with her kitchen décor, and the last one she never look for the appearance.

What they think about the appliances?

Electric Toaster: All of them said that it is an important appliance in their kitchen. Two of them said that they used it only during the winter, and one other that she used it four times during the week.

Electric Kettle: They all owned an electric kettle, they used everyday several times for saving time, for convenience and its an essential item in the kitchen.

Food Processor: Only one of them think that it's an important appliance in the kitchen, the others they found it very complicated to use.

Electric Food Mixer: Two of them owned it and used it very often and find it very important, convenient and easy to use. The other one own this appliance but rarely used it and she don't think that it's important appliance in the kitchen.

Blender: They all own a blender and found it very important. The two of them said that they used it more when their children were young. The other one said that she used it once a week for chopping onion, parsley, nuts.

Microwave Oven: Two of them used the microwave oven a lot only for reheating and defrosting food. They don't seem to like to cook food on it. The other one she never used the microwave oven and she don't think that it's an important appliance in her kitchen.

Coffee Maker: Two of them own this appliance. They don't think that it's an important appliance in the kitchen.

Juice Maker: All of them owned this appliance but only one of them used it once a week during summer, the others they don't think that it's an important appliance in the kitchen.

Electric grill: Two of them used it very often because it's healthy and the food taste good. They think that it's an important appliance in the kitchen.

Sandwich Maker: Two of them owned a sandwich maker and found it very important and used it several times during the week, for making a quick hot snack because they are working.

Ice-cream maker: No one owned an ice-cream maker but they don't seem to want to own one because they can buy a good taste ice-cream.

Bread maker: Only one of them seem to want to buy a bread maker, the others said that they can buy a good bread and there is no need to buy this kind of appliance.

Electric crepe and pancake maker: Two of them owned this appliance, they used it only once a year and they don't think that it's an important appliance in the kitchen.

Waffle maker: Only one owned this kind of appliance, she used it only when she first bought it but now she never used it and it's stored away.

Appendix 8 - Focus Group Discussions carried out in Cyprus- Adults over 60years of age carried out in Adult Centres

Focus groups were carried out in order to gather more information on ownership and use of small domestic kitchen appliances. Female respondents over 60years of age were contacted and asked to participate. They were divided into two groups, each group consisted of five women. Questionnaires were distributed personally by the researcher to old people who visited Adult Centers in Paphos and to old people who lived in the villages of Paphos and Limassol which were recruited by their local community council. Those individuals were asked to explain why they buy the small domestic kitchen appliances for food preparation, from where they hear about them, how they decide which model to buy, what they think about each of the appliances, why are important or unimportant to them, if they look for the appearance when they buy those appliances, if they look for the appliances do have extra features and if they situated them in the top of their kitchen.

1st Focus group of old people in the Adult Centre in Yeroskipos

Why they buy the small domestic kitchen appliances, from where they hear about them?

The two of the old ladies in Cyprus have an electric grill for health reasons. The one of them stated that it was bought by her children and the other said that was bought by herself in order to cook healthy and look after her diet. The other three ladies except from one which again she had an electric grill that was bought by her children but never used it, had never bought or used any small domestic kitchen appliances in their life, because they said that they continued to cook with the traditional utensils, traditional Mediterranean dishes as they had learnt from their parents with the only exception that today they have a gas or an electric cooker, and also one of them said that she can't afford to buy any domestic kitchen appliance. One of them also said that there is no need to go and buy an electric food mixer in order to help her make cakes when he can make it by hand.

In the past as stated by all the respondents life was very difficult, lots of poverty, the people used to work very hard in the fields in order to feed their family. The majority of participants used to remember the cooking methods used in the past by

their parents or relatives from where they learn how to cook. In their houses for cooker they used to have a fireplace that they have the woods or coals underneath and upon that they have "niskia"- an iron instrument which was used to put the "magirissa"-casserole on it when they were cooking a meal. They remembered the casserole when they were young , was made of earthernware or stoneware or iron and after were made of aluminium and copper. They didn't have any appliances, only pans and saucepans made of iron, aluminium and copper. Most of them women and men used to worked in the fields from early in the morning until late in the evening and they used to cooked their lunch there. They used to place two stones which were used to stand the casserole on and with woods underneath they were cooking a meal.

How they decide what model to buy?

The one lady that bought an electric grill by herself said that she looked for price she wanted a reasonable price and she didn't look for brand name, extra features or the appearance of it.

What they think about the appliances that they have?

The only appliances that the three of the five old ladies had was an electric grill. The two of them cook in the electric grill traditional Mediterranean style dishes (e.g.mousakka) and they used the grill instead of frying for health reasons and found it very important. The one of them used it very often, everyday and the other one used it twice a week. They both have their electric grills in the top of their kitchen. The third lady who own an electric grill never used it because she continued to cook with the traditional utensils, traditional Mediterranean dishes, as learnt by her mother.

2nd Focus group of old people in the Adult Centre in Yeroskipou

Why they buy the small domestic kitchen appliances, from where they hear about them?

Only three of the old ladies own small domestic kitchen appliances. Those appliances were all purchased by their children. They all though that those appliances are important and essential for the housewife today but they don't go and

buy them because they used to cook with the traditional utensils, traditional Mediterranean dishes as they had learnt from their parents with the only exception that today they have a gas or an electric cooker, and also one of them said that she can't afford to buy one, health reasons and because their children have those appliances and when they cooked something they bring them.

How they decide what model to buy?

Because all the small domestic kitchen appliances were bought by their children they never looked for price, for brand names, extra features or the appearance of the appliances that they have.

What they think about the appliances that they have?

Only the three of the five told ladies own small domestic kitchen appliances. The first lady own a microwave oven and used it to grill or reheat food once a week or once every two weeks and finds it very important. The second lady own an electric grill and used it once a week and finds it very important. The third lady own an electric kettle, a food mixer, a juice maker, a blender, but she never used them except when their children come to visit her. The other two ladies they never bought or used any small domestic kitchen appliances in their life, because they said that they continued to cook with the traditional utensils, traditional Mediterranean dishes as they had learnt from their parents. Also all the ladies cook with this way. The one's that they own small domestic kitchen appliances they all have them in the top of their kitchen.

Appendix 9 - Traditional utensils used for food preparation

"niskia"-iron instrument, which was used to put the casserole on (magirissa) to cook a meal.

"Sadji"-"Gastra"- earthern ware dish or iron that was used to cook and fry pittes and kattimerga (traditional pastries).

"Goudi"- "Mortar"-"Pestle"- wooden tool that was used for thrashing-grinding of the spices or other small seeds.

"Sanida"- wooden long narrow board with one or two series of hollows to put dough in before to placed in the wooden oven.

"Xartzi"- copper make big pot, which was used to cook trahana and palouze or resi (traditional foods) for weddings.

"Talari"- it's an implement tool, made of straw and primarily is used to traditional cheese (halloumi or anari) to drain before use.

"Skafi"- small and big, wooden bowls used for knead the dough.

"Kkefkira"-"Skimmer"-big perforated spoon for skimming, used for palouze.

"Magirissa"- casserole, cooper made pot, which was used to cook food for many persons up to ten.

"Koutala"- a long wooden spoon, used to stir food.

Kiprianou, P.C. (1992) *Folklore of Palekithron.* Nicosia: Renaissance Press.

Appendix 10 Publications

The ownership and use of small kitchen domestic appliances by a Cypriot population

Aglaia Efstathiou, Diane Grant and Sheila Maxwell.

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Mediterranean countries such as Cyprus traditionally had a low incidence of nutritionally related diseases. This has been related to the food items consumed and the methods used for cooking which was heavily dependant on the use of olive oil. However in the past few years the incidence of coronary heart disease has been increasing and become a major concern. There has also been an increase in tourism that has resulted in an increase affluence for some, providing the means to purchase kitchen appliances that are readily available in the shops. The way in which food is prepared may contribute to the nutritional content of the diet. Traditional methods of cooking can be influenced by increased ownership of domestic appliances.

This study aimed to carry out a cross sectional study of people living in Cyprus to determine the ownership and use of small kitchen domestic appliances in relation to the possible consequences the appliances may have on the nutrient intake of the individual. An opportunistic sample of 291 female adults aged 25-60y was recruited from amongst mothers of schoolchildren in Cyprus (31 % professional, 50% partly skilled, 18% unskilled). Data was collected using a self-completion questionnaire consisting of questions concerning personal details, the ownership and use of domestic appliances which may influence nutrient intake. The Liverpool John Moores University Ethics Committee granted ethical approval.

Electric toasters, juice makers and sandwich makers were owned by 80% of the population with over 50% of owners using them 3 or more times a week. Over 50% of the population owned food processors and blenders but the majority only used them less than once a week. Only 57% owned a microwave with the majority of owners using it daily. Newer items such as a bread-maker were rarely owned (1%). Those with professional occupations were significantly more likely to own a food mixer, blender, coffee maker and electric grill. There was no significant difference between age groups and ownership of any appliance. Also there was not a significant difference in the use of the appliances was found with occupational group or age.

A large percentage of people own a variety of domestic appliances, the use of which may have beneficial effect on their nutrient intake.

Proceedings of the 2nd International Institute of Consumer Science Research Conference,

Liverpool, July 2005

A comparison of the macronutrient intake of British adults in Liverpool, UK and Cypriot adults in Paphos, Cyprus. BY A.EFSTATHIOU and S.M. MAXWELL, *School of The Outdoors. Leisure and Food, Liverpool John Moores University, IM Marsh Campus, Liverpool, L17 6BD.*

Mediterranean countries, such as Cyprus, traditionally had a low incidence of nutritionally related diseases (Berrino & Muti, 1989). The low incidence of disease has been related to the foods consumed, The Mediterranean diet (Ferro-Luzzi & Sette, 1989). The Mediterranean diet has a high monounsaturated saturated fat ratio, high consumption of legumes, fruit and vegetable and moderate consumption of milk, dairy products and alcohol (Trichopoulou & Lagiou, 1997). During the last decade there has been a trend in Mediterranean countries away from the traditional way of eating due to urbanisation and the adoption of a North American way of eating and lifestyle (Serra-Majem & Helsing, 1993). In the past few years the incidence of CHD has been increasing in Cyprus (Cyprus Ministry of Health, 1995). This study aimed to compare the macronutrient intake of Cypriot adults living in Paphos, Cyprus and British adults living in Liverpool, with respect to the Mediterranean diet.

The dietary intake of females, aged 25-55 years, was assessed using 3 days dietary diaries and analysed using Microdiet ™. Thirty-two Cypriots (C) (mean age 35.5y) and forty-two British (B), (mean age 36.8y) from 3 socio-economic groups (professional: C: 15, B: 18; partly skilled: C: 12, B: 16; unskilled: C: 5, B: 8) were recruited.

Nutrient intake	Mediterranean diet	Cypriot		British	
(% energy)	Mean**	Mean	95%CI	Mean	95%CI
Carbohydrate*	42	49.7	47.0, 52.4	45.4	42.8, 48.0
Protein*	15	23.7	22.1, 25.4	16.9	15.7, 17.9
Fat*	42	26.2	24.8, 27.7	33.4	30.8, 36.0
Saturated fat*	9	7.2	6.4, 7.9	11.2	9.7, 12.8
Monounsaturated	19	10.4	9.5, 11.2	11.3	9.9, 12.7
Polyunsaturated fat*	4	2.7	2.6, 3.0	6.0	5.2, 6.8
Alcohol*	2.5	0.3	-0.1, 0.8	3.8	2.1, 5.6

*Significant difference between Cypriot and British Mean nutrient intakes ($p<0.05$)

**Trichopoulou et al. (1993)

Differences were seen in all mean macronutrient intakes between British and Cypriot subjects with the exception of intakes of monounsaturated fats as a percentage of energy .The macronutrient intake, as a percentage of energy, of the Cypriot subjects demonstrated higher carbohydrate and protein intakes compared to the Mediterranean diet, there was a lower fat intake 50% lower in monounsaturated fats. Very little alcohol was drunk.

It appears that Cypriot female adults are moving away from the traditional Mediterranean diet with a decrease in the monounsaturated/saturated fat ratio. Alcohol however is still drunk in moderation. They were consuming a diet similar in composition to that recommended in the UK. This change in dietary intake may be related to the increase in coronary heart disease incidence in Cyprus.

Berrino F &. Muti P (1989) *European Jouma of Clinica Nutrition* 43, 49-55.

Cyprus Ministry of Health (1995) *Risk factors of the Cypriot population in relation to coronary heart disease. Ministry of Health: Nicosia, Cyprus.*

Ferro-Luzz A & Sette S (1989) *European Journal of Clinical Nutrition* 43, 13-29.

Serra-Majem L & Helsing E (eds) (1993) *European Journal of Clinical nutrition* 47, *supplement 1 1-100.*

Trichopoulou A & Lagiou P *(1997) Nutrition reviews* 55, *383-390.*

Trichopoulou A. Katsouvanni K & Gnardellis C (1993) *European Journal of Clinical Nutrition* 47. *supplement 1 S76-S81.*

Ownership and use of domestic kitchen appliances related to cooking methods and macronutrient intake. BY A. EFSTATHIOU, *School of Education, Community and Social Science, Liverpool John Moores University, IM Marsh Campus, Liverpool Ll7 6BD.*

The ownership of domestic appliances for food preparation has increased in the last few years. This is thought to reflect an increased affluence and a desire to try new foods without using traditional cooking methods. The higher socio-economic groups are more likely to buy small kitchen appliances (Mintel, 2000). Kitchen appliances, such as electric steamers, provide a means to alter traditional cooking methods and achieve a more nutritious diet, however other appliances, such as a deep-fat fryer, may have a detrimental effect on nutritional intake, providing a diet that contains a higher fat content.

The aim of the study was to assess the extent of ownership and use of kitchen appliances and relate this to cooking methods and dietary intake.

A questionnaire concerning ownership and use of small kitchen domestic appliances and cooking methods was distributed to 150 women from 3 socio-economic groups (38 professional, 65 partly skilled and 47 unskilled). Dietary intake (14 women) was determined using 3-day dietary records. The majority (46%) spent 1-2 hours/day cooking. The only difference between socio-economic groups and the frequency of the various cooking methods used was for deep-fat frying ($p=0.002$), 24% of the unskilled, 3.8% of partly skilled and 2.9% of professionals deep-fat fried every other day. Ownership of microwaves was 89%, deep-fat fryers 27%, food processors 49%, steamers 17% and bread-makers 11%. Ownership of deep-fat fryers ($p=0.03$) and steamers ($p=0.015$) was significantly higher in the unskilled group but that of food processors lower ($p=0.047$). 62.5% used the microwave everyday and 71% used their steamer 3-4 times a week, other appliances were used once a week or less. 60% of the unskilled group used the deep-fat fryer at least 3 times a week whereas the majority of other groups used this appliance less than once a week.

There were no significant differences between ownership of any domestic appliance and the percentage of energy intake from fats, carbohydrates or proteins.

Ownership of domestic appliances does not appear to reflect usage, but may reflect a possible difference in cooking skills. However, the usage of domestic appliances may account for the differences in dietary intake between socio-economic groups group as observed in other studies.

Mintel (2000) www.mintel intemational group ltd 17/08/01

Proceedings of the Nutrition Society. Nutrition Society Summer meeting

The ownership and use of small kitchen domestic appliances: case study, Liverpool

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Abstract

The nutritional habits of UK consumers have become a cause for concern with an increasing number of people suffering from diseases related to nutrition. The way in which food is prepared may contribute to the nutritional content of the diet. Traditional methods of cooking and eating are being influenced by increased ownership of domestic appliances. This study aimed to carry out a cross sectional study of people living on Merseyside to determine the ownership and use of small kitchen domestic appliances in relation to the possible consequences the appliances may have on the nutrient intake of the individual. An opportunistic sample of 276 female adults aged 25-70 years was recruited from amongst university staff and community groups within Merseyside. Data were collected using a self-completion questionnaire consisting of questions concerning personal details, the ownership and use of domestic appliances that may influence nutrient intake. The Liverpool John Moores University Ethics Committee granted ethical approval. Microwave ovens, electric toasters and grills were owned by 80% of the population. Coffee makers, handheld electric food mixers, sandwich makers, blenders and food processors although owned by over 45% were used by the majority only once a week or less. Newer items such as a bread maker were owned by 9% who were significantly more likely to have a professional occupation. Those with unskilled occupations were significantly more likely to own a deep fat fryer and least likely to own a food processor. Those aged 25-34 years were significantly least likely to own a handheld food mixer. Households comprised of couples with or without children were significantly more likely to own sandwich makers, bread makers, food processors and handheld food mixers. No difference in the use of the appliances was found with occupational group or age. A large percentage of people own a variety of domestic appliances, the use of which may have a beneficial effect on their nutrient intake, however, it is of concern that those in the lower socio-economic group were more likely to own appliances that will have a negative effect on their diet.

Keywords Domestic appliances, kitchen appliances.

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Introduction

Eating patterns and cooking techniques have undergone dramatic change over the past 50 years for a number of reasons: greater female employment, an increasing number of single parent households, changing lifestyles, less formal eating, less time spent in the kitchen and an escalating demand for leisure time activitiesY Changes in family structure and an individual's role largely resulting from an increase in female employmenf has led to the household cooking no longer being entirely the domain of women with much less time being spent in the kitchen. All these social and demographic changes have fuelled a demand for more convenience when preparing food. Safe and simple to operate appliances that are time and labour saving have become an important part of household developments in equipment, which have been accompanied by advances in food technology and manufacture.4-6

The ownership of certain appliances has been suggested to indicate to consumers their arrival at a higher social level, which is associated with the acquisition of material possessions.[4] Higher-income groups are significantly more likely than lower-income groups to own domestic appliances.[7],8

There has been an increase over the past 10 years in the ownership of domestic appliances and the range of appliances available. The ownership of microwave ovens demonstrated an increase from 51 % in 1990 to 76% in 1998.[9],10 A survey based on 1017 adults showed

that 83% owned a toaster, 48% a sandwich maker, 32% a deep fat fryer and 17% a steamer.[8]

Differences have been shown in the ages and socio-economic groups of people owning specific domestic appliances. Those most likely to own toasters were within the 45-55 years age group, suggesting the presence of children who enjoy snacking on toast. The presence of children in the house also appeared to influence the ownership of a sandwich maker, 61 % of those who had children owned a sandwich maker compared with 43 % of those who did not have children. Deep fat fryers were found to be more likely to be owned by younger respondents who used them for quick snacks[8] and by those in the lower-income groups (66.8%) compared with those in higher-income groups (40.5%).7

The number of different domestic appliances available for food preparation has increased; recent additions to the range are electric steamers, rice cookers and bread makers.[8]

The nutritional habits of the nation are a cause for concern with an increasing number of people suffering from diseases related to nutritionY Nutrition is perhaps the most important factor causing inequalities in health. Professionals appear more likely to follow a healthy lifestyle than more routine white collar or manual workers. It is also well documented that healthier diets tend to cost more than energy dense foods.[12] The diet of the lower socio-economic groups compared with the higher socio-economic groups has been shown to provide cheap energy from foods such as sugars, fats, meat products, full cream milk, preserves, potatoes and cereals but has a low intake of fruits, vegetables and whole meal bread. The incidence of diseases such as heart disease, stroke and some cancers are higher in people of low socio-economic status than the more affluent.[11]

Traditional methods of cooking are being influenced by the ownership of domestic kitchen appliances such as microwaves and electric steamers, which could provide a more nutritious diet. People have a desire to try new and healthier foods without using traditional methods, for example production of bread using a bread maker. It has also been demonstrated that individuals try to cook meals from basic ingredients at the weekend although this is more prevalent amongst the higher socio-economic groups. The ownership of small kitchen appliances was found to enhance and supplement the traditional methods of cooking.[8]

The way in which food is prepared may contribute to the nutritional content of the diet, for example frying rather than grilling will increase the fat content and boiling may decrease the water soluble vitamin content of foods. Small kitchen appliances provide a means to assist in the provision of meals by reducing the time and skills required for preparation and cooking but may alter the nutritional content of various food items. The nutritional content of cooked food items can depend on which appliance is used for food preparation. Using frying, rather than poaching and grilling, to prepare a meal of eggs, bacon, mushrooms and bread increases the fat content of this meal by 58 g. The vitamin C content of fresh broccoli cooked in the microwave has been found to be significantly higher than conventionally boiled broccoli (mean: 93.3 mg/100 g).4,13 The use of small kitchen appliances may also change the diet of an individual, for example the use of a deep fat fryer will increase the fat content, whereas the use of a bread maker may increase the fibre and carbohydrate content of the diet. Merseyside and the Northwest are areas with a high incidence of mortality from diseases such as coronary heart disease and cancer.[11] High intakes of saturated fat and low intakes of dietary fibre have been implicated as risk factors in these diseases.

This study aimed to carry out a cross sectional study of people living on Merseyside to determine the ownership and use of small kitchen domestic appliances, in terms of age, occupational status and composition of the household, in relation to the possible consequences the appliances may have on the diet of the individual.

Methods

An opportunistic sample was recruited from amongst university staff and community groups within Merseyside between September and December 2002. Subjects (276) were recruited from different areas of Liverpool in order to provide respondents from a variety of socioeconomic groups. Persons of responsibility in various organizations known to the researcher and her colleagues were contacted and permission granted for an approach to members of their organization for inclusion in the study. An opportunistic sample was recruited and

questionnaires were distributed personally by the researcher to people who worked in schools, in the university, in care homes and organizations such as: Gingerbread, Victim Support, and The Citizens Advice Bureau. The questionnaires were collected from the respondents within 24 h following completion.

A questionnaire was specifically designed for this study. Content and face validity were established by conducting a pilot study. The questionnaire consisted of questions regarding personal details, such as age and occupation of the head of the household, followed by questions concerning the ownership and use of domestic appliances. Domestic appliances included on the questionnaire were related to those that may influence eating habits or nutritional content of food items. The appliances included those that may have a positive effect on diet and nutritional content: microwaves (because of retention of water soluble vitamins), an electric grill (reduction of fat content), a bread maker (increase in fibre and carbohydrate content of diet), an electric steamer (increase in water soluble vitamin content), a rice cooker (increased consumption of carbohydrate) and a juice maker (increase in fruit intake). Appliances also included those that may have a negative effect: a sandwich maker (increase in fat content, cheese sandwiches the most commonly made), a deep fat fryer (increase in fat content), an ice cream maker, a popcorn maker, a crepe and pancake maker (increase in sugar and fat content) and a soft drink maker (increase in sugar content). Finally appliances included those that may have either positive or negative effects namely food processors, blenders and food mixers that could be used for producing either nutritious soups or high fat and sugar products such as deserts. The subjects were asked to complete the questionnaire on their own. Ethical approval for the study was granted from the Liverpool John Moores University ethics committee.

The subjects were classified into three groups (professional, partly skilled and unskilled) dependent on the occupation of the head of the household based on The National Statistics Socio-economic Classifications: 1 & 2 professional; 3, 4 & 5 partly skilled; 6, 7 & 8 unskilled.

The data from the questionnaire were analysed using SPSS for windows v11. Frequency counts, percentage of responses and cross tabulations were calculated. Chi squared tests were conducted to test for any significant differences between groups. Significant differences between the subgroups were taken below $P = 0.05$.

Results

Subject characteristics

A total of 276 subjects (aged 25-70 years) completed the questionnaire, 25% were in a professional, 46% in a partly skilled and 29% in an unskilled occupation. 15.3% were single adult households, 20.7% single adult households with children under 18 years living with them 41.0% of households were composed solely of two adults (couples) and 23.0% of households were composed of a couple with children. There were similar numbers of subjects in each age group (25-34 years: 27.7%; 35-44 years: 24.0%; 45-55 years: 28.0%; > 55 years: 20.3%). One hour or less was spent cooking each day by 44.6% of respondents, only 10.5% spent greater than 2 h cooking each day. There was no significant difference between the respondent's occupation and the time they spent on cooking, however, as age increased the amount of time spent on cooking by the individuals increased ($P < 0.05$).

Ownership

The ownership of small kitchen electric appliances is shown in Table 1. Those with a professional occupation were significantly more likely to own a bread maker, or a handheld electric food mixer ($P < 0.05$), and those with unskilled occupations were significantly more likely to own a deep fat fryer ($P < 0.05$) and least likely to own a blender or a food processor ($P < 0.05$) (Table 1). The younger age groups were more likely to own the majority of appliances than the older age groups except in the case of food processors, blenders, handheld food mixers and juice makers, however, this difference in ownership was significant only for handheld electric food mixers ($P < 0.05$) (Table 2). In relation to the composition of the household, significant differences were found in the ownership of sandwich makers, bread makers, food processors and handheld food mixers, households comprised of couples with or without children were more likely to own these items ($P < 0.05$) (Table 3). 41.8% of those with children

Table 1 Ownership of small kitchen domestic appliance with reference to occupational group ('Yo)

Appliance	Total	Occupation		
		Professional	Partly skilled	Unskilled
Electric toaster	88.6	92.8	88.9	83.5
Microwave oven	88.9	91.3	88.9	87.3
Sandwich maker	51.3	47.8	51.6	53.2
Electric grill	85.6	85.5	87.3	83.5
Deep fat fryer'	28.8	24.6	23.8	39.2
Bread maker'	9.2	17.4	7.9	5.1
Electric steamer	15.9	11.6	15.1	21.5
Rice cooker	6.3	7.2	7.1	3.8
Food processor'	48	59.4	53.2	29.1
Blender'	48.3	53.6	54.8	35.4
Handheld electric food mixer'	53.5	72.5	51.6	38
Juice maker	17	20.3	19.8	10.1
Ice cream maker	4.4	8.7	3.2	2.5
Waffle maker	2.2	1.4	1.6	3.8
Popcorn maker	4.1	4.3	2.4	6.3
Electric crepe/ pancake maker	0.7	1.4	0.8	1.1
Soft drink machine	2.2	2.9	0.8	3.8

'Significant difference between occupational groups ($P < 0.05$).

Table 2 Ownership of small kitchen domestic appliance with reference to age group ('Yo)

Appliance	Age groups (years)			
	25-34	35-44	45-55	>55
Electric toaster	89.3	90.8	84.2	90.9
Microwave oven	86.7	95.4	89.5	83.6
Sandwich maker	58.7	56.9	48.7	38.2
Electric grill	90.7	81.5	82.9	87.3
Deep fat fryer	30.7	27.7	30.3	25.5
Bread maker	5.3	16.9	6.6	9.1
Electric steamer	18.7	16.9	13.2	14.5
Rice cooker	9.3	4.6	6.6	3.6
Food processor	36	49.2	55.3	52.7
Blender	41.3	49.2	55.3	47.3
Handheld electric food mixer'	34.7	61.5	59.2	61.8
Juice maker	13.3	15.4	18.4	21.8
Ice cream maker	2.7	6.2	3.9	5.5
Waffle maker	2.7	1.5	1.3	3.6
Popcorn maker	1.3	9.2	1.3	5.5
Electric crepe/pancake maker	1.3	0	1.3	0
Soft drink machine	1.3	3.1	2.6	1.8

'Significant difference between age groups ($P < 0.05$).

Table 3 Ownership of small kitchen domestic appliance with reference to household composition ('Yo)

Appliance	Household composition			
	Couple no children	Couple + children	Single no children	Single + children
Electric toaster'	93.4	96.1	79.4	84.8
Microwave oven	92.3	86.3	91.2	82.6
Sandwich maker'	65.9	45.1	47.1	37
Electric grill	83.5	86.3	85.3	89.1
Deep fat fryer	38.5	25.5	26.5	21.7
Bread maker'	13.2	17.6	0	4.3
Electric steamer	18.7	17.6	11.8	13
Rice cooker	8.8	9.8	2.9	2.2
Food processor'	48.6	47.1	32.4	41.3
Blender	46.2	49	58.8	47.8
Handheld electric food mixer'	65.9	62.7	44.1	37
Juice maker	15.4	21.6	14.7	13
Ice cream maker	4.4	7.8	2.9	2.2
Waffle maker	1.1	2	0	6.5
Popcorn maker	5.5	5.9	5.9	0
Electric crepe/pancake maker	1.1	0	0	4.3
Soft drink machine	1.1	2	2.9	0

'Significant difference between households ($P < 0.05$).

owned a sandwich maker, whereas a greater percentage (60.0%) of those without children owned one ($P < 0.05$). Those with children aged 6-11 years were significantly more likely to own a sandwich maker (62.5%), a bread maker (16.7%) and a deep fat fryer (45.8%) than those that did not (sandwich maker 48.7%, bread maker 7.9%, deep fat fryer 25.1 %, respectively) ($P < 0.05$) and those with children 12-17 years were more likely to own an electric handheld food mixer (71.4 %) and a popcorn maker (12.2%) than those without children in this age range (electric handheld food mixer: 48.9%, popcorn maker: 2.2% respectively) *(P< 0.05)*.

No significant differences were found between age groups, socio-economic groups or the presence of children in the household and the stated importance of any appliance.

Use of domestic appliances

The frequency of use of the various domestic appliances is shown in Table 4. No difference was found in the use of these appliances with occupation group or age, however, those without children tended to use the microwave less often than those with children ($P < 0.05$).

Discussion

These results demonstrate that the ownership of small kitchen domestic appliances is similar to that previously reported.[5] The ownership of microwave ovens appears to be still increasing, 89% of these respondents owned this item, with a large number of respondents considering it to be important to them. Differences in the percentage ownership of specific appliances such as a handheld food mixer, blender or food processor between the different socio-economic groups may reflect the fact that the higher socio-economic groups are more likely to cook meals from basic ingredients at the weekend where the ownership of these appliances enhance and supplement the traditional methods of cooking.[5] As previously reported the ownership of deep fat fryers was highest in those in the lowest socio-economic group (39.2%), however, this was a lower percentage than that reported by other studies.[6],8 This may reflect either a difference in the classification of low/high income between studies or a greater awareness of the population in this area, where the incidence of coronary heart disease is high, of the health implications of deep fat frying. The use of this appliance would predispose an increase in the fat content of the diet of this

Table 4 The frequency of use of each domestic kitchen appliance by the respondents

Appliance	More than once a day No. (%)	Once a day No.(%)	3-4 times a week No. (%)	Once a week No. (%)	Less than once a week No. (%)
Electric toaster	62 (27.0)	105 (45.7)	43 (18.7)	13 (5.7)	7 (3.0)
Microwave oven	79 (35.3)	53 (23.7)	76 (33.9)	11 (4.9)	5 (2.2)
Sandwich maker	2 (1.7) 15	3 (2.5)	16 (13.3)	23 (19.2)	76 (63.3)
Electric grill Deep	(9.3) 2	27 (16.8)	82 (50.9)	20 (12.4)	17 (10.6)
fat fryer Bread	(3.4)	1 (1.7)	14 (23.7)	10 (16.9)	32 (54.2)
maker Electric		2 (9.5)	5 (23.8)	6 (28.6)	8 (38.1)
steamer Rice		4 (11.8)	18 (52.9)	4 (11.8)	8 (23.5)
cooker Food			4 (36.4)	4 (36.4)	3 (27.3)
processor	1 (0.9)	1 (0.9)	22 (20.8)	27 (25.5)	55 (51.9)
Blender	3 (2.5)	5 (4.2)	19 (16.0)	39 (32.8)	53 (44.5)
Handheld electric food mixer	1 (0.9)	2 (1.8)	16 (14.4)	27 (24.3)	65 (58.6)
Juice maker		4 (11.8)	12 (35.3)	5 (14.7)	13 (38.2)
Ice cream maker					11 (100.0)
Waffle maker		1 (25.0)			3 (75.0)
Popcorn maker		3 (37.5)			5 (62.5)
Electric crepe/pancake maker					1 (100.0)
Soft drink machine					4 (100.0)

group. Another studt demonstrated that this appliance is more frequently owned by the younger age groups, however, in this study there was no difference in the ownership of this appliance with age that may indicate an increased awareness of the unhealthy consequences of deep fat frying in an area where the incidence of coronary heart disease is high.[14]

The greater ownership of the domestic appliances by those in the high socio-economic groups compared with those with unskilled occupations, together with the fact that there was no difference in the use of these appliances between occupational groups tends to support the suggestion that ownership of certain appliances indicates to consumers their arrival at a higher social level, which can be associated with the acquisiti.on of material possessions.[4]

The higher percentage of ownership found within the older groups compared with the younger age groups in regard to food processors, handheld food mixers and blenders may reflect a lack of cooking skills in these younger individuals.[Is] Previous studies have shown that younger subjects are more likely to own a toaster and a sandwich maker because of the presence of children in the household.[8] However, in this study only those with young children (6-11 years) were more likely to own a sandwich maker.

The subjects with young children were the group most likely to own a bread maker and deep fat fryer. Whereas the bread maker has the potential to increase the fibre and carbohydrate content of the diet as recommended by The Committee on Medical Aspects of Food POlicyI6 and thus improve the diet, whilst the deep fat fryer has the potential to increase the fat content of the diet, which is not recommended. The ownership and probable use of this appliance demonstrates a concern voiced by many individuals that what is taught in school regarding healthy eating is not supported by the home environment where unhealthy options are offered for consumption leading children to believe that lessons have no relevance to practiceY

The majority of those items whose use could have a potential negative influence on the nutritional content of the diet were owned by a greater percentage of the unskilled occupational group, this contrasts with the professional occupational group who were found to be the owners of appliances that may have a positive impact on the nutritional content of their diet, although the differences in frequency of ownership between occupational groups was only significant for the bread maker and the deep fat fryer. The ownership of these items may be making a contribution to the inequalities in health between different socio-economic groups.

Conclusion

This study has demonstrated that a large percentage of the population own and use regularly a variety of small kitchen domestic appliances, the use of which may have a beneficial effect on their nutrient intake. However, it is of concern that those in the unskilled occupational group were more likely to own those appliances that will have a negative impact on their diet. Further study into the dietary intake of these respondents is being undertaken to determine the effect of the use of these appliances on nutrition.

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