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Evaluation of Liverpool's Drink Less Feel Good intervention

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Introduction

Alcohol use disorders such as alcohol abuse or dependency have been linked to increased levels of morbidity and mortality [1]. Whilst alcohol abuse and dependence have traditionally been the focus of healthcare interventions, increasing emphasis has been placed on the detection and intervention of less severe but still harmful levels of alcohol consumption [1]. Amongst adults in England who had consumed alcohol in the past year, 63% of men reported average weekly alcohol consumption of up to 21 units and 62% of women drank up to 14 units (the recommended lower risk limit for men and women respectively) [2]. A further 17% of men and 12% of women drank at hazardous risk levels (22-50 units for men and 15-35 units for women), whilst 5% and 4% of men and women respectively were drinking more than these amounts at harmful levels of consumption [2].

Drink Less Feel Good (DLFG) is a new behaviour change intervention designed by Public Health Liverpool that aims to tackle high levels of alcohol consumption and encourage people to drink less. The intervention is aimed at individuals aged 35-55 years who make up a substantial proportion of low risk and hazardous drinkers [3]. The purpose is to signpost individuals to a website which hosts a brief intervention called the My Drinks Check tool. The tool is designed to enable people to assess how much they drink and measure their risk level in a variety of different ways. The tool also provides personalised feedback on the benefits of consuming less alcohol and suggests ways individuals can reduce their alcohol consumption without having to stop drinking completely.

The Public Health Institute, LJMU were commissioned to assess the impact of the DLFG intervention and inform its future implementation and development. The research aimed to identify the characteristics and behaviours of the population who accessed the My Drinks Check Tool and assess its accessibility, usability, and impact.

Methods

A mixed methods approach was implemented and which included both primary and secondary data. Primary data consisted of pre (N=165), post (N=73) and follow-up (N=33) questionnaires and semi-structured interviews (N=18) with a convenience sample of individuals who had completed the My Drinks Check. Surveys explored alcohol consumption levels, behaviours and related problems, and level of motivation to change behaviours. Interviews explored participants' motivations to use the tool; barriers and facilitators to accessing and using the tool and interpreting the results; perceived usefulness of the tool; recommendations for change; and, changes in actual or intended alcohol consumption levels. Secondary data collection consisted of analyses of the data collected routinely from all individuals who access and complete the My Drinks Check tool (N=19,361). This data included: demographics; where individuals had heard about the tool; past week alcohol consumption; motivations for consuming alcohol; situational contexts for alcohol consumption; social norms around alcohol; and, measures of wellbeing.

Limitations

While data in the report is presented as independent individuals, the nature of the tool means that the same individual may have accessed the tool at several time points and there is no way to link this data. Individuals indicating they consumed a high risk level of alcohol in the past week (≥50 units for men and ≥35 units for women) were not required to complete the remaining questions in the My Drinks Check and instead were redirected to the end page. Thus, individuals drinking at higher risk levels are not represented in the majority of My Drinks Check data analyses (e.g. motivations to consume alcohol etc.).

Individuals were recruited to the evaluation surveys and interviews through a convenience sampling method, and may have been motivated to take part in the study for reasons that differed from individuals who accessed the tool after seeing it advertised. Specifically, individuals who accessed the tool and were not part of the study may have been more motivated to use it to reduce their alcohol consumption or because they were interested in the calorie perspective than individuals who took part because they were approached as part of a research study. The analysis of the effectiveness of the tool in reducing alcohol consumption or increasing motivation to reduce alcohol intake may represent an underestimation of its true impact.

Key Findings

My Drinks Check tool usage

- Over an eleven month period, between the 1st February 2018 and the 7th January 2019, there were 19,361 completions of the My Drinks Check tool, with the majority of completions (94.3%) taking place within the first three months.
- Individuals were asked how they heard about the My Drinks Check tool. Facebook was the most common source, with almost half (49.7%) of all My Drinks Check completions selecting it as the source, whilst 16.6% heard about the tool through the Drink Less Feel Good website. Males were significantly more likely than females to have heard about the My Drinks Check tool through the Drink Less Feel Good website, whilst females were more likely than males to have heard about it through Facebook.
- There was an approximately equal split in the proportion of My Drinks Checks completed by males and by females and over half of the My Drinks Checks were completed by the intervention target age group 35-55 years. The majority (76.8%) of My Drinks Checks were completed by individuals living in Liverpool.

Alcohol consumption levels and patterns

- Past week units of alcohol consumption were categorised into risk levels; over one third (37.4%) of individuals were consuming alcohol at low risk levels, 43.1% at increasing risk level and 19.4% at higher risk levels. There was a significant association between sex and risk levels, with males more likely than females to be drinking at increasing risk level. The highest prevalence of high risk drinkers was amongst people aged 45-54 years.
- The My Drinks Check also included questions about individuals' motivations to consume alcohol, and occasions and situations in which they usually drank alcohol. The most popular reason for consuming alcohol was 'to relax' (51.5%) followed by 'to have fun with friends' (41.5%). Questions relating to the context in which individuals reported

consuming alcohol found the most popular situation to be whilst on a night out with friends (50.5%) followed by drinking at home with a partner. There were significant differences between males and females and age groups in motivations and contexts for consuming alcohol.

Alcohol social norms and measures of wellbeing

- Individuals were asked whether they thought they consumed more, less or about the same amount of alcohol as other people their age and sex. Two thirds of individuals thought they drank less than other people their age and sex (33.8%) or about the same (36.1%).

- Individuals' perceptions about how their alcohol consumption compared with other people their age and sex was matched against how their actual levels of alcohol consumption measured against other people. Over four in ten (41.8%) individuals underestimated how their drinking compared to other people their age and sex. Younger individuals were more likely to underestimate how their drinking compared to others than individuals in older age groups.

- There was a significant negative correlation between number of units consumed in the past week and all wellbeing measures ($p<0.01$); with higher levels of alcohol consumption strongly associated with lower levels of mental health ($r=-.055$), energy levels ($r=-.054$) and available money ($r=-.058$) and weakly associated with sleep quality ($r=-.029$) and weight satisfaction ($r=-.025$).

Interviewees perceptions' of the My Drinks Check tool

- Overall, interview participants generally liked the main concept of the tool and felt considering alcohol in terms of calories was an interesting and novel idea.

- Interview participants commented very positively about the design and graphics of the website. The majority of participants felt that the tool was appealing, easy and quick to complete and interesting. One of the key barriers participants felt would prevent people from using the tool was not actually being aware of it.

- The main obstacle in terms of usability of the tool however was the recording of a typical week's alcohol consumption. Interview participants reported different ways of defining a typical week with some reporting past week alcohol consumption, others reporting somewhere in between a heavy week and an alcohol free week, and others reporting their heaviest week. Individuals reporting their heaviest week, but who do not drink every week were frustrated with their results, which depicted them as very heavy drinkers.

- In terms of the content of the results page, the comparison with other peoples' alcohol consumption drew contradictory views from interview participants. In general, interview participants reported that the comparison with people their age shocked them. For some individuals, this shock was motivating and they spoke about intending to reduce their alcohol consumption and then rechecking how their drinking compared with others. However, some individuals reported it was distressing and one individual reported it would discourage them from using the tool again. Further, the vast majority of interviewees were sceptical about the comparison.

- All interview participants had positive feedback on the alcohol consumption change slider. However, there was a lot of confusion around what one less drink meant, with many individuals initially presuming this to mean one less drink a week. Whilst the box underneath the slider states it is one less on each day you drink, participants reported they did not read this box properly and so wrongly interpreted the information.

Impact of the My Drinks Check tool

- Several interviewees reported that the tool had made them consider their alcohol consumption and the personalised tips in particular were something which participants reported they may incorporate in the future. Some interview participants reported that the information about calories in alcohol had encouraged them to cut back on their alcohol intake as part of their attempts to lose weight and increase fitness levels.
- Over one third (34.3%) of participants demonstrated positive actual or intended behaviour change in the post-intervention survey.
- The median number of units consumed over the course of the previous week was lower at post-intervention than pre-intervention, although this difference was non-significant (n=71; pre, 10.4; post, 7.2; p=0.588).
- There was a significantly higher proportion of participants drinking within the lower risk guidelines for their sex in the week prior to completing the post-intervention survey compared to the pre. (n=71; pre, 66.2%; post, 69.0%; p>0.01).

Conclusion

Estimates for alcohol-specific mortality, binge drinking and harmful levels of alcohol consumption are significantly higher for Liverpool than the national average [4]. Data from the mixed methods evaluation study suggest that the My Drinks Check may be associated with a number of positive changes in alcohol consumption levels and patterns, and increased motivation to change alcohol consumption amongst study participants. Whilst there was some feedback and suggestions for areas of improvement in the tool, overall study participants were generally positive about its content, scope and premise. The Drink Less Feel Good intervention and accompanying My Drinks Check tool represent an important piece of work that compliments other alcohol interventions targeted at other settings (e.g. nightlife) such as Drink Less Enjoy More. Such a suite of work aims to gradually help to make it more acceptable to drink less alcohol, ultimately change social norms and reduce alcohol consumption and alcohol-related harms in Liverpool.

Evaluation of Liverpool's Drink Less Feel Good intervention

Drink Less Feel Good is a new behaviour change intervention designed by Public Health Liverpool that aims to tackle high levels of alcohol consumption and encourage people to drink less. The aim is to signpost individuals to a website which hosts a brief intervention called the **My Drinks Check tool**. The tool is designed to enable people to assess how much they drink and measure their risk level in a variety of different ways.

www.drinklessfeelgood.com

Methodology

My Drinks Check secondary data

Data collected routinely from all individuals who access and complete the My Drinks Check tool (N=19,361)*
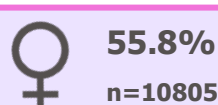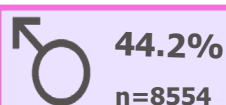
Semi-structured interviews

Interviews (N=18) with individuals aged 35-55 years who had completed a pre-intervention survey
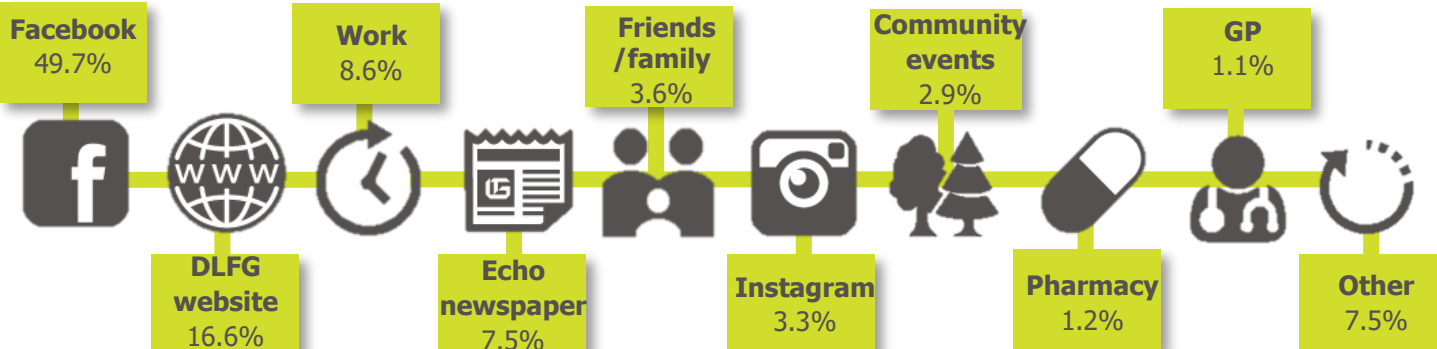
Pre, post and follow-up surveys

Pre (N=165), post (N=73) and follow up (N=33) intervention surveys with individuals aged 35-55 years
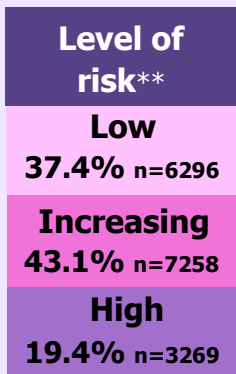
My Drinks Check secondary data

44.2% n=8554

55.8% n=10805

My Drinks Check tool accessed via:

Facebook 49.7%	
	DLFG website 16.6%
Work 8.6%	
	Echo newspaper 7.5%
Friends /family 3.6%	
	Instagram 3.3%
Community events 2.9%	
	Pharmacy 1.2%
GP 1.1%	
	Other 7.5%

Alcohol consumption levels

Level of risk*

Low 37.4% n=6296

Increasing 43.1% n=7258

High 19.4% n=3269

Males were more likely to be drinking at increasing risk levels

(Males, 51.5%; females, 36.2%; p<0.001)

The highest prevalence of high-risk drinkers was amongst people aged **45-54** years

Over four in ten (41.8%) individuals **underestimated** how their drinking compared to other people their age and sex

Alcohol consumption patterns

Motivations for consuming alcohol

To relax 51.5%
Higher amongst 35+ years and females

To have fun with my friends 41.5%
Higher amongst 16-34 years and males

Contexts for consuming alcohol

On a night out with friends 50.5%
Higher amongst 16-35 years

At home with my partner 46.0%
Higher amongst 35+ years and females

At home on my own 29.3%
Highest amongst 35+ years and male

* Total number of people completing My Drinks Check 1st Feb 2018-7th January 2019. **Past week units of alcohol consumption were categorised into risk levels for males (low, 1-14 units; increasing, >14-50 units; higher, >50 units) and females (low, 1-14 units; increasing, >14-35 units; higher, >35 units)

The **My Drinks Check tool** requires individuals to complete questions about their alcohol consumption levels/patterns. Based on that persons responses personalised feedback, such as providing comparisons of how their drinking compares to other people their age, their alcohol consumption in terms of calorie content, the benefits of consuming less alcohol and ways individuals can reduce their alcohol consumption is provided.

Survey and interview key findings

Perceptions of the tool

Long-term health risks

"It did say it was a warning, so that was useful. I don't know if it was further up in the red… if that might change my reaction to it. There could be a section that could explain further maybe."

Comparison with other peoples' alcohol consumption

80%

"That would be useful for people to see, it's easy to have a couple of beers every night, suddenly realise how much it's totted up to and then see how it compares to everyone else."

Benefits of reducing alcohol consumption

"It was helpful that they were personalised so a really good thing to include and I like the fact that with some of them there are links that you can click on which will tell you a bit more about a particular thing."

Doughnut equivalent of alcohol consumption

"You don't realise how much is in it, it's quite a shock actually and it's good the way it shows you the comparison to donuts and calories."

Equivalent miles to walk off calories

15

"I don't think anyone would actually go 'ok I've got to go out and walk 15 miles' but I think it might encourage people to exercise more."
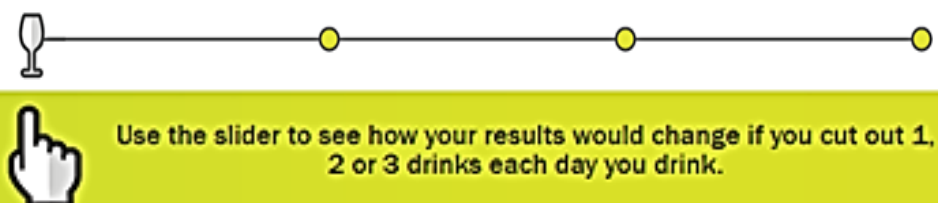
Top tips to reduce alcohol consumption

"There was something that said swap from a pint to a bottle of beer and I thought oh my god that makes so much sense…like a pint to a half pint doesn't seem realistic but a pint to a bottle makes sense. That is a really sensible tip, it just hadn't occurred to me."

Interactive Slider

"Yeah definitely, [one drink less] is not a hard goal to set yourself. Whether you achieve it or not is something different but I think small realistic goals are probably the easiest way, yeah."

Same | 1 less | 2 less | 3 less

Use the slider to see how your results would change if you cut out 1, 2 or 3 drinks each day you drink.

Impact of the tool

Motivation to change alcohol consumption*

Positive intended/actual behaviour change **34.3%**	"I'll start to have a half glass every other day and then cut it out completely in the week, then just have a glass on the weekend, that's something for me to aim to."
No behaviour change **48.6%**	"I might look at having a shandy instead of a beer but I don't think I would drink that much less. I try to use low calorie mixtures anyway."
Negative behaviour change **17.1%**	"Some people might not want to go over a certain amount [of calories] though so might end up substituting alcohol for food so this could have a negative effect."

The total units consumed over the course of the previous week was lower at post-intervention than pre-intervention, although this difference was non-significant (n=71; pre, 10.4; post, 7.2; p=0.588)

There was a significantly higher proportion of participants drinking within the lower risk guidelines for their sex in the week prior to completing the post-intervention survey compared to the pre. (n=71; pre, 66.2%; post, 69.0%; p<0.01)

* Assessed by measuring participants' alcohol motivation stage of change at pre and post-intervention. Participants were classed as negative (moving back down the stages of change), no change (stayed at the same stage), or positive (moved along the stages) of change.

1. Introduction

Alcohol use disorders are a significant cause of morbidity and mortality [1]. The incidence of alcohol specific mortality for the years 2015-17 in England was 10.6 per 100,000 population, with estimates for Liverpool significantly higher than the national average (19.0 per 100,000) [4]. These disorders include severe problems, such as alcohol abuse or dependence, as well as less severe alcohol consumption, including heavy, hazardous or harmful drinking. Whilst alcohol abuse and dependence have traditionally been the focus of healthcare interventions, increasing emphasis has been placed on the detection and intervention of less severe but still harmful levels of alcohol consumption [1]. Amongst adults in England who had consumed alcohol in the past year, 63% of men reported average weekly alcohol consumption of up to 21 units and 62% of women drank up to 14 units (the recommended lower risk limit for men and women respectively) [2]. A further 17% of men and 12% of women drank at hazardous risk levels (22-50 units for men and 15-35 units for women), whilst 5% and 4% of men and women respectively were drinking more than these amounts at harmful levels of consumption [2]. Thus, harmful and alcohol-dependent drinkers comprise a small minority, 4.4% of the UK population, whilst hazardous and low risk drinkers make up 16% and 62% of the population respectively [2]. It has also been estimated that a minority of the population drink the majority of all alcohol consumed in England, with 70% of alcohol being consumed by the 20% of the population whose drinking is classed as hazardous, harmful or extreme [2]. Estimates for the years 2011-14, for harmful and binge drinking in Liverpool, are considered to be significantly worse than both the England and North West averages [4]. At a population level, a substantial impact on alcohol-related problems can be made by intervening with people who exhibit low risk or hazardous alcohol consumption levels and who constitute a large proportion of the population representing a cohort whose problems are arguably less entrenched and are more responsive to interventions [5, 6].

Brief interventions in primary care settings provided by general practitioners are an evidenced based strategy for reducing excessive alcohol consumption [7]. However, despite the evidence of effectiveness of such interventions, some heavy drinkers may not present at such services or may not recognise that their alcohol consumption is at heavy or hazardous levels [8]. Recent technological advances afford the opportunity to access hard to reach groups by enabling people to access alcohol interventions directly from home computers, mobile devices or smartphones, whilst also providing a cheaper alternative to interventions delivered in health care settings [9, 10]. Most traditional brief interventions follow the FRAMES approach, which includes: giving feedback on the person's intake; impressing the responsibility for change onto them; offering advice; listing a menu of options; having an empathic approach; and building self-efficacy [11]. Digital interventions typically include similar intervention content [9]. A systematic review of 41 randomised control trials that evaluated the effectiveness of digital interventions for reducing hazardous or harmful alcohol consumption demonstrated that participants who used the digital intervention drank approximately 3 standard units[1] less at follow-up than participants who received no or

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[1] 1 unit is equivalent to 8 grams of pure alcohol.

minimal interventions [12]. Further, a secondary analysis of 15 studies demonstrated that participants who engaged with digital interventions had approximately one drinking day less per month than controls, one binge drinking session less per month and drank one unit less per occasion [12]. The review also demonstrated that some behavioural change techniques such as behaviour substitution (i.e. substituting alcohol consumption with other activities) were associated with digital intervention effectiveness. The authors concluded that behaviour change techniques in digital interventions may help people generate practical and specific ways of reducing their alcohol consumption [12]. Evidence suggests that digital interventions, specifically those with behaviour change techniques, may be effective in reducing alcohol consumption amongst those drinking at hazardous and harmful levels [13, 14].

Challenging beliefs that high levels of alcohol consumption is normative and that drunkenness is socially acceptable may be a crucial aspect of brief interventions. Research suggests that drunkenness is perceived as a common feature of nightlife environments in Liverpool and is considered socially acceptable [15]. Crucially, digital interventions provide an opportunity to educate individuals on the number of units in their typical weekly alcohol consumption and whether this falls within lower risk drinking guidelines. UK studies have suggested that about a third of frequent beer drinkers and a sixth of frequent wine drinkers are not aware of the number of units in what they are drinking. Studies also found that less than 15% of drinkers were able to correctly identify their own gender drinking guidelines and use these guidelines to keep track of their drinking [16]. Evidence also suggests that individuals are less likely to engage with, or be influenced by, long-term health related messages regarding alcohol consumption, and more likely to be influenced by gains that can be made in the short-term such as weight loss, increased disposable income, and health benefits [17, 18, 19, 20]. Previous evaluations of digital interventions suggests that the provision of personalised content and ease of functionality are important in engaging users [21]. Such strategies could be crucial to incorporate in digital interventions to reduce levels of alcohol consumption.

Drink Less Feel Good is a new behaviour change intervention designed by Public Health Liverpool that aims to tackle high levels of alcohol consumption and encourage people to drink less. The intervention is aimed at individuals aged 35-55 years who make up a substantial proportion of low risk and hazardous drinkers [3]. National surveys suggest that whilst the number of young people who binge drink has decreased in recent years, the proportion of middle age adults who binge drink has remained the same [22]. The intervention aims to signpost the target audience to a website which includes a brief intervention called the My Drinks Check tool. This tool is designed to enable people to assess how much they drink and measure their risk level in ways that are meaningful to them, such as providing comparisons of how their drinking compares to other people their age nationally, information on the equivalent number of calories their reported alcohol consumption contains in numbers of doughnuts and the number of miles they would have to walk to burn off the calories in their alcohol. The tool also provides personalised feedback on the benefits of consuming less alcohol and suggests ways individuals can reduce their alcohol consumption.

Study aims and objectives

The current study aims to assess the impact of the DLFG intervention and inform its future implementation and development. The research had two core objectives, which included a number of research questions.

1. To identify characteristics and behaviours of the population who accessed and completed the My Drinks Check including:
   a. Demographics;
   b. Alcohol consumption levels, patterns and motivations;
   c. Alcohol consumption social norms;
   d. Impacts of alcohol use on current wellbeing.

2. To assess the accessibility, usability and impact of the My Drinks Check tool including:
   a. Exploring how and why participants' accessed the tool;
   b. Identifying barriers and facilitators to accessing and using the tool and interpreting the results;
   c. Identifying participants perceptions of the usefulness of the tool and recommendations for change;
   d. Exploring the impact of the intervention on alcohol consumption and motivation to change alcohol consumption.

2. Methods

To fulfil the study objectives a mixed methods approach was used which included both primary and secondary data. Primary data consisted of pre, post and follow-up questionnaires and semi-structured interviews with individuals who had completed the My Drinks Check and were recruited to take part in the evaluation. Secondary data collection consisted of analyses of the data collected routinely from all individuals who access and complete the My Drinks Check tool.

2.1 Primary data

2.1.1 Sampling methods

A targeted convenience sampling strategy was used to recruit participants to the pre-intervention survey and semi-structured interviews, with the focus on sampling the target group for the intervention (individuals aged 35-55 years). Participants were recruited via a range of methods including:

- Face-to-face at local community events (n=56) including, Liverpool Food and Drink Festival 2018, Lighthouse project, Garston park festival, Childwall Children Centre, academic conferences, and a Holy Trinity School community event.
- Face-to-face with employees at local organisations (n=39).
- Online via promotion of the evaluation on social media and via gatekeepers at local organisations.
- Online via convenience snowball sampling.

2.1.2 Study design

Pre-intervention surveys were both paper-based (n=100) and electronic (n=95). Recruited participants were provided with a copy of the pre-intervention survey and access to the My Drinks Check tool[2]. Participants completed the pre-intervention survey prior to accessing and completing the My Drinks Check Tool.

Two weeks after completing the pre-intervention survey and My Drinks Check tool, participants received a link via email to the post-intervention survey. Two weeks after completing the post-intervention survey, participants received a new link via email to the follow-up survey. A maximum of two reminder emails were sent out to participants who had not completed the survey one week after receiving the links. Pre, post-intervention and follow-up surveys were linked using unique identifiers (i.e. date of birth, initials).

2.2.3 Survey measures

The first section of the pre-intervention survey included five screening items to establish participants' eligibility to take part in the study. To fulfil inclusion criteria, participants had to be aged between 25-59 years old; have consumed alcohol in the past month; not received

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[2] Participants recruited at events completed the My Drinks Check on laptops/iPads provided by the researchers. Participants who completed the survey online where provided with a link to the My Drinks Check website at the end of the survey and asked to follow and complete it.

support for alcohol misuse or have previously completed the My Drinks Check; and, consent to be contacted with the link to the post-intervention and follow-up surveys.

The second section of the pre-intervention survey included sociodemographic items (area of residence, gender, employment status, qualification level) and asked participants where they had heard about the study. It also included the Alcohol Use Disorder Identification Test (AUDIT), a 10-item validated tool which assesses alcohol consumption, drinking behaviours, and alcohol-related problems [23].

The third section of the pre-intervention questionnaire and the post-intervention and follow-up questionnaires contained items which measured what participants had drank in the past week by drink type and size, and two validated measures:

- **The Alcohol Stages of Change (Short Form) tool** consists of a brief series of self-report questions assessing alcohol consumption and intentions to reduce alcohol consumption [24]. Individuals are classified into one of six stage categories: pre-contemplation, contemplation, preparation, action, maintenance, and non-bingers. This provided a measure of the impact of the intervention on individual's motivation to reduce their alcohol consumption.
- **The Weight Control: Stages of Change (Short Form) tool** consists of a brief series of self-report questions assessing weight loss intentions and current activities [25]. Individuals are classified into one of four stage categories: pre-contemplation, contemplation, action, and maintenance. This allowed exploration of whether one of the core concepts of the My Drinks Check tool, the presentation of alcohol units in terms of calories, was a fact in behaviour change at follow-up.

Overall, 195 pre-intervention surveys were completed. Of these, 165 (84.6%) met the inclusion criteria for the study. The post-intervention survey was completed by 73 participants, which represented a 44.2% retention rate (of eligible participants). The follow-up survey was completed by 33 participants, which represented a 45.2% retention rate from the post-intervention survey. Participant socio-demographics (of eligible participants only) split by survey phase are provided in Table 1.

Table 1: Socio-demographics of survey participants

		Pre-intervention (%)	Post-intervention (%)	Follow-up (%)
Sex	Female	76.9	78.1	72.7
Age	25-29	21.8	26.0	27.3
	30-49	58.8	61.6	57.6
	50-59	19.4	12.3	15.2
Area of residence	Liverpool	41.6	36.4	40.0
	Knowsley	5.2	4.5	0.0
	St Helens	2.6	4.5	8.0
	Sefton	3.9	2.3	0.0
	Wirral	6.5	9.1	12.0
	Other	40.3	43.2	40.0
Employment status	Employed full time	75.6	83.6	81.8
	Employed part time	10.6	6.8	6.1
	Self-employed	6.3	4.1	3.0
	Student	4.4	2.7	3.0
	Unemployed	1.3	1.4	3.0
	Long-term sick or disabled	0.6	0.0	0.0
	Carer	1.3	1.4	3.0
Education level	Degree level qualification or equivalent	61.3	67.1	66.7
	Higher education qualification below degree level	11.3	12.3	9.1
	A level or equivalent	12.5	11.0	12.1
	ONC/National level BTEC	1.3	1.4	3.0
	Level or GCSE equivalent (Grade A-C)	7.5	6.8	6.1
	GCSE grade D-G or equivalent	4.4	1.4	3.0
	Other qualifications	1.3	0.0	0.0
	No formal qualifications	0.6	0.0	0.0
Where did you hear about this study	Facebook	21.6	21.4	16.7
	Twitter	12.2	14.3	8.3
	Family/friend	32.4	23.8	25.0
	Employer/work colleague	33.8	40.5	50.0

2.2.4 Semi-structured interviews

Qualitative semi-structured interviews were carried out with participants who completed a pre-intervention survey and the My Drinks Check tool. Interview length ranged in time from 6-31 minutes, and were carried out face-to-face (n=13) and over the telephone (n=5). All interviews were audio recorded and transcribed. Interviews explored:

- Information around individual's circumstances and demographics;
- How individuals heard about the tool, including reasons and motivation for using the tool;

- Identifying barriers and facilitators to accessing and using the tool and interpreting the results;
- Identifying participants perceptions of the usefulness of the tool and recommendations for change; and,
- Whether the tool encouraged individuals to think about and/or reduce their alcohol consumption.

Table 2: Socio-demographics of interview participants[3]

		% (n)
Sex	Female	64.6 (11)
Age	25-29	35.3 (6)
	30-39	29.4 (5)
	40-49	17.6 (3)
	50-59	17.6 (3)
Ethnicity	White British	64.7 (11)
	White other	35.3 (6)
Residence	Liverpool	58.8 (10)
	Outside of Liverpool	41.1 (7)
Marital status	Married	29.4 (5)
	Co-habiting	23.5 (4)
	Divorced	5.9 (1)
	Single	41.4 (7)
Dependent children	Yes	11.8 (2)
Qualification level	GCSE/ O- Levels/ CSE	11.8 (2)
	Vocational qualifications (=NVQ1+2)	5.9 (1)
	A-Level or equivalent (=NVQ3)	29.4 (5)
	Bachelor Degree or equivalent (=NVQ4)	5.9 (1)
	Masters / PhD or equivalent	47.1 (8)
	Other	0 (0)
	No formal qualifications	0 (0)

2.2 Secondary data - My Drinks Check tool

Data entered by individuals as part of the My Drinks Check is routinely collected and held by Liverpool City Council. This data was shared with the research team to inform an exploration of the characteristics and alcohol consumption patterns and motivations of the population who accessed and completed the tool (N=19,361). Data items included:

- Demographics (age, sex, area of residence);
- Where individuals heard about the My Drinks Check tool;
- Alcohol consumption in the past week by drink type and size;
- Motivations for consuming alcohol (e.g. to relieve stress/relax);
- Situational contexts for alcohol consumption (e.g. at home/during a meal, by oneself/with friends);

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[3] No sociodemographic data was available for one participant.

- Social norms including how individuals perceive how their alcohol consumption compares to other people their age; and
- Wellbeing measures including weight, energy, sleep, mental health and finances.

2.3 Data analyses

Quantitative analyses were undertaken in SPSS (v.25) using descriptive statistics, chi-square for independence (with Yates Continuity Correction), paired and independent samples t-tests, Wilcoxon signed rank test, McNemar's test, Cochran's Q test and Friedman test.

To calculate the amount of alcohol consumed in the past week by participants, drinks were coded into standard UK units using the following conversion: small glass (125ml) of wine, 1.5 units; standard (175ml) glass of wine, 2.1 units; large (250ml) glass of wine, 3.0 units; pint of lager/beer/cider, 2.0 units; bottle of lager/beer/cider, 1.7 units; can of lager/beer/cider, 2.0 units; bottle of alcopops, 1.5 units; and, single (25ml) shot of spirits, 1.0 unit [4].

Past week alcohol consumption for individuals completing the My Drinks Check was compared against regional alcohol consumption levels by age and sex [26]. Individuals were classed as drinking less than other people if their past week alcohol consumption fell more than one standard deviation below the mean number of weekly units consumed by people their age and sex. Individuals whose past week alcohol consumption fell within one standard deviation either side of the mean number of units for people their age and sex were classified as drinking about the same as other people. Individuals whose past weeks alcohol consumption was higher than one standard deviation of the mean were classified as drinking more than other people.

Thematic analysis was used to analyse the data from the semi-structured interviews. The analysis is presented with illustrative quotes where appropriate to highlight key findings.

2.4 Ethical approval

Ethical approval for the study was granted by Liverpool John Moores University Research Ethics Committee (REC no 18/PHI/009).

2.5 Limitations

Data collected as part of the My Drinks Check tool (e.g. units consumed in the past week) or AUDIT-C could not be verified and thus may represent an over or under estimation of individuals alcohol consumption. While data in the report is presented as independent individuals, the nature of the tool means that the same individual may have accessed the tool at several time points and there is no way to link this data. Individuals indicating they consumed a high risk level of alcohol in the past week (≥50 units for men and ≥35 units for women) were not required to complete the remaining questions in the My Drinks Check and instead were redirected to the end page. This page contained a warning to individuals that they were drinking at a dangerous level and at risk of a range of serious health problems. The page also provided information on how and where to get support to reduce their alcohol

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[4] See https://www.nhs.uk/Livewell/alcohol/Pages/alcohol-units.aspx

consumption; meaning individuals drinking at higher risk levels are not represented in the majority of My Drinks Check data analyses (e.g. motivations to consume alcohol etc.).

Primary data collected to evaluate the impact of the tool on individuals' alcohol consumption levels and motivation to reduce alcohol intake may be skewed by the nature of recruitment to the study. Individuals were recruited to the evaluation through a convenience sampling method, and may have been motivated to take part in the study for reasons that differed from individuals who accessed the tool after seeing it advertised. Specifically, individuals who accessed the tool and were not part of the study may have been more motivated to use it to reduce their alcohol consumption or because they were interested in the calorie perspective than individuals who took part because they were approached as part of a research study. The analysis of the effectiveness of the tool in reducing alcohol consumption or increasing motivation to reduce alcohol intake may represent an underestimation of its true impact.

3. Findings

3.1 My Drinks Check data

Data presented below relates to the numbers and proportions of My Drinks Checks which were completed; as an individual could have accessed and completed the tool on more than one occasion the figures do not necessarily represent numbers of unique individuals.

3.1.1 My Drinks Check tool usage

Over an eleven month period, between the 1st February 2018 and the 7th January 2019[5], there were 19,361 completions of the My Drinks Check tool. The majority of completions (94.3%; n=18,252) took place within the first three months of the Drink Less Feel Good intervention and My Drinks Check tool being launched (Table 3).

Table 3: Completions of the My Drinks Check tool by month

| Month	n	%
February 2018	8357	43.2
March 2018	4975	25.7
April 2018	4920	25.4
May 2018	208	1.1
June 2018	329	1.7
July 2018	119	0.6
August 2018	166	0.9
September 2018	97	0.5
October 2018	47	0.2
November 2018	76	0.4
December 2018	43	0.2
January 2018 (1-7th only)	22	0.1

Individuals were asked how they heard about the My Drinks Check tool. Facebook was the most common source, with almost half (49.7%; n=7838) of all My Drinks Check completions selecting it as the source (Figure 1). Over one in ten (16.6%; n=2623) heard about the tool through the Drink Less Feel Good website, whilst other sources included: at work (8.6%; n=1361); the Liverpool Echo newspaper (7.5%; n=1182); friends or family members (3.6%; n=571); Instagram (3.3%; n=527); community event (2.9%; n=465); pharmacy (1.2%; n=182); and GP (1.1%; n=174). Other sources included Twitter, other newspapers and other media sources such as BBC online or the radio.

Males were significantly more likely than females to have heard about the My Drinks Check tool through their GP (males, 1.8%; females, 0.6%; p<0.001), their pharmacy (males, 1.5%; females, 0.9%; p<0.001), and the Drink Less Feel Good website (males, 20.3%; females, 14.1%; p<0.001). Females were significantly more likely than males to have heard about the My Drinks Check tool through a community event (females, 3.2%; males, 2.6%; p<0.05), Facebook (females, 52.9%; males, 45.1%; p<0.001), and Instagram (females, 3.7%; males, 2.8%; p<0.01). There was no significant difference between the proportion of males and females in hearing

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[5] The date which the data was downloaded and shared with the project team.

about the My Drinks Check tool through friends or family members, the Echo newspaper or at work. For all sources expect GP, pharmacy, and community events there was a significant association between age of individuals and the proportion in each age group who reported hearing about the tool from different sources (Figure 1).

Figure 1: Where individuals heard about the My Drinks Check tool by age group
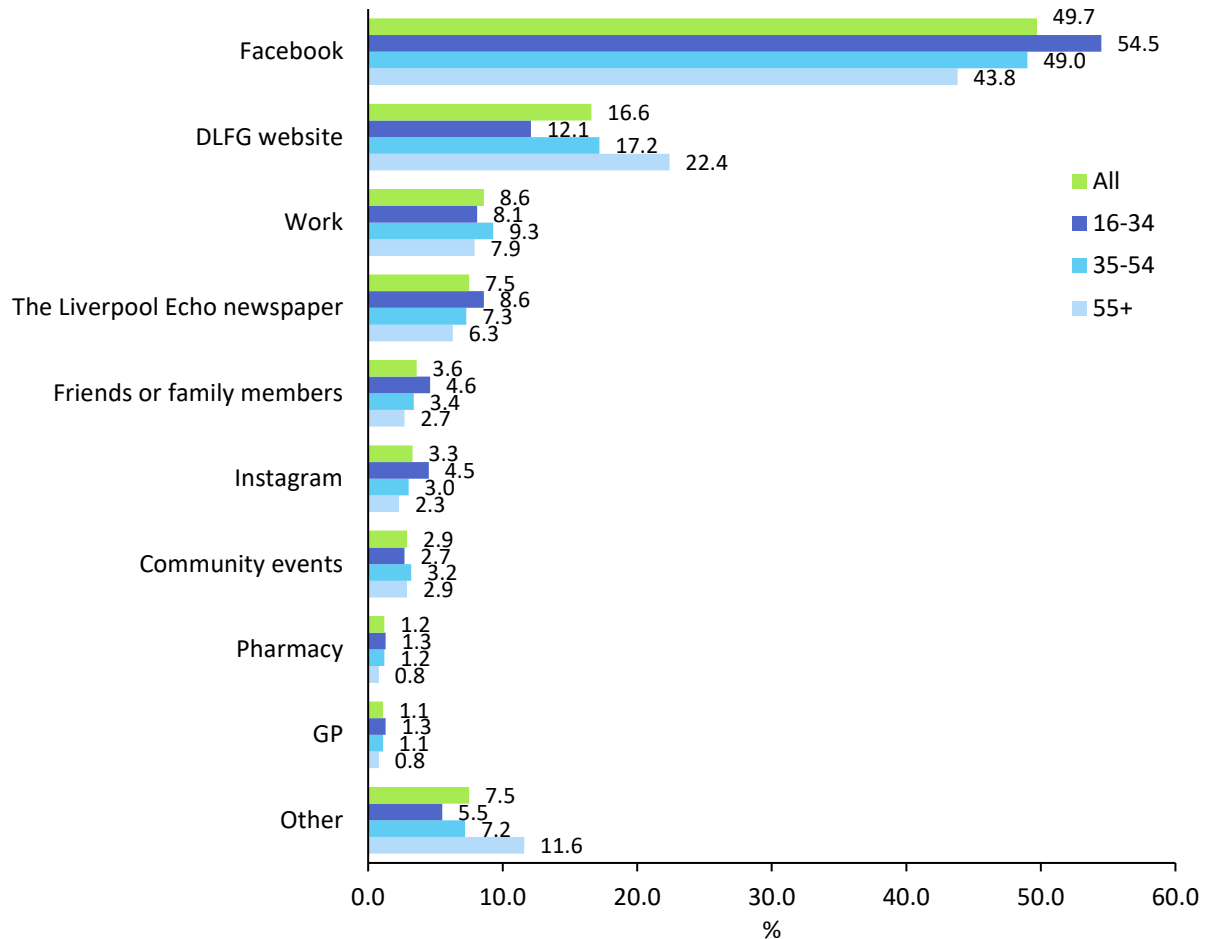
3.1.2 Demographics

There was an approximately equal split in the proportion of My Drinks Checks completed by males (44.2%; n=8554) and by females (55.8%; n=10805). Over half of the My Drinks Checks were completed by the intervention target age group 35-55 years; 24.9% (n=4817) were aged 35-44 years and 24.7% (n=4774) aged 45-54 years. Over three in ten My Drinks Checks were completed by individuals aged 16-34 years, whilst less than one tenth of my Drinks Checks were completed by those over 65 years of age (Figure 2).

The majority (76.8%; n=12,411) of My Drinks Checks were completed by individuals living in Liverpool, with almost four in ten (39.7%; n=6424) being completed by individuals living in the L1 area (Figure 3). Just over one in ten (12.3%; n=1997) of My Drink Checks were completed by individuals living in Merseyside but outside of Liverpool, whilst 10.9% (n=1766) were completed by individuals living outside of Merseyside.

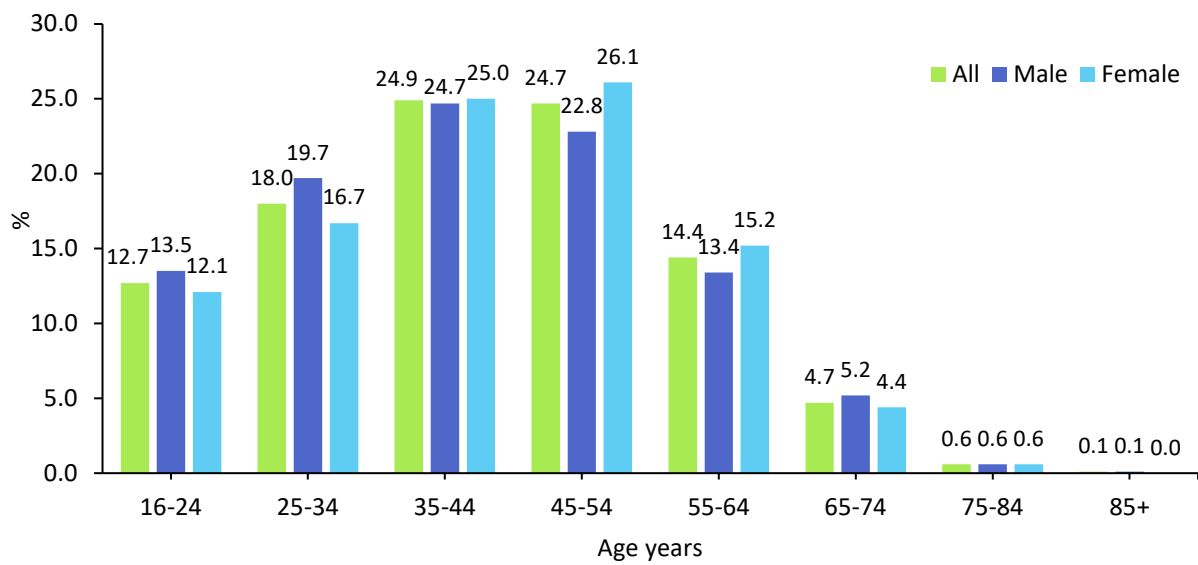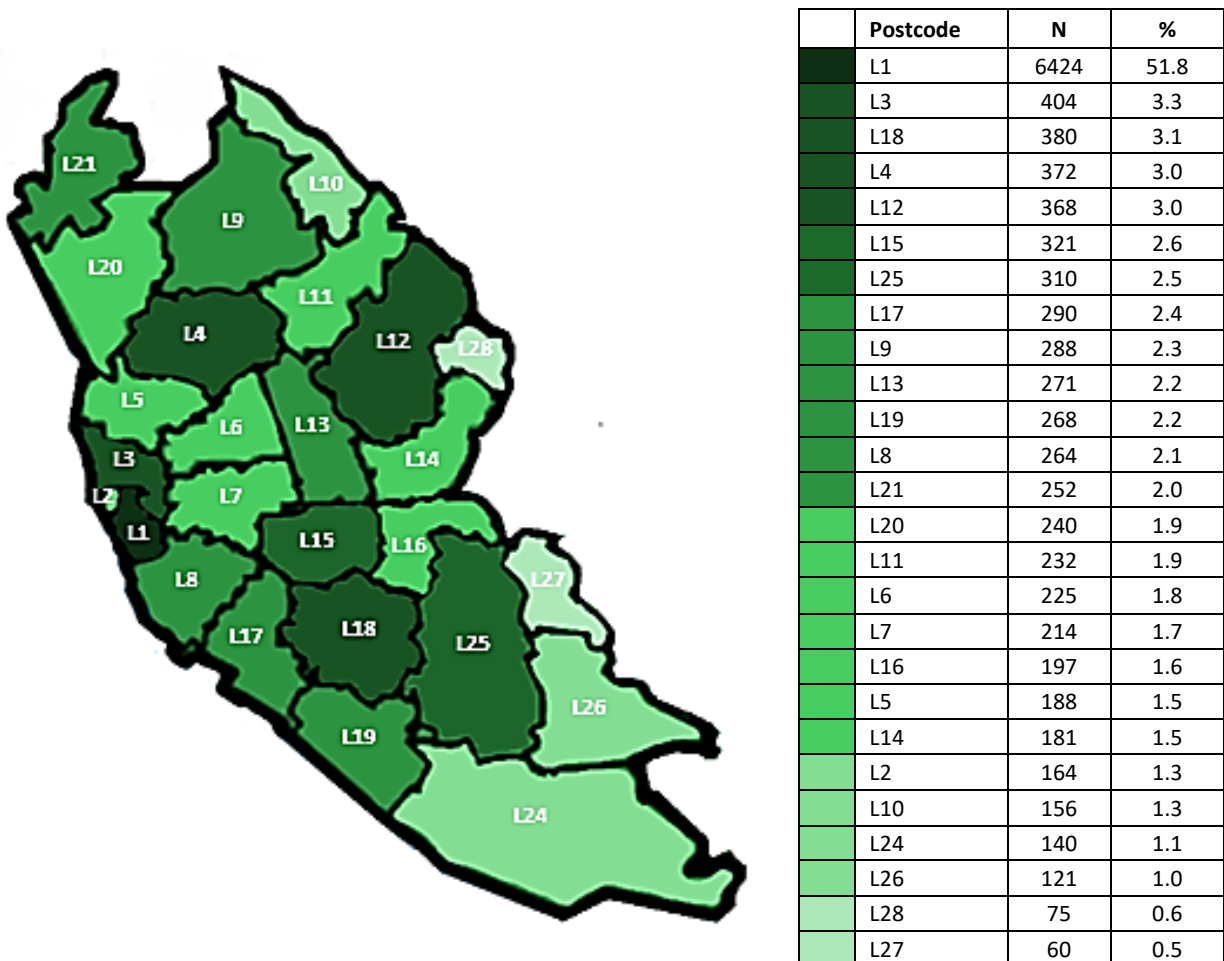**Figure 2: Age and sex of individuals completing the My Drinks Check**

Figure 3: Proportion of completed My Drinks Checks by Liverpool postcode

	Postcode	N	%
	L1	6424	51.8
	L3	404	3.3
	L18	380	3.1
	L4	372	3.0
	L12	368	3.0
	L15	321	2.6
	L25	310	2.5
	L17	290	2.4
	L9	288	2.3
	L13	271	2.2
	L19	268	2.2
	L8	264	2.1
	L21	252	2.0
	L20	240	1.9
	L11	232	1.9
	L6	225	1.8
	L7	214	1.7
	L16	197	1.6
	L5	188	1.5
	L14	181	1.5
	L2	164	1.3
	L10	156	1.3
	L24	140	1.1
	L26	121	1.0
	L28	75	0.6
	L27	60	0.5

3.1.3 Alcohol consumption levels

The majority (87.0%; n=16843) of those who completed the My Drinks Check had consumed alcohol in the previous week. Of individuals who reported consuming at least one unit of alcohol in the past week, the mean number of units consumed was 29.21. Of those who had consumed alcohol in the past week, 16.4% of all individuals had consumed between one and seven units of alcohol, half (46.3%; n=4993) had consumed between eight and 28 units of alcohol, and almost one quarter (22.6%, n=2439) had consumed 29 units or more in the past week (Figure 4). 13.9% (n=2342) of those who reported consuming alcohol in the previous week had consumed ≥50 units of alcohol[6]. There was a significant association between sex and alcohol consumption in the past week, with a higher proportion of males reporting higher levels of alcohol consumption (Figure 4).

Figure 4: Alcohol units consumed in the past week, all individuals, males and females (n, %)

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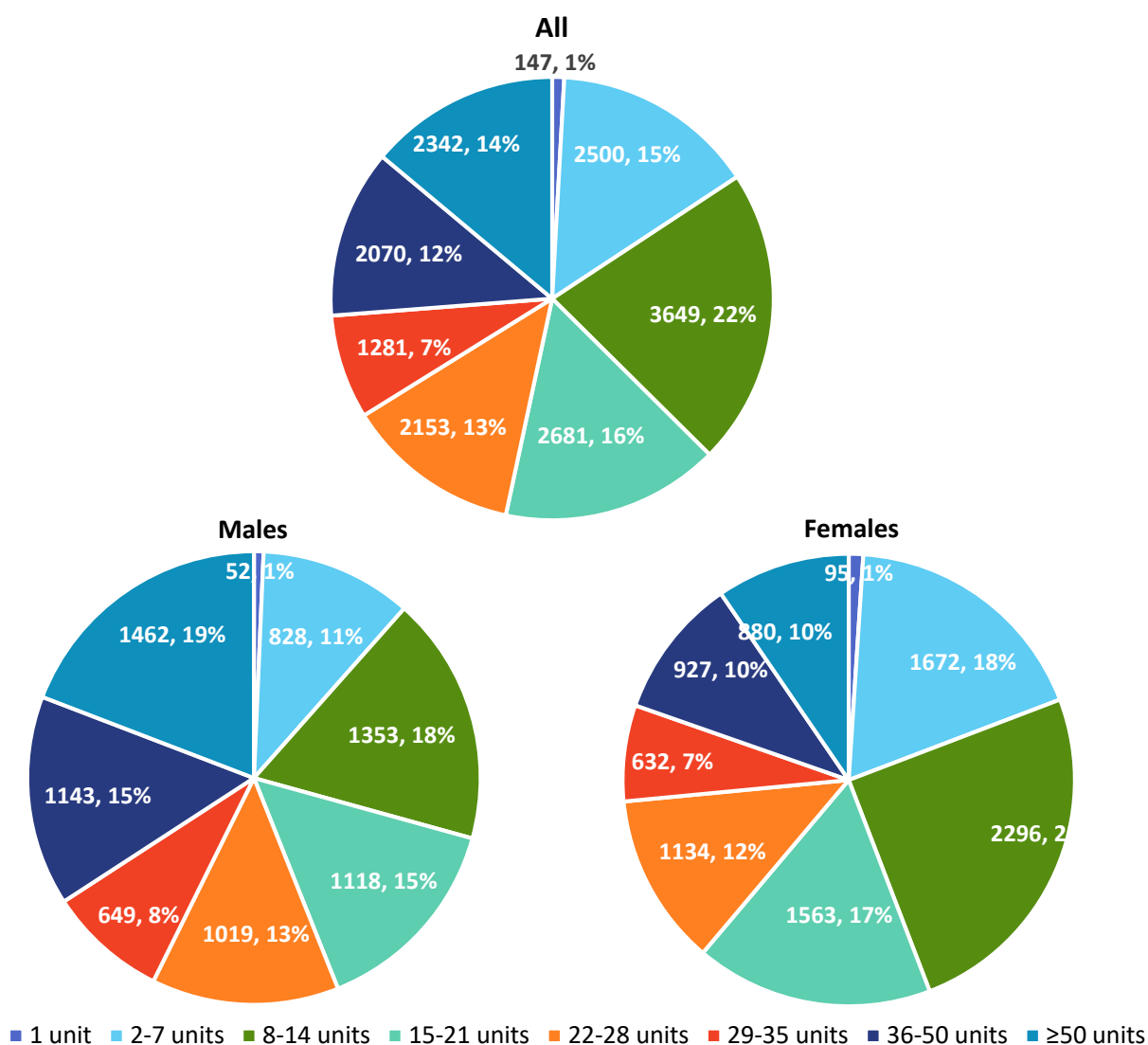
[6] Individuals indicating they consumed a high risk level of alcohol in the past week (≥50 units for men and ≥35 units for women) were not required to complete the remaining questions in the My Drinks Check and instead were redirected to the end page which contained sources of support.

Past week units of alcohol consumption were categorised into risk levels for males (low risk, 1-14 units; increasing risk, >14-50 units; higher risk, >50 units) and females (low risk, 1-14 units; increasing risk, >14-35 units; higher risk, >35 units). Almost one fifth (19.4%; n=3269) of individuals who reported consuming alcohol in the previous week, were consuming alcohol at a high risk level, whilst over four in ten (43.1%; n=7258) were drinking at an increasing risk level and approximately one third were drinking at a low risk level (37.4%; n=6296). There was a significant association between sex and risky levels of alcohol consumption (p<0.001). A higher proportion of females compared to males were drinking at low risk levels (females, 44.2%; males, 29.3%), whilst a similar proportion of females and males were drinking at high risk levels (females, 19.6%; males, 19.2%), a lower proportion of females compared to males were drinking at increasing risk levels (females, 36.2%; males, 51.5%). There was also a significant association between age and risky levels of alcohol consumption, with proportions of high risk drinkers highest amongst the 35-44 year old, 45-54 year old, and 55-64 year old age groups (p<0.001; Table 4).

Table 4: Levels of risky alcohol consumption by age group

Age group (years)	Low risk		Increasing risk		Higher risk	
	n	%	n	%	n	%
16-24	842	37.1	1049	46.3	376	16.6
25-34	1222	38.0	1474	45.8	520	16.2
35-44	1495	34.3	1928	44.3	933	21.4
45-54	1546	37.7	1668	40.6	891	21.7
55-64	877	39.9	878	40.0	442	20.1
65+	314	46.0	261	38.3	107	15.7

3.1.4 Alcohol consumption patterns

The My Drinks Check also included questions about individuals' motivations to consume alcohol, and occasions and situations in which they usually drank alcohol. The most popular reason for consuming alcohol was 'to relax' (51.5%; n=8332) followed by 'to have fun with friends' (41.5%; n-6716; Figure 5). Differences between males and females were significant for all reasons except 'when I feel tired' (Figure 5). There were also significant differences across age groups in the proportion of individuals agreeing with each reason for consuming alcohol (Figure 6). Social reasons such as 'when I'm getting in the mood to go out', 'when I want to have fun with my friends' and 'to make me feel more confident' were endorsed by a higher proportion of individuals in younger age groups (16-24, 25-34 years) compared to other age groups (Figure 6). Emotional reasons such as 'to relieve stress', 'when I want to relax', 'when I feel tired' and 'when I'm feeling down' were endorsed by a higher proportion of individuals in middle age groups (35-44, 45-54 years) than in younger or older age groups (Figure 6). There was an incremental increase in the proportion of individuals who selected 'I enjoy the taste of alcohol' as age group increased, with the highest proportion of individuals in the oldest age groups selecting this reason (Figure 6).
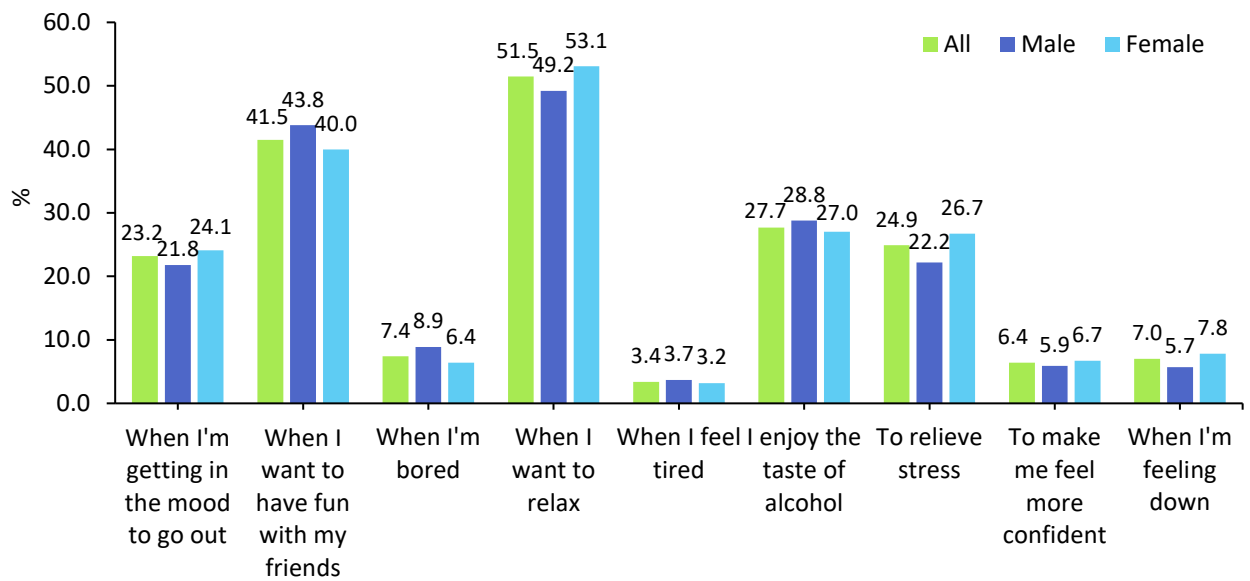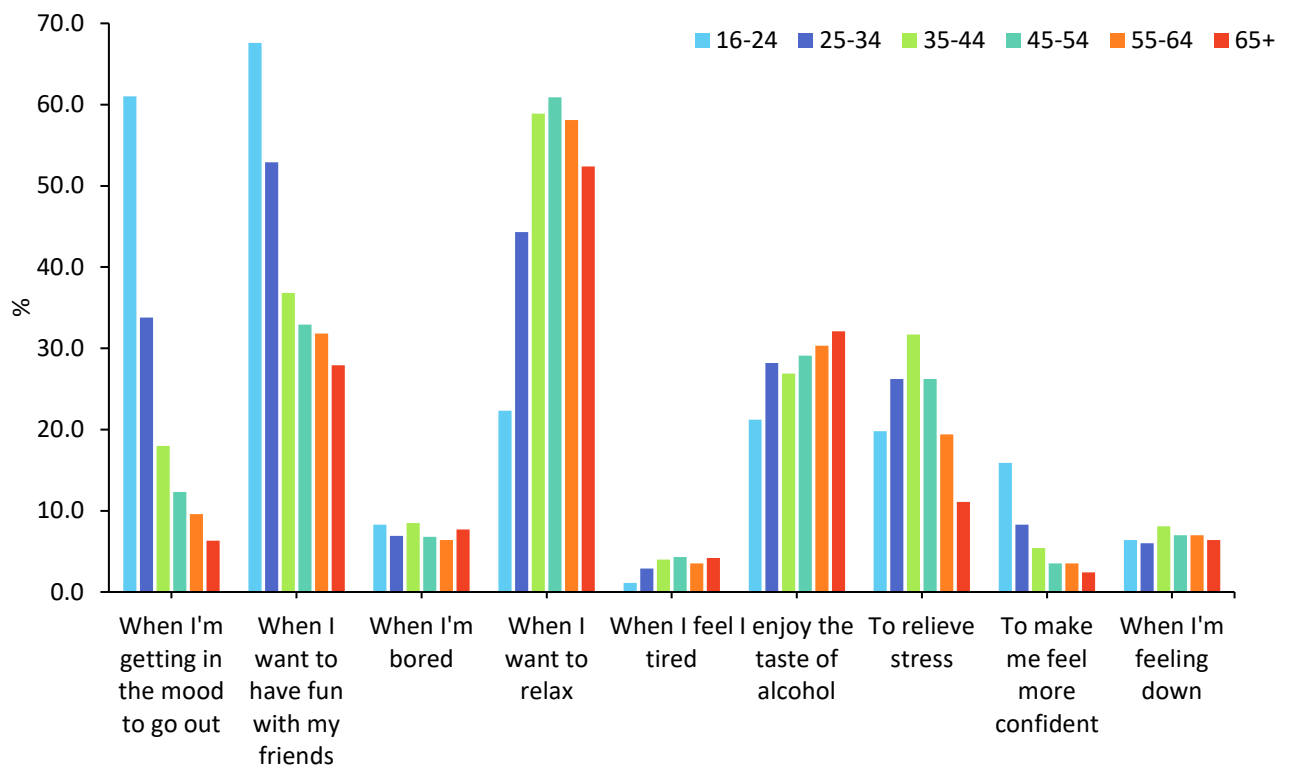
Figure 5: Motivations for consuming alcohol by sex

Figure 6: Motivations for consuming alcohol by age group

The most popular context or situation in which individuals reported consuming alcohol was on a night out with friends (50.5%; n=8171; Figure 7). Almost one in three (29.3%; n=4747) individuals reported drinking at home by themselves, whilst one in 10 individuals reported only drinking on special occasions (Figure 7). Differences between males and females were significant for all contexts except drinking on a night out with friends and only drinking on special occasions (Figure 7). Higher proportions of males than females reported they drank at home by themselves, after their shift or on days off and/or whilst watching sport, whilst higher proportions of females than males reported consuming alcohol at home with their partner, at home with their family/friends and/or drinking with a meal. There was also significant differences across age groups in the proportion of individuals reporting consuming alcohol in different situations and contexts. Drinking on a night out with friends, at home with friends and when watching sport were endorsed by a higher proportion of individuals in younger age groups (16-24, 25-34 years) compared to other age groups (Figure 8). Drinking at home by oneself or with a partner were endorsed by a higher proportion of individuals in middle age groups (35-44, 45-54 years) than in younger or older age groups (Figure 8). There was an incremental increase in the proportion of individuals who reported drinking alcohol with a meal as age increased, with the highest proportion of individuals in the oldest age groups (Figure 8). There was no significant association between age group and the proportions of individual who reported only consuming alcohol on special occasions (Figure 8).

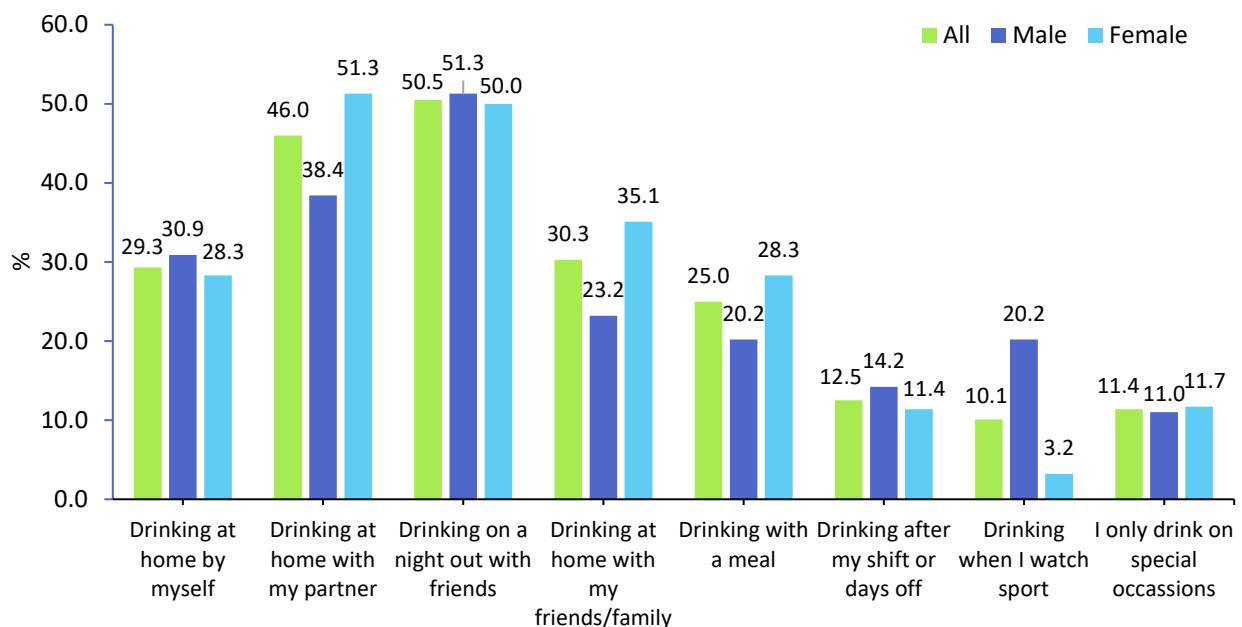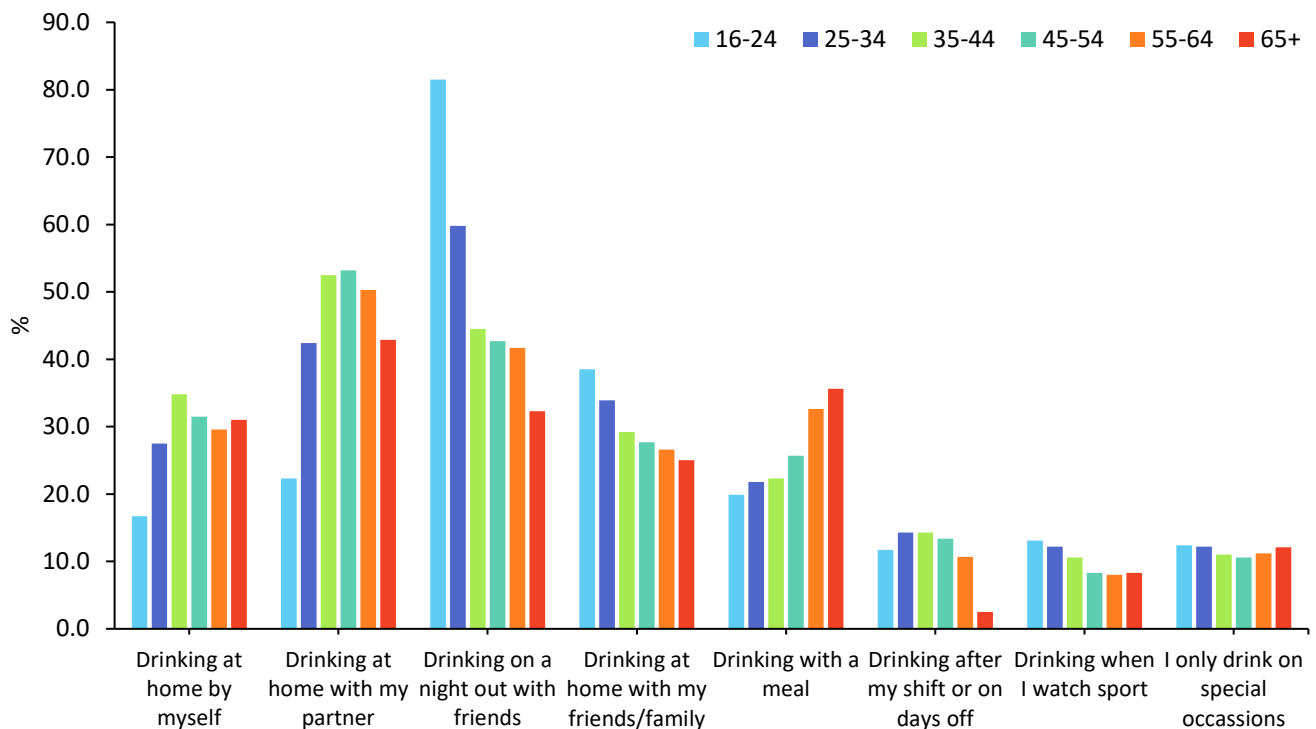**Figure 7: Contexts of alcohol consumption by sex**

Figure 8: Contexts of alcohol consumption by age group

3.1.5 Alcohol social norms

Individuals were asked whether they thought they consumed more, less or about the same amount of alcohol as other people their age and sex. Two thirds of individuals thought they drank less than other people their age and sex (33.8%; n=5472) or about the same (36.1%; n=5840). One fifth of individuals thought they consumed more alcohol than other people their age and sex, whilst 8.3% (n=1338) reported that they did not know how their drinking compared with others.

Past week alcohol consumption of individuals completing the My Drinks Check who had consumed less than 50 units[6] was compared against population levels of alcohol consumption by age and sex to determine how levels of alcohol consumption amongst individuals completing the My Drinks Check compared to other reported alcohol consumption in the wider population. Approximately six in ten (59.8%; n=11581) individuals completing the My Drinks Check had consumed more alcohol in the past week than other individuals their age and sex in the wider population. There was a significant association between age of individuals completing the My Drinks Checks and level of alcohol consumption compared to the wider population (Figure 9).

Individuals' perceptions about how their alcohol consumption compared with other people their age and sex was matched against how their actual levels of alcohol consumption measured against other people. Over four in ten (41.8%; n=6756) individuals underestimated how their drinking compared to other people their age and sex. There was no significant difference between males and females in the proportion of individuals who correctly

estimated how their drinking compares with other people. There was a significant association between age and correctly estimating how their alcohol consumption compares with other people, with the highest proportions of individuals underestimating how their drinking compares amongst the youngest age groups (Figure 10).

Figure 9: Alcohol consumption levels of individuals completing the My Drinks Check compared to other people their age and sex

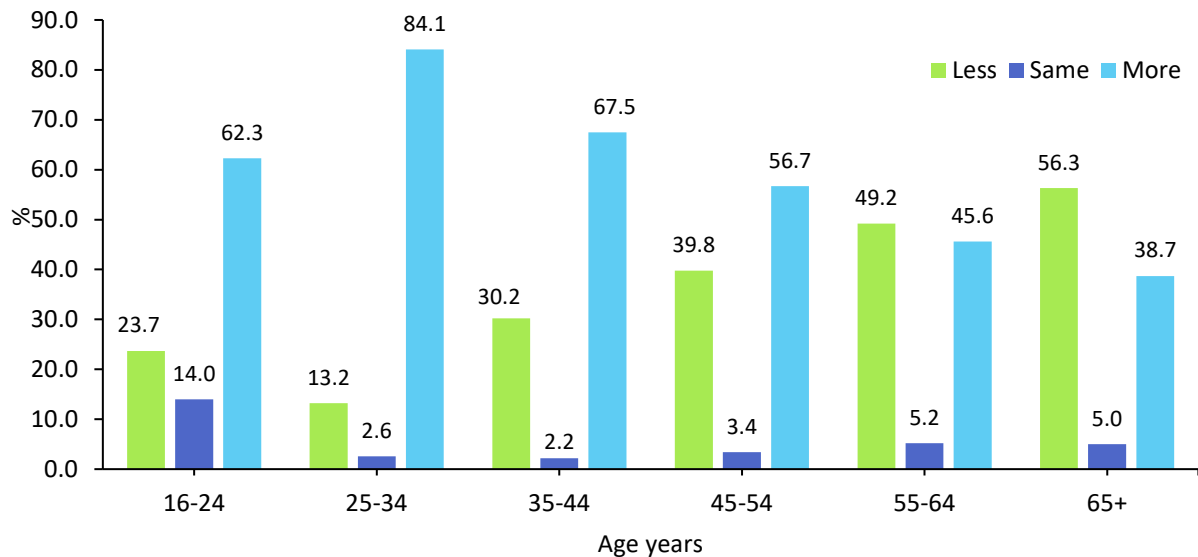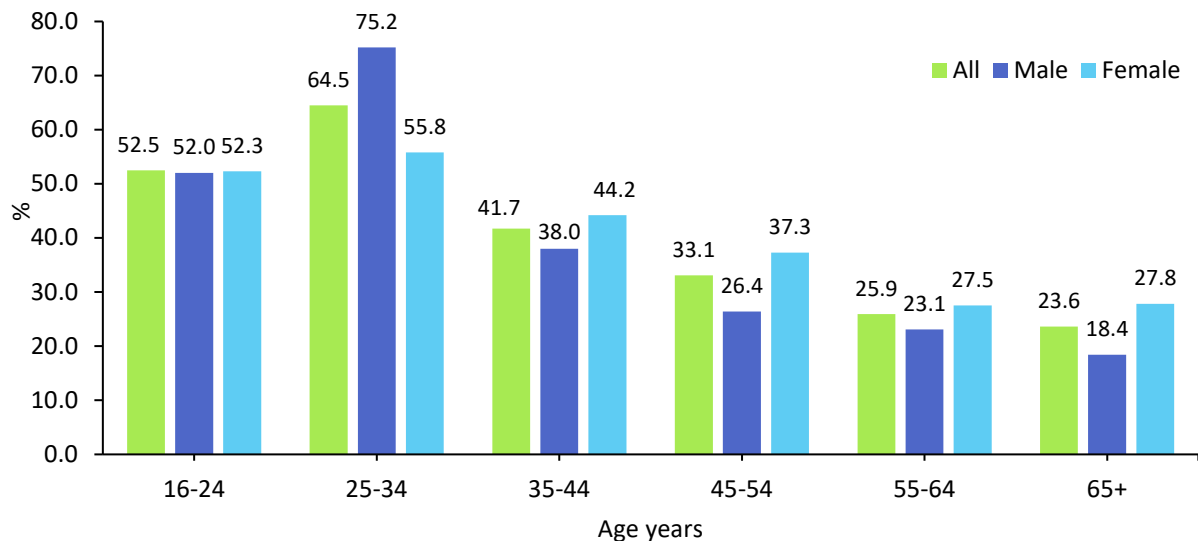**Figure 10: Proportion of individuals underestimating how their alcohol consumption compares to other people by age group and sex**


3.1.6 Measures of wellbeing

Individuals completing the My Drinks Check were asked to rate their current state for a number of wellbeing measures on a scale 0-100. Higher scores represented more positive ratings for each measure. Scores were categorised as negative (0-32), average (33-66) and

positive (67-100) scores. Approximately three in ten individuals scored their mental health and sleep quality as a positive rating (Figure 11). Just under one in five individuals scored their satisfaction with their current weight highly, whilst approximately one sixth of individuals scored their current energy levels and money circumstances highly (Figure 11).

Figure 11: Proportion of individuals reporting negative, average and positive scores for each wellbeing measure
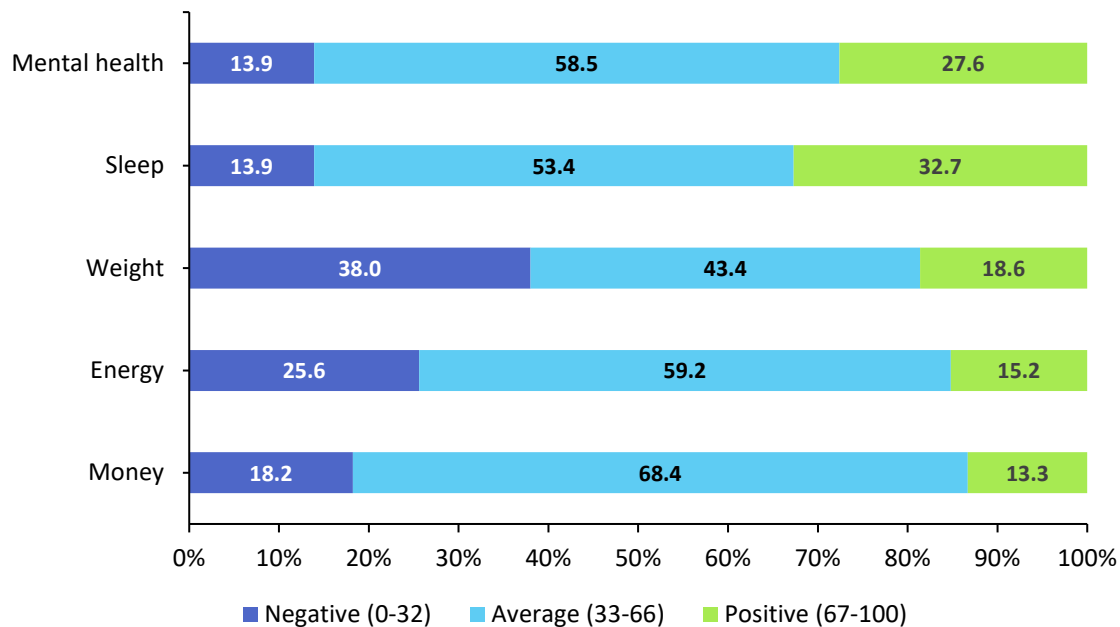
There was a significant negative correlation between number of units consumed in the past week and all wellbeing measures (p<0.01); with higher levels of alcohol consumption strongly associated with lower levels of mental health (r=-.055), energy levels (r=-.054) and available money (r=-.058) and weakly associated with sleep quality (r=-.029) and weight satisfaction (r=-.025).

3.2 Accessing the My Drinks Check tool

The majority of interview participants heard about the website through a researcher from the Public Health Institute or from a spouse or friend. Participants also reported seeing the tool advertised on social media (Facebook), in their GP surgeries and at their place of work. When asked what prompted them to complete the tool, participants reported that they had an interest in alcohol research, health improvement or because a researcher invited them to take part as their main motivations.

Some interview participants had been attending a wellbeing community event, at which the Drink Less Feel Good intervention had a stall. They reported completing the My Drinks Check as part of a broader interest in wellbeing in general. All participants noted that the online nature of the tool made it easily accessible, with several participants reporting that it would be easy to share the resource with family and friends.

3.3 Overall perceptions of the Drink Less Feel Good intervention and My Drinks Check tool

Overall, interview participants generally liked the main concept of the tool and felt considering alcohol in terms of calories was an interesting and novel idea. One participant noted that calories were a more immediate consequence of alcohol consumption than other health-related impacts. It was perceived that women in particular may relate more to this concept as they tend to be more conscious of their weight and calories in general. Several participants reported that when trying to lose weight, the first thing they would try to do is to reduce their alcohol consumption or replace their usual choice for a lower calorie alternative.

"It is a different angle because it makes it feel more immediate. I think about calories and my waist line… whereas long term effects of alcohol like liver damage… seem really far away and I don't have to worry about that." – Participant 13.

Some participants felt that whilst most people are aware of the calories that are in alcohol, some people try not to think about this or do not think about the calories in the same way when it is a beverage so the tool was useful in challenging these ideas.

"It's funny because it is things that you know, none of it was new information but it's stuff you don't think about." – Participant 13.

Some interview participants felt that unless you were concerned about your weight or actively trying to lose weight then the calorie content alone would not discourage them from drinking alcohol. However, other participants reported that whilst they were not actively monitoring their weight it was good to be made aware of the calories alcohol contained so they could monitor this.

"I don't think people pay much attention to the calories that are in drinks other than to lose weight, most people wouldn't care." – Participant 9.

"I think the idea of thinking about alcohol in relation to calories was interesting… I am not concerned about calories and I am not counting calories so that does not influence my decision to drink." – Participant 12.

"I think if I was ever concerned or wanted to keep an eye on it then yes, I would definitely use [the tool] again, particularly in relation to calories." – Participant 12.

"I guess it's always good to see it quantified in a different way but it's not something I'd look at and sort of… I'm quite ok with my diet anyway so I'm not so fussed but I guess it's good if you've had like a big session and you do see that sort of alarming amount of calories then it's useful." – Participant 16.

Whilst some interview participants felt that if individuals were not thinking about their weight they would not care about the calories in alcohol, other participants noted that there was a range of information presented in the results section and there was likely something that captured the attention of everyone. For example, amongst participants who were not interested in calories or weight loss, they reported that the information about health risks concerned them and would motivate them to drink less. It was noted that even the act of entering what they drank on a typical week forced participants to stop and consider their level of alcohol consumption.

"Just evaluating how much you actually drink and seeing it, when you're at the pub you have a certain amount but don't analyse it or think about it. One of the things was how much you drank per day over the last seven days; if you were to see the numbers you might be quite startled once they were totting up." – Participant 2.

Overall, interview participants commented very positively about the design and graphics of the website. The majority of participants felt that the tool was appealing, easy and quick to complete and interesting. However, some participants noted that when selecting their sex it did not appear to look like anything had actually been selected, whilst another individual felt that the questions were very wordy and there were quite a few, commenting it may have been more user friendly if it was shorter.

"It's quite user friendly, simple to navigate. I think the language like skint and minted is quite clever as it's quite localised." – Participant 16.

*"I think it's a really nicely designed tool and some of the pictures are fantastic." – Participant 13.*

One of the key barriers participants felt would prevent people from using the tool was not actually being aware of it. Once participants are aware of the tool it was felt that while not necessarily motivated to change alcohol in the first place, that the tool can encourage you to drink less even if you were not thinking about it. Participants noted however, that the online nature of the tool and the easiness of accessing and using it meant that people could simply share amongst friends and family, to get others thinking about their alcohol consumption. However, another participant noted that the need for internet access, as opposed to it also being available when offline might be a barrier.

"I suppose just getting started in the first place, to address the point, but the thing is that I like about it, you could say to a group of friends 'have a look at this' and have a mess around with it." – Participant 2.

3.4 Perceptions of the individual components of the results page

3.4.1 Long-term health risks

After completing the tool, on the results page, participants' alcohol consumption was rated on a barometer in terms of health risks. The majority felt that the long-term health risk barometer was very easy to interpret, however some participants felt that this was the least eye-catching aspect in comparison to some of the other components on the results page. Some participants felt more information to explain the long-term health impacts was needed. One participant noted that their barometer fell in the yellow zone and this made no mention of health so they did not realise this was a measure of health risks. It was suggested that it might be helpful to be able to click or hover over the icon to get more information about the health impacts or links to more information. Another participant observed that where you fell on the scale may influence whether you decided to make changes.
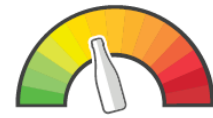
"It did say it was a warning, so that was useful. I don't know if it was further up in the red if I would feel like that was a bit unfair or not that might change my reaction to it. I don't know if there could be a section that could explain further maybe." – Participant 11.

"I think for that particular one where it's in that sort of [green-yellow] range probably not, it may be if they saw themselves more towards the red you know, they could identify some of the symptoms of their drinking, it probably might have a bit more of a kick." – Participant 16.

3.4.2 Comparison with other peoples' alcohol consumption

On the results page, participants were provided with a figure showing how their alcohol consumption compared to other people their age and sex in the English population. A couple of participants felt that this was a fair reflection of their alcohol consumption, however most felt the comparison was far too high. Some participants reported that they could not understand why their number was so high and felt the tool was inaccurate. Participants spoke about how they knew many individuals who drank more and more often than them. This seemed particularly the case for participants who entered their alcohol for a typical week when they drank but noted that they do not drink every week.

"I know people my age who drink an awful lot more than me and I know people who drink like mad but I couldn't believe when it said I drink more than 70% of people my age." – Participant 10.

"There is no way this thing is accurate, it showed I drink more than 95% of people. A) I don't drink weekly B) when I do I only usually have 2-3 glasses of wine so there is no way that I am drinking more than 95% of women my age." – Participant 9.

One participant reported that they found this depressing, as it was so high, whilst another reported feeling terrified and that it would discourage them from using the tool again particularly if they were consuming more alcohol.

"From what I just saw there and I think my alcohol consumption is on the low end of the spectrum, I would be afraid to use that thing again. It would probably just tell me that I am going to die or something!" – Participant 10.

There was a high level of distrust in the overall calculated figure with several participants wanting to know more information about how this figure was calculated and where this information had come from. One participant enquired if people who had not drank any alcohol were included as this could make people who have consumed alcohol appear to have drank significantly more. Another participant noted that people tend to be sceptical about shocking statistics and did not trust the validity of the results.

"I know I drink quite a bit but 95% more than women my age? I want to know where that data has come from. Is that 95% of women my age who have completed this tool or 95% of women my age from a nationally representative survey?" – Participant 13.

"It felt that they were trying to give me facts and figures that I know may not be 100% accurate and I needed a bit more information about that. People are very mistrusting about this sort of thing and think the NHS are trying to control them." – Participant 13.

In contrast, one participant did report that it helped raise their awareness, but also would have liked more information on how this number was calculated. One participant reported that their initial reaction was distrust in the results but the shocking nature of the figure did make them take notice, whilst some participants who had lower scores felt that they were happy to see they were drinking less than other people and were surprised by their result.

"I think I may be able to drink a little bit more because I thought I was higher than what I was, quite happy to stick to what I have got." - Participant 1.

"That would be useful for people to see, it's easy to have a couple of beers every night and suddenly realise how much it's totted up to and how then see how it compares to everyone else." – Participant 2.

"I mean no [I don't think it's an accurate representation], but then I also understand that's quite an obvious train of thought to like immediately deny it like 'no I'm not that bad'." – Participant 16.

"I think the [comparing your drinking to other people your age] was the best feature because it was quite alarming to me, but again I think it was the worst feature because I would have liked to have been able to quantify it a bit more rather than just one week, but I guess there's nothing stopping me going back when I've had a less heavy week and putting it in to see what the comparison is." – Participant 16.

3.4.3 Doughnut equivalent of alcohol consumption

After completing the tool, participants were given the equivalent of their alcohol calories in doughnuts. Most interview participants liked this part of the tool as they felt it was a novel, easy to interpret and a good basic representation of the calories in alcohol. It was also very visually appealing to many of the participants. Furthermore, one participant felt it demonstrated that there are no particular health benefits to drinking alcohol.

This week you've drank the equivalent of 8.5 doughnuts (not counting any other snacks or mixers!)

"I like it, it's a nice basic representation and a simplified version, everyone knows what a doughnut is and the graphics are lovely." – Participant 13.

"I mean I knew it was high but I'd never seen it quantified in an easy to understand measure." – Participant 16.

Some of the participants reported being quite shocked about the calorie content in their drinks. One participant remarked the concept was quite clever it made them think they would never consume that many doughnuts in a day so why would they with alcohol. They suggested that many people pretend or ignore the high calorie content in alcohol because beverages are perceived as different from food so the link with doughnuts was useful.

"You don't realise how much is in it, it's quite a shock actually and it's good the way it shows you the comparison to donuts and calories. It's an eye opener." – Participant 7.

"I think that was a surprise. It compares to doughnuts, which was a good comparison. I was surprised at the calorie content in Gin because I always thought Gin was probably quite low with a low sugar mixer." – Participant 3.

"I think we are all aware, like with beer we know there is a high calorie content and you just pretend you do not know… because it is a beverage maybe because it is a drink it's not thought about in the same way. I would never dream of eating that many doughnuts in a day. Why would I do the same with alcohol, I think that was a good idea." – Participant 10.

However, some interview participants reported that they are not particularly weight focused so the doughnuts would not discourage them but did acknowledge the benefits of having this comparison as it may allow people to plan their week and make healthier choices. It was also suggested that it would be useful to display the number of calories as a figure, giving more specific, accurate information which might be useful for people who do not eat doughnuts or know how many calories are in them.

"You could hover over icons to make it a bit more interactive, find out exactly how many calories rather than just doughnuts. You could have pictures for each of the benefits i.e. save money, sleep, mood that you could click on and more information would pop up." - Participant 12.

3.4.4 Equivalent miles to walk off calories

To burn off the calories that you've drank this week, you'd need to walk for 15 miles

After completing the tool, on the results page, participants were given the equivalent of their alcohol calories in miles that they would need to walk off. Interview participants reported feeling initially shocked after seeing the results for this component but also stated they would take it with a pinch of salt and mostly laughed it off. Several participants suggested that the amount of calories that you burnt off totally depends on a number of factors for example a person's body, height, weight, fitness and speed that they walk. One participant observed that some people tend to walk a lot throughout the week anyway as part of their everyday lives, and may think they that they already burn off the calories as part of their normal routine and it is not something to be concerned about. Some participants reported that this part of the tool was the least effective; if they were to exercise to burn off the calories from alcohol they would not walk it off, and felt it would be more useful to have other options represented, such as running and cycling.

However, it was acknowledged that it would be difficult to try to please everyone in this respect. Conversely, some participants liked this component and stated that it was beneficial to have some idea of the amount of exercise needed to burn off the calories and that it might encourage people to exercise more.

"I think it works fine but if I was to exercise to burn off alcohol I would do something else so there may be another way of quantifying that exercise… I suppose it is hard trying to come up with something everyone would want to do exercise wise where most people already walk." – Participant 11.

"I took that with a pinch of salt, because I know the calories you burn off depends on a million different factors… walking is a weird one because walking is something we all do without noticing so I wonder if running or cycling might be better… people might say well I'm not going to run for 15 miles but it felt like I do walking anyway. It was nice to have a number put on that though." – Participant 13.

"I don't think anyone would actually go 'ok I've got to go out and walk 15 miles' but I think it might encourage people to exercise more." – Participant 16.

3.4.5 Alcohol consumption change slider
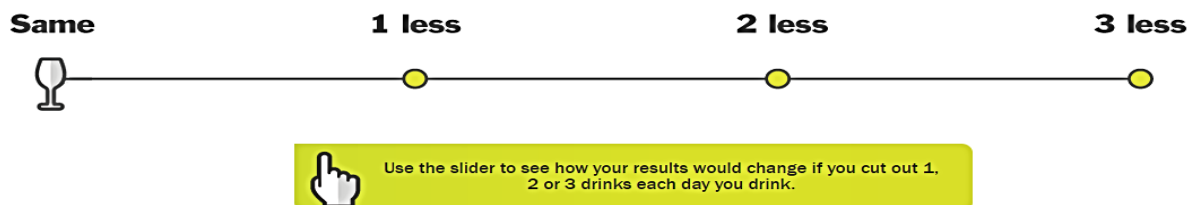
The results page also featured an interactive slider which participants could use to see how reducing their alcohol consumption by one, two or three drinks on each day they consumed alcohol would change their results. The majority of participants reported that the slider was their favourite part of the tool. Most participants felt that reducing their alcohol consumption by just one drink would be attainable and achievable for most people. They noted that even reducing their alcohol consumption by one drink meant that for the most part their statistics dropped significantly. One participant noted that reducing the number of drinks by one was doable, but they may not reduce by any more as it would impact on their night out and once intoxicated it is difficult to monitor your alcohol consumption. Similarly, another participant reported that the slider is something that would influence them with regard to their home drinking but not on a night out when they would not consider monitoring their alcohol consumption.

"Yeah I liked that because it allowed you to see that even if you drank just one less a week my statistics changed pretty dramatically. So if I go down to just one less I drop from 52% to 23% [more than people my age]. I thought that was quite good and achievable as well. I could drink one less and be better than a lot of other people." – Participant 11.

"I just felt that if I clicked to one less drink I saw that it made a significant difference that is totally doable… however if you move it up to two or three I'm not so sure as this means going home early. I suppose it's easier said than done because once you get over the threshold into becoming intoxicated then your train of thought and mind set changes and you are not necessarily thinking about that."
– Participant 12.

"Yeah definitely, it's not a hard goal to set yourself. Whether you achieve it or not is something different but I think small realistic goals are probably the easiest way, yeah." – Participant 16.

"It's about the settings, when I'm out with my friends its infrequent so I'm trying to relax, catch up with people and chill out, and I feel like in that kind of context I'm not going to drink one less...but it probably would sit with me if I was sitting at home chilling out with my partner and I know I have to get up early in the morning it would make me more conscious of it." – Participant 17.

Some participants felt that the while the slider was useful, it was made ineffective by the comparison with other people as the percentage change seemed unrealistic. For other participants, whilst they were somewhat sceptical of the comparison to other people, they noted they would trust the website and the results would influence them to drink less.

"Well if I did three less I would be drinking nothing, if I did two I would only be having one glass of wine. It's one glass of wine but it is still saying I'm drinking more than 75% of women my age."
– Participant 9.

"I would tend to trust the accuracy of the website, it surprised me but it would also influence me to drink at least one drink less knowing that I don't want to be in that high percentage." – Participant 12.

Despite the positive perceptions of this component, there appeared to be a lot of confusion around what 'one less' meant. The majority of interview participants immediately presumed this meant just one less drink per week. When the interviewer corrected them and told them to read the writing in the box, only then did participants realise the reduction referred to one less drink per drinking occasion. Most participants acknowledged that whilst it was clearly written in the box they would not have read it unless directed to by the interviewer and thus would have misinterpreted the change in their results with the one drink reduction.

"I could probably drink one less, but three less a day well there was a lot of days when I wasn't drinking anything so I couldn't quite work out what data they were getting it from really." – Participant 13.

"It needs to be made clearer. I did play around with it and by just having one less, it did change it quite a bit it felt like it made a difference but then I thought hang on are you saying to drink 7 less a week?"
– Participant 13.

"The slider thing I quite like but I didn't fully understand what it meant." – Participant 13.

"Yeah I thought it was one less drink rather than a drinking occasion." – Participant 16.

3.4.6 Benefits of reducing alcohol consumption

Most interviews participants felt that the benefits of not drinking were relatively common sense and things most people would know. One participant stated that it was obvious that if you do not drink as much, you would have more money. Nevertheless, other participants felt that it is always good to be reminded of such benefits. Other participants felt that the personalisation aspect of this component was one of the tools strongest features. Several participants felt that it was helpful and especially liked that you could click on links to find out additional information.

"It was helpful that they were personalised so a really good thing to include and I like the fact that with some of them there are links that you can click on which will tell you a bit more about a particular thing." – Participant 11.

"I liked the feedback on mood and tiredness. This is one of the reasons I drink less now than I used to. I get anxiety the day after I drink. This sort of feedback is not usually available." – Participant 14.

"For me personally, I found it helpful but I guess it is a bit stating the obvious but sometimes you do just need to state the obvious and make the fact for people to see in front of them." – Participant 16.

3.4.7 Top tips to reduce alcohol consumption

This section in general was very well received and most felt that at least one of the top tips was a good idea or something they might consider doing in the future. One participant also commented that by providing several tips on how to cut down individuals had a choice about which ones were the most feasible for them. Only a couple of participants felt that this section was overly long and suggested making each tip a link to click on for more information if the person was interested in learning more information, as it may feel like there is too much to read and most people would not bother.

Several participants thought the tip about avoiding rounds to ensure they don't drink faster or more than they usually would was useful. Participants reflected it made them consider how they often drink in rounds when they are on a night out and reflected that this makes them drink at the same pace as others. Another participant reflected on their tip about having one alcohol free night a week and said it was something they would consider.

"I think one of the things I noticed was thinking about when I drink I tend to go out and drink in rounds and you get dragged along with other people and there's certain people I know who drink much quicker than me and you tend to try and keep up with them." – Participant 3.

"If I wanted to cut back I think I could do and I would do that by not going into rounds with people." – Participant 3.

"It said about rounds and thinking about good ways of getting out of ordering rounds which is something I thought was useful. It was a good idea and I liked that it gave examples of how to do it." – Participant 11.

"Yes it probably made me think actually I'm having a drink every night when I should probably have a night off." – Participant 8.

Other tips such as ways to relieve stress rather than consuming alcohol and watching the amount of alcohol that you pour into your glass were also reported by participants as being useful. One participant noted that the tip to swap drink sizes was really useful and not something they had considered, but which felt quite easy to do.

"I thought the one about finding other ways to relieve stress was one of the main reasons whenever I drink… Keep an eye on how much is in your glass was interesting, I am a slow drinker and I don't realise it but then somebody else who I am drinking alongside will tell me to keep drinking so I am trying to keep up with them then." – Participant 12.

"There was something that said swap from a pint to a bottle of beer and I thought oh my god that makes so much sense… like a pint to a half pint doesn't seem realistic but a pint to a bottle makes sense. That is a really sensible tip, it just hadn't occurred to me." – Participant 13.

Overall, this section received very positive feedback, with almost all participants commenting about which specific tips they found particularly useful. One participant noted that the advice provided in the tips came across in a positive non-condescending way and this was important.

"I was reading them I thought these are good points, things I had forgotten about, or just not thought of. They are also presented really nicely, they're not condescending or telling you what to do, they're gentle suggestions." – Participant 13.

3.5 Recommendations for change

Interview participants were asked if they had any recommendations for improving the tool and several suggestions were made. Firstly, some participants found recording their alcohol consumption confusing, with some reporting their alcohol consumption from the last week whereas others reported their alcohol consumption from a typical week. Participants found this difficult as they stated no week is a typical week as their alcohol consumption varies widely. Whilst some participants stated they reported their alcohol consumption as somewhere in between a heavy week and a week where they did not drink, other participants reported just the week where they consumed alcohol and were left frustrated with the results which depicted them as very heavy drinkers.

"It asked what you would drink on each day of the week and that was a bit of a challenge for me. One week might be heavier than another week, some weeks I will not drink at all and it was difficult to decide what to put. I know it was supposed to be your average week so I kind of tried to shoot for the where the middle might be." – Participant 10.

"I don't drink weekly, so I don't feel that it's a good judge to what my monthly drinking would be because I don't drink weekly." – Participant 9.

Those who reported their alcohol consumption from the last week were confused about if they should report retrospectively from the day they completed the survey or from Monday to Sunday the previous week. Some participants felt that a monthly scale would be more informative than a weekly one. They suggested that the results could state the health concerns if they continue to consume alcohol at that level. However, all participants acknowledged the difficulty in changing this scale.

"It should have the option to say if you continue to drink a bottle a week for the next six months these will be the health concerns, rather than telling me the health concerns after drinking 2 glasses of wine once a week or on one occasion." – Participant 9.

"If you wanted it to be more accurate you should do it over a typical year instead of asking what days a week do you drink. For me I don't drink on a typical week at all so if I put down I drink on a Friday it will look like I drink every Friday." – Participant 15.

"Even a month I feel isn't broad enough, peoples habits change so quickly. Maybe for people who do drink that regular it might be a good indication of maybe a month." – Participant 15.

"Yeah say you could enter each week for a month or whatever and then average it, people still might dismiss it and be like 'oh I just had a heavy month' or whatever, but that would at least, for me anyway, I would have been like ok that's more typical." – Participant 16.

Some participants noted that one way of overcoming the difficulties associated with entering alcohol consumption for a typical week would be to allow users to save their entries over a longer time-frame, allowing people to monitor their results over the long-term and see the impact of any changes they made.

"The only thing I would say is I'd like to see the ability to put in drinks over a month, or to like keep a log and then have that comparison, so calories over a month and how much money you've spent and how much exercise you would need to do, to have that would be quite alarming." – Participant 16.

Several participants remarked on the shocking nature of their results, and some reported feeling distressed and upset. One participant acknowledged that while the results might shock people that this may be more effective in helping people understand the health-related consequences of alcohol consumption. They suggested providing more information for people who do find the results concerning and want more support.

"I think it could scare people, like if you're drinking more than 75% of women your age, but I suppose that's kind of the point to make us aware of the alcohol we are drinking and that it's not healthy." – Participant 13.

"It doesn't then really have anything towards the end if people do have concerns there aren't any links for support, like we suggest you to talk to your doctor or you can ring these organisations for some advice. It's like they've missed off some signposting and maybe the point is for you to think about it but then some people might want help with it and there isn't anything obvious about what I do to get help with this." – Participant 13.

Some participants felt that the top tips and benefits were not as obvious as the other sections and had not actually read theirs until the researcher drew attention to them. One participant suggested that the final two sections of the results page, the benefits and top tips, could be done in picture and interactive format.

"The top ones were easy to interpret but I didn't really scroll down until I was asked these [interview] questions so I didn't know there was more to it I just saw the pictures and thought that was it." – Participant 9.

"They could have done it as icons or images like increased money or whatever because I don't think people want to read lots of stuff." – Participant 9.

"Maybe some icons or logos to break it up might make it a bit more interactive. You could have pictures for each of the benefits i.e. save money, sleep, mood etc. if you had images you could click on and more information would pop up so it felt more interactive." – Participant 12.

Most interview participants felt that people who are most likely to make changes after using this tool are people who are intending to lose weight and are therefore most likely to be weight conscious. They suggested it would be useful to have links to other relevant organisations/groups such as gyms, sports groups, running groups, in order to encourage physical activity as well as reducing alcohol. It is important to note that this feature is included in the tool, however the comments demonstrate that individuals did not explore the further information provided.

3.6 Impact of the tool on alcohol consumption and motivation to change alcohol consumption

Data collected from qualitative interviews and from the pre, post and follow-up surveys demonstrated a number of potentially positive changes in alcohol consumption levels and patterns, as well as increased motivation to change alcohol consumption by a number of participants.

3.6.1 Impact of the tool on interview participants

Interview participants spoke about the changes they were planning on making regarding their future alcohol consumption, although these were often changes which they had already been thinking about, but which the tool had further encouraged.

"I think I will start to have a half a glass every other day and then cut it out completely in the week and then just have a glass on the weekend, that's something for me to aim to." – Participant 6.

"Well it has definitely made me think about my alcohol use, I had already thought about cutting down a bit. I would like to get myself in better physical shape because I play sports… I think it has definitely been an encouragement for that." – Participant 10.

"It doesn't necessarily make me change my behaviour but it makes me aware of it… I do genuinely think I'm going to switch from pints to bottles – like how have I never thought of that before it makes so much sense." – Participant 13.

"It would encourage me to think about my drinking. I might take one or two of the tips on board maybe for when I am at home." – Participant 17.

However, sometimes the results may have had the potential to actually increase participants' future alcohol consumption. Some participants seemed to wrongly interpret the main aim and message of the tool – to reduce alcohol consumption – and instead focus on reducing future calorie intake. One participant felt the concept of linking alcohol to calories was potentially dangerous, particularly with lower calorie drinks available to buy.

"I think I may be able to drink a little bit more because I thought I was higher than what I was, so I might have an extra one, but I'm quite happy to stick to what I got." – Participant 1.

"I might look at having a shandy instead of a beer but don't think I would drink that much less. I try to use low calorie mixtures anyway." – Participant 5.

"Subconsciously I know that if I have to choose between a glass of wine and a glass of gin, I know that the glass of wine is going to have more calories in it. If I am trying to lose weight or if I am trying not to drink too much then I will choose depending on that." – Participant 12.

"On top of that say I went out on Saturday night and ended up staying out for one too many it would probably influence what I was going to eat the following week if I was watching my weight." – Participant 12.

"Some people might not want to go over a certain amount though so might end up substituting alcohol for food so this could have a negative effect." – Participant 15.

"In the shops they sell skinny wines or skinny beers and I don't think that's the best way to go about it. It's encouraging people to maybe drink more or maybe feel better about drinking because its less calories people think they're being healthier. Instead of doing that they should moderate their drink."
– Participant 15.

Some participants felt that while the tool and results may raise concerns, particularly in relation to health impacts of alcohol use, this was a positive as it was a preventative measure where individuals got the information and then could do something to change their behaviour to prevent future health issues.

"It may well [raise health concerns] for people, but the good thing is that the way that it is might raise the health concern before you get to the point where you need to do something about it – or before you feel the effect is what I'm saying. Its prevention." – Participant 2.

One participant noted that the tool was a good way to evaluate levels of alcohol consumption over a longer-term period and intended to use it to measure what impact their reduction in alcohol consumption had had in terms of their test results. Two participants made comparisons to their experience using the DrinkAware tool, which they had used in the past to monitor their alcohol intake and felt the My Drinks Check was easier to navigate, and more visually appealing.

"Yes I would use it as a benchmark. Maybe do it again in 12 months and see if I have improved." – Participant 6.

"I have used the DrinkAware website, however I feel like there is a lot going on there and there is a lot of information and navigating it isn't as straight forward as this was but then the DrinkAware is more established so maybe more people are inclined to use it." – Participant 12.

"The DrinkAware one was quite generic in comparison. Making it more colourful and eye-catching makes a difference." – Participant 14.

Overall, the majority of individuals were happy to recommend the tool to family and friends, particularly if they knew someone who should cut down on drink and who wanted to lose weight.

"I can now take that and pass it around my friends and get them to look at it as well." – Participant 2.

"Maybe if I knew they liked a drink and that was what was holding them back from losing weight." – Participant 9.

"If I knew someone who was looking to cut back or was looking at losing weight because it gives you some useful tips." – Participant 10.

3.6.2 Impact of the tool on survey participants

Pre-intervention survey data

Of participants who completed the pre-intervention survey and were eligible to take part in the study, approximately four in ten (40.9%, n=63) scored in the lower risk level of the AUDIT-C tool (scores 0-4). Four in ten (40.9%, n=63) participants were classed as increasing risk (scores 5-7), whilst 17.5% (n=27) of participants were classed as high risk (scores 8-10) and one participant (0.6%) was classed as being possibly dependent (scores 11-12). There was a significant association between sex and AUDIT-C risk category, with higher proportions of

males in the increasing risk and high-risk categories compared to females (Table 5). There was no significant association between age and AUDIT-C risk category.

Table 5: AUDIT-C risk category by sex

	Low risk		Increasing risk		High risk/possible dependence		
	n	%	n	%	n	%	*p*
Male	8	22.9	17	48.6	10	28.6	
Female	54	46.6	45	38.8	17	14.7	<0.05

Participants were asked to record their alcohol consumption over the week prior to completing the survey. The median number of units all pre-intervention survey participants consumed over the previous week was 9.2 units, with 16.6% of participants consuming no alcohol in the previous week. Of participants who reported consuming alcohol in the week prior to the survey, the median number of units consumed was 12.1. There was a significant association between past weeks alcohol consumption and AUDIT-C risk category, with low risk drinkers drinking a median of 3.1 units, increasing risk drinkers drinking 5.8 units, and high risk/possibly dependent drinkers drinking a median of 9.5 units (p<0.001). There was no significant association between sex or age and reported alcohol consumption in the past week. The mean number of days participants reported consuming alcohol was 2.6, whilst the median number of units consumed on participants' heaviest drinking day was 6.0 units.

Participants' motivation to change their alcohol consumption prior to completing the My Drinks Check was measured using the Alcohol Stages of Change (Short Form) tool. There are five stages of change: pre-contemplation, contemplation, preparation, action and maintenance. People in the pre-contemplation stage do not intend to take action in the foreseeable future within the next six months. Contemplation is the stage in which people intend to change in the next six months, whilst preparation is the stage in which people are taking action in the immediate future, within the next 30 days. Action is the stage in which people have made specific modifications to their behaviour within the past 6 months, whilst maintenance is the stage in which people have made changes and are maintaining them over the long term. One in three (34.8%, n=54) pre-intervention survey participants were in the pre-contemplation phase of behaviour change, whilst 9.7% were in the contemplation phase, 11.0% in the preparation phase, 23.2% in the action phase and 14.8% in the maintenance phase. Ten participants (6.5%) were classified as being non-bingers (i.e. they have never drank more than 5/6 drinks in a row and thus they would not be expected to make changes after the intervention). Excluding non-bingers, there was a significant association between alcohol stage of change and sex (p<0.01). There was a higher proportion of males than females in the pre-contemplation (males, 50.0%; females, 33.3%) and action (males, 38.2%; females, 20.7%) stages, whilst there was a higher proportion of females compared to males in the contemplation (females, 12.6%; males, 2.9%), preparation (females, 13.5%; males, 5.9%) and maintenance (females, 19.8%; males, 2.9%) stages. There was no significant association between alcohol stage of change and age.

Pre-intervention survey participants also reported on their motivation to lose weight prior to completing the My Drinks Check tool. Motivation to lose weight was categorised into four

stages of change: pre-contemplation, contemplation, action and maintenance. The majority of pre-intervention survey participants were in the action or maintenance phase of behaviour change for weight loss, with 51.4% (n=72) of participants classed in the action phase and 40.0% (n=56) in the maintenance phase. Less than one in ten participants were classed in the pre-contemplation (5.0%, n=7) or the contemplation (3.6%, n=5) phase. There was no significant association between age or sex and motivation to lose weight stage of change.

Pre and post-intervention survey data comparisons

Impact of the intervention on motivation to change alcohol consumption was assessed by measuring the alcohol stage of change at both pre and post-intervention. Individuals movement between the stages of change from pre to post-intervention were categorised as negative (moving back down the stages of change), no change (stayed at the same stage), or positive (moved along the stages of change). Over one third (34.3%; n=24) of participants demonstrated positive actual or intended behaviour change at post-intervention, whilst there was no change for 48.6% (n=34) of participants, and a negative change for 17.1% (n=12) of participants[7].

There was a lower proportion of participants reporting consuming any alcohol in the week prior to completing the post-intervention survey compared to the pre, although this difference was non-significant (n=72; pre, 87.5%; post, 79.2%; p=0.154). The median number of total units consumed over the course of the previous week was lower at post-intervention than pre-intervention, although this difference was non-significant (n=71; pre, 10.4; post, 7.2; p=0.588). The median number of units consumed on participants' heaviest drinking day was also lower in the week prior to the post-intervention survey compared to the pre, although this difference was non-significant (n=72; pre, 6.0; post, 5.1; p=0.659). The mean number of days individuals reported consuming alcohol on was also slightly lower at post-intervention than pre-intervention, although this difference was non-significant (n=72; pre, 2.15; post, 2.01; p=0.486). There was a significantly higher proportion of participants drinking within the lower risk guidelines for their sex (up to 21 units for men and up to 14 units for women) in the week prior to completing the post-intervention survey compared to the pre (n=71; pre, 66.2%; post, 69.0%; p>0.01).

Pre, post and follow-up survey data comparisons

Very few individuals completed pre, post and follow-up intervention surveys (n=33), thus findings should be interpreted with caution. Of participants who completed surveys at each of the three time points (pre, post-intervention and follow-up[8]) there was no significant difference in the proportion of participants who reported consuming alcohol in the week prior to survey completion (pre, 81.3%; post, 71.9%; follow-up, 78.1%; p=0.558). The median number of total units consumed over the course of the previous week was lower at follow-up

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[7] Actual or intended alcohol consumption behavioural change between pre and post-intervention surveys was also compared against individual's pre-intervention motivation to lose weight. However, most participants were in the maintenance or action stages of weight change, thus numbers in other categories were too small to report these findings.

[8] Participants were emailed with the post-intervention survey link two weeks after completing the pre, and the follow-up survey link two weeks after completing the post. However, participants varied in when they completed the surveys thus these are not set standard time points and vary between participants.

than post-intervention which was lower than pre-intervention, although this difference was non-significant (pre, 7.1; post, 6.7; follow-up, 6.5; p=0.681). There was no significant difference in the median number of units consumed on participants' heaviest drinking day between survey time points (pre, 4.1; post, 4.2; follow-up, 5.6; p=0.863). There was also no significant association between the proportion of participants drinking within the lower risk guidelines for their sex (up to 21 units for men and up to 14 units for women) and survey time point (pre, 68.8%; post, 75.0%; follow-up, 65.6%; p=0.459).

4. Discussion

Estimates for alcohol-specific mortality, binge drinking and harmful levels of alcohol consumption are significantly higher for Liverpool than the national averages [4]. Addressing harmful alcohol consumption forms part of the city's local alcohol strategy, which aims to gradually reduce the amount of alcohol the local population consumes and make it more acceptable to drink less alcohol. To achieve these aims Public Health Liverpool launched a new behavioural change intervention in 2018 called Drink Less Feel Good. The intervention aims to signpost the target group to the intervention website, including the My Drinks Check tool. This is designed to enable people to assess how much they drink and measure their risk level in ways that are meaningful to them, such as providing comparisons of how their drinking compares to other people their age nationally and their alcohol consumption in terms of calorie content. The tool also provides personalised feedback on the benefits of consuming less alcohol and suggests ways individuals can reduce their alcohol consumption.

Data entered by individuals as part of the My Drinks Check and routinely collected by Public Health Liverpool demonstrated a high level of usage of the tool with almost 20,000 completions in an eleven-month period. A similar digital alcohol intervention has been launched at national level in the past five years (i.e. DrinkAware app) and approximately 170,000 users downloaded the application in a twelve-month period [27]. Proportionate to the intervention target group and population size, the My Drinks Check is arguably as successful as similar national interventions and tools[9]. Almost half of the My Drinks Checks completions occurred in the first month after the tool had been launched and during the most intensive media advertising period, with numbers declining sharply after the first three months. Facebook was the most effective means of promoting the tool, with almost half of individuals reporting they had seen an advert for the tool on the social media app. This suggests that media advertising, particularly on Facebook, is crucial in driving traffic to the website and tool. Feedback from interviewees also suggested that one of the biggest barriers to accessing and using the tool was knowing about it in the first place. Many interviewees were made aware of the tool through word of mouth, and almost all felt it was something they would recommend to family and friends, particularly those they knew were conscious of their weight. Encouraging sharing of the tool on social media, perhaps through intervention adverts which recommend sharing the tool with friends who are weight conscious and consume alcohol may help to promote and drive traffic to the website. Similarly, targeting of adverts on social media pages at individuals who engage with health or weight loss groups and content may be useful in promoting the intervention amongst individuals likely to relate to the core messages.

The intervention also appeared to be successful in getting the target age group (35-55 years) to complete the tool, with over half of all completions done by individuals in this age range. The motivations to drink alcohol and the contexts in which individuals drank differed significantly by age. Those in younger age groups (i.e. 16-34 years) were more likely to choose

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[9] This is difficult to determine exactly as the Drinkaware app counts individual user downloads, whereas the My Drinks Check counts the number of completions of the tool, thus an individual may complete the tool on more than one occasion.

social motivations and contexts for their alcohol consumption, such as getting in the mood to go out and drinking on a night out with friends, than their older counterparts. Conversely, those in older age groups (i.e. 35-54 years) were more likely to choose emotional reasons for consuming alcohol, such as relieving stress, and whilst in the home either alone or with a partner. This suggests that the decision to target the intervention at 35-55 year olds who were perceived as consuming alcohol in the home, often as a means to relax and who may not associate their drinking with adverse consequences, was valid. Interview data suggested that even amongst younger drinkers, the intervention motivated them to consider their alcohol use in the home whilst casually drinking even though it would not affect the amount of alcohol they consumed on a night out with friends. The context and motivation for alcohol consumption may be the most relevant factors when considering when and for whom the intervention is most effective. Such an intervention, which addresses home drinking, also compliments existing work programmes by Public Health Liverpool which target alcohol consumption in other settings (e.g. Drink Less Enjoy More aimed at nightlife settings).

The tool was designed for and aimed at Liverpool residents. Data showed the intervention was also successful in primarily targeting those living in the Liverpool area, with the majority of completions done by people who lived in Liverpool. There was a relatively equal split in the number of males and females who completed the tool, suggesting that the concept and content is relevant to both. Some interviewees suggested that the tool may appeal more to women, who they perceived as being more weight conscious than men, however male interviewees felt the concept of the tool was just as relevant to them as to women. The My Drinks Check data showed significant differences between males and females in the contexts and motivations for alcohol consumption. Females were more likely to consume alcohol in the home with others and or whilst having a meal, and reported consuming alcohol for emotion-related motives such as to relax and or when they felt stressed, in addition to social reasons such as getting in the mood to go out. Males were more likely than females to drink at home by themselves, after their shift and or while watching sport, and reported consuming alcohol when they wanted to have fun with friends, when bored and or because they enjoyed the taste. Such differences may influence the extent to which the intervention is effective for males compared to females.

The My Drinks Check tool also aimed to target those individuals consuming alcohol at low or increasing risk levels rather than high risk drinking and data showed that the majority of individuals who completed the tool were drinking within these alcohol limits. Almost one in five individuals reported past week alcohol consumption that was above the high risk cut off for their sex. This is significantly higher than population level estimates for high risk drinking (approx. 4.4%) and may suggest that the tool also appeals to harmful and possibly alcohol-dependent drinkers. Individuals who enter past week alcohol consumption that is above high risk levels for their sex are not required to complete the full check but are redirected to the end page and signposted to more intensive support services. Whilst outside the scope of the current evaluation and not an explicit aim of the intervention, the tool may potentially also increase the numbers of high-risk drinkers accessing support to address their alcohol consumption problems through such signposting.

Interview data suggested that whilst in general completing the My Drinks Check was easy and efficient, there were also some minor issues. Some interviewees noted that on the screen where they had to select their sex they did not realise the icon was selected as the colour change was not obvious and that they should then press next to move on. The main obstacle in terms of usability of the tool however was the recording of a typical week's alcohol consumption. Interview participants reported different ways of defining a typical week with some reporting past week alcohol consumption, others reporting somewhere in between a heavy week and an alcohol free week, and others reporting their heaviest week. Individuals reporting their heaviest week, but who do not drink every week were frustrated with their results, which depicted them as very heavy drinkers. They also noted that as they may only consume that amount of alcohol once a month they were not particularly worried about the calorie content. All interviewees acknowledged the difficulty in changing the alcohol consumption entry format however. Previous research has demonstrated that in the context of alcohol reduction interventions, accurately determining consumption based on retrospective recall is challenging, particularly as high levels of consumption, either over the long-term or in a single binge drinking occasion, can interfere with memory [27, 28]. Some participants noted that such difficulties may be overcome by allowing individuals to input their past week alcohol consumption over time and saving this data. This would also allow individuals to monitor any changes they made and the impact this had on their health and wellbeing.

In terms of the content of the results page, the comparison with other peoples' alcohol consumption drew contradictory views from interview participants. In general, interview participants reported that the comparison with people their age shocked them. For some individuals, this shock was motivating and they spoke about intending to reduce their alcohol consumption and then rechecking how their drinking compared with others. However, some individuals reported it was distressing and one individual reported it would discourage them from using the tool again. Further, the vast majority of interviewees were sceptical about the comparison. Many asked what the data was based on (e.g. national or local populations, small or large samples), with several stating that without such information they did not believe the figures. For many interview participants this was the aspect of the tool they liked and engaged with the most. However, their scepticism about its accuracy and discontent with the result prevented them from taking it seriously. Evidence from tobacco literature suggests fear-inducing health messages may provoke reactance and denial, partially undermining the positive effect of such messages, by either weakening the intended message or leading to boomerang effects (i.e. increasing alcohol consumption) [29, 30, 31]. Data used to generate the comparison includes individuals who do not consume alcohol at all, thus increasing the overall percentage of people which an individual drinks more than. Interviewees felt this was an unfair comparison and the inclusion of non-drinkers was not obvious. Thus, whilst the comparison had the intended effect of shocking individuals about how their alcohol consumption compared to other people, it may have discouraged people from believing the validity of the tool and reducing the impact of the intervention on behaviour change.

Past week alcohol consumption from individuals who completed the My Drinks Check was compared against the data on alcohol consumption from the national population

(disaggregated by age and sex) which was used to generate the comparisons in the tool, but this time excluding individuals who had not consumed alcohol [26]. This data was used to determine whether individuals were consuming more than, less than or about the same number of units weekly as other individuals their age. How individuals' actual alcohol consumption compared to other individuals in the wider population was then compared to how individuals perceived their drinking to compare to others[10]. Results from this analysis demonstrated that four in ten individuals underestimated how their drinking compared to other people their age even when individuals who do not drink were excluded from the comparison data. It may be more effective to remove individuals who do not drink from the comparison data; this would still serve to inform and educate individuals who underestimate their drinking, whilst also presenting a less extreme figure which individuals may be more inclined to believe. The data source on which the comparison figure is based could be included to further convince individuals of the validity of the data. Evidence from previous research on the effectiveness of alcohol-reduction apps has demonstrated the importance of, and value which people place in, receiving guidance from what they perceive as a credible source [32, 12].

Data gathered from interviewees also suggested some minor issues with other components on the results page and suggestions for change. Similar to issues with the comparison to other people's drinking indicator, some interviewees felt the long-term health risks barometer would benefit from more specific information. Interviewees whose meter fell within the yellow zone did not understand that the barometer referred to health risks as the statement underneath made no mention of health. Some other participants felt that the barometer could be interactive so individuals could get more information about the health risks at different levels. All interview participants had positive feedback on the alcohol consumption change slider. However, there was a lot of confusion around what one less drink meant, with many individuals initially presuming this to mean one less drink a week. Whilst the box underneath the slider states it is one less on each day you drink, participants reported they did not read this box properly and so wrongly interpreted the information. Other suggestions for the results page components included: displaying the number of calories as a figure for those unaware of the calories in a doughnut; including other options besides walking (e.g. running, cycling) as this is often a part of people's daily routine anyway; and, providing links to other relevant information on wellbeing activities. Such information on other local alcohol-free activities and sports organisations and health-related groups are included on another page if participants explore the website in more detail but most seemed unaware of this. Some participants noted that the benefits of and tips to reduce alcohol consumption sections were not as interactive as other parts of the results page and this had initially caused them skip over it, however, in general, these sections received very favourable feedback from all participants, with participants particularly liking the personalised aspect of these components.

Evaluation data collected from interviews and pre, post and follow-up intervention surveys suggested that the My Drinks Check may be associated with a number of positive changes in

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[10] One of the questions on the My Drinks Check asked individuals whether they thought they consumed more than, less than, or about the same amount of alcohol as other people their age and sex.

alcohol consumption levels and patterns, and increased motivation to change alcohol consumption. Several interviewees reported that the tool had made them consider their alcohol consumption and the personalised tips in particular were something which participants reported they may incorporate in the future. Some interview participants reported that the information about calories in alcohol had encouraged them to cut back on their alcohol intake as part of their attempts to lose weight and increase fitness levels. Data from the pre and post-intervention surveys also suggested a number of positive changes in the proportion of participants who consumed alcohol, the median number of units consumed over one week and motivation to change alcohol consumption following completion of the intervention. By the follow-up survey, median number of units was lower than those reported in the post-intervention survey suggesting these changes were maintained for some individuals, although this was no longer statistically significant. Whilst the current study is too small to be generalizable to the entire population, and there was no control group to determine if the changes in alcohol consumption amongst survey participants were attributable to the intervention, initial findings are promising and suggest the intervention may impact alcohol consumption levels and motivation to change alcohol consumption. Previous research has suggested that the positive effect of digital interventions in reducing alcohol consumption can last up to six months but not to one year [12]. The My Drinks Check provides individuals with the opportunity to receive tips, reminders and information via email on an ongoing basis and this may help to increase the likelihood of individuals staying engaged and maintaining any behaviour change. Further research is needed to explore the long-term impact of this.

Whilst findings suggested most behavioural change to be positive, such as influencing reductions in alcohol consumption, consideration also needs to be given to potentially negative behaviours which the tool may encourage. For individuals whose alcohol consumption fell within the low risk level, there was the potential that the results may encourage consumption, with some interviewees reporting that they felt they could have an extra drink in future since their alcohol consumption was not as high as others. Previous research has suggested that care needs to be taken to ensure intervention content is used as intended. The tool should not be a means to quantify how reductions in alcohol consumption at one time point can be used to engage in different, yet equally damaging drinking at a later date [33, 34, 27]. For example, some interview participants reported that knowing the calorie content in alcohol would simply make them substitute higher calorie for lower calorie alcohol. A substitution from high calorie and low alcohol drinks (e.g., beer or cider), to high alcohol content but lower calorie drinks (e.g., spirits) may increase overall alcohol consumption. Another potential concern highlighted by data from interview participants was the potential for the information on calories in alcohol to encourage substituting food for alcohol on occasions where individuals intend to consume a lot of alcohol. Such behaviour, sometimes referred to as 'drunkorexia', has been found in previous research, demonstrating a relationship between dieting severity and frequency of alcohol consumption and binge drinking [35, 36]. Drinking alcohol on an empty stomach (i.e. to reduce calorie intake from food) allows alcohol to be absorbed in the body faster, raising blood alcohol levels higher and leading to increased risk of brain impairments (e.g. blackouts) and alcohol-related harms [28].

Such considerations are based on a small sample of interviewees who were discussing their perceptions of what the tool might influence them to do in the future or other people to do. Further research is needed to determine if the tool has any impact in the longer-term on actual behaviour change for such factors.

Conclusion

Estimates for alcohol-specific mortality, binge drinking and harmful levels of alcohol consumption are significantly higher for Liverpool than the national average [4]. The Drink Less Feel Good intervention and accompanying My Drinks Check aims to address and reduce alcohol consumption amongst low and increasing risk drinkers. Findings from this pilot evaluation and data collected as part of the My Drinks Check are promising. Data from the My Drinks Check demonstrate that the number of individuals exposed to and accessing the tool may be proportionately similar to those downloading a comparable national application. The data also demonstrates that the intervention is successful at reaching its target audience and may even be useful in signposting higher risk drinkers, who fall outside the scope of the intervention, to appropriate services. Data from the mixed methods evaluation study suggest that the My Drinks Check may be associated with a number of positive changes in alcohol consumption levels and patterns, and increased motivation to change alcohol consumption amongst study participants. Whilst there was some feedback and suggestions for areas of improvement in the tool, overall study participants were generally positive about its content, scope and premise. Future consideration may be given to investigating whether the tool impacts other lifestyle behaviours, however, the Drink Less Feel Good intervention and accompanying My Drinks Check tool represent an important piece of work that compliments other alcohol interventions targeted at other settings (e.g. nightlife) such as Drink Less Enjoy More. Such a suite of work aims gradually help to make it more acceptable to drink less alcohol, ultimately change social norms and reduce alcohol consumption and alcohol-related harms in Liverpool.

References

[1] M. C. Reid, D. A. Fiellin and P. G. O'Connor, "Hazardous and harmful alcohol consumption in primary care," *JAMA Internal Medicine,* vol. 159, no. 15, pp. 1681-1689, 1999.

[2] N. Sheron and I. Gilmore, "Effect of policy, economics, and the chaning alcohol marketplace on alcohol related deaths in England and Wales," *BMJ,* p. 353, 2016.

[3] B. Gunstone, L. Piggot, B. Butler, A. Appleton and J. Larsen, "Drinking behaviour and moderation among UK adults: Findings from Drinkaware Monitor 2018," YouGov and Drinkaware, London, 2018.

[4] Public Health England, "Local Alcohol Profiles for England," 2011-2014. [Online]. Available: https://fingertips.phe.org.uk/profile/local-alcohol-profiles/data#page/3/gid/1938133118/pat/6/par/E12000002/ati/102/are/E08000012/iid/92776/age/168/sex/4. [Accessed 11 September 2017].

[5] R. McGovern and E. F. S. Kaner, "Alcohol prevention and treatment: interventions for hazardous, harmful, and dependent drinkers," in *The Handbook of Health Behavior Change*, New York, Springer, 2013, pp. 211-227.

[6] M. B. Sobell and L. C. Sobell, "Treatment for problem drinkers: a public health priority," in *Addictive behaviors across the life span: prevention, treatment, and policy issues*, Thousand Oaks, CA, Sage Publications, Inc, 1993, pp. 138-157.

[7] A. O' Donnell, P. Anderson, D. Newbury-Birch, B. Schulte, C. Schmidt, J. Reimer and et al., "The impact of brief alcohol interventions in primary healthcare: a systematic review of reviews," *Alcohol and Alcoholism,* vol. 49, no. 1, pp. 66-78, 2013.

[8] J. Brown, R. West, C. Angus, E. Beard, A. Brennan, C. Drummond and et al., "Comparison of bried interventions in primary care on smoking and excessive alcohol consumption: a population survey in England," *British Journal of General Practice,* vol. 66, no. 642, pp. e1-9, 2016.

[9] Z. Khadjesari, E. Murray, C. Hewitt, S. Hartley and C. Godffrey, "Can stand-alone computer-based interventions reduce alcohol consumption? A systematic review," *Addiction,* vol. 106, no. 2, pp. 267-82, 2011.

[10] E. F. S. Kaner and B. M. Bewick, "Brief alcohol intervention in young people: the impact of practitioner and internet-basde approaches," in *Young People and Alcohol: Impact, Policy, Prevention, Treatment*, Hoboken (NJ), Wiley-Blackwell, 2011, pp. 152-69.

[11] W. R. Miller and V. C. Sanchez, "Motivating young adults for treatment and lifestyle change," in *Issues in Alcohol Use and Misuse by Young Adults*, Notre Dame, Indiana, University of Notre Dame Press, 1994.

[12] E. F. S. Kaner, F. R. Beyer, C. Garnett, D. Crane, J. Brown, C. Muirhead, J. Redmore, A. O'Donnell and et al., "Personalised digital interventions for reducing hazardous and harmful alcohol consumption in community-dwelling populations," *Cochrane Database of Systematic Reviews,* no. 9, 2017.

[13] S. Michie, M. Richardson, M. Johnston, C. Abraham, J. Francis, W. Hardeman, M. P. Eccles, J. Cane and C. E. Wood, "The behavior change technique tasxonomy (v1) of 93 hierarchically clustered techniques: building an international consensus for the reporting of behavior change interventions," *Annals Behav Med,* vol. 46, no. 1, pp. 81-95, 2013.

[14] C. Vandelanotte, A. M. Muller, C. E. Short, M. Hingle, N. Nathan, S. L. Williams, M. L. Lopez, S. Parekh and C. A. Maher, "Past, present, and future of eHealth and mHealth research to improve physical activity and dietary behaviors," *J Nut Ed Behavr,* vol. 48, no. 3, pp. 219-228, 2016.

[15] Z. Quigg, K. Ford, C. McGee, H. Grey, K. Hardcastle and K. Hughes, "Evaluation of the Liverpool Drink Less Enjoy More intervention," Centre for Public Health, Liverpool John Moores University, Liverpool, 2016.

[16] P. Buykx, J. Li, M. Lovatt, E. Gomes de Matos, J. Holmes, Hooper L. and P. Meier, "An investigation of public knowledge of the link between alcohol and cancer," University of Sheffield and Cancer Research UK, 2015.

[17] N. Khan, T. Wilkinson and S. Keeling, "Reasons for changing alcohol use among older people in New Zealand," *Australasian Journal on ageing,* vol. 25, no. 2, pp. 97-100, 2006.

[18] E. L. Davies, D. Conroy, A. R. Winstock and J. Ferris, "Motivations for reducing alcohol consumption: An international survey exploring experiences that may lead to a change in drinking habits," *Addictive Behaviors,* vol. 75, pp. 40-46, 2017.

[19] S. Mollen, S. Engelen, L. T. E. Kessels and B. van den Putte, "Short and sweet: the persuasive effects of message framing and temporal context in antismoking warning labels," *Journal of Health Communication International Perspectives,* vol. 22, no. 1, pp. 20-28, 2017.

[20] M. Gerend and M. Cullen, "Effects of message framing and temporal context on college student drinking behavior," *Journal of Experimental Social Psychology,* vol. 44, no. 4, pp. 1167-1173, 2008.

[21] J. Milward and Z. Khadjesari, "User preferences for content, features, and style for an app to reduce harmful drinking in young adults: analysis of user feedback in app stores and focus group interviews," *JMIR Mhealth Uhealth,* vol. 4, no. 2, 2016.

[22] Office for National Statistics, "Adult Drinking Habits in Great Britain, 2013," 2013. [Online]. Available: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/drugusealcoholandsmoking/articles/howmuchdopeoplebingedrinkingreatbritain/2015-06-12. [Accessed 02 April 2019].

[23] T. F. Babor, J. R. de la Fuente, J. Saunders and M. Grant, "AUDIT. The Alcohol Use Disorders Identification Test. Guidelines for use in primary health care," World Health Organization, Geneva, Switzerland, 1992.

[24] R. G. Laforge, J. E. Maddock and J. S. Rossi, "Comparison of five stage methods for alcohol abuse among college students," *Annals of Behavioral Medicine,* p. 20, 1998.

[25] University of Rhode Island, "Weight Control: Stages of Change (Short Form)," The University of Rhode Island, 2019. [Online]. Available: https://web.uri.edu/cprc/weight-control-stages-of-change-short-form/. [Accessed 27 02 2019].

[26] NHS Digital, "Health Survey for England 2015," NHS Digital, 14 December 2016. [Online]. Available: https://webarchive.nationalarchives.gov.uk/20180307193646/http://digital.nhs.uk/catalogue/PUB22610. [Accessed 01 April 2019].

[27] S. Attwood, H. Parke, J. Larsen and K. L. Morton, "Using a mobile health application to reduce alcohol consumption: a mixed-methods evaluation of the drinkaware track and calculate units application," *BMC Public Health,* vol. 17, no. 394, 2017.

[28] A. M. White, "What happened? Alcohol, memory blackouts, and the brain," *Alcohol Res Health,* vol. 27, no. 2, pp. 186-196, 2003.

[29] K. Witte, "Putting the fear back into fear appeals: the extended parallel process model," *Commun Monogr,* vol. 59, pp. 329-349, 1992.

[30] H. Leventhal, "Fear appeals and persuasion: the differentiation of a motivational construct," *Am J Public Health,* vol. 61, pp. 1208-1224, 1971.

[31] K. Witte and M. Allen, "A meta-analysis of fear appeals: implications for effective public health campaigns," *Health Educ Behav,* vol. 27, pp. 591-615, 2000.

[32] D. Crane, C. Garnett, J. Brown, R. West and S. Michie, "Behavior change techniques in popular alcohol reduction apps: content analysis," *J Med Internet Res,* vol. 17, no. 5, p. e118, 2015.

[33] M. Gajecki, A. H. Berman, K. Sinadinovic, I. Rosendahl and C. Andersson, "Mobile phone brief intervention applications for risky alcohgol use among university students: a randomized controlled study," *Addict Sci Clin Practe,* vol. 9, no. 1, pp. 1-12, 2014.

[34] S. Prinsen, C. Evers and D. de Ridder, "Oops I did it again: examining self-licensing effects in a subsequent self-regulation dilemma," *Appl psychol health and well-being,* vol. 8, no. 1, pp. 104-126, 2016.

[35] D. Krahn, C. Kurth, M. Demitrack and A. Drewnowksi, "The realtionship of dieting severity and bulimic behaviors to alcohol and other drug use in young women," *Journal of Substance Abuse,* vol. 4, pp. 341-353, 1992.

[36] S. C. Burke, J. Cremeens, K. Vail-Smith and C. L. Woolsey, "Drunkorexia: calorie restriction prior to alcohol consumption among college freshman," *Journal of Alcohol and Drug Education,* vol. 54, no. 2, pp. 17-35, 2010.

[37] B. Borsari and K. B. Carey, "Peer influences on college drinking: A review of the research," *Journal of Substance Abuse,* vol. 13, pp. 391-424, 2001.

[38] C. Neighbors, A. J. Dillard, M. A. Lewis, R. L. Bergstrom and T. A. Neil, "Normative misconceptions and temporal precedence of perceived norms and drinking," *Journal of Student Alcohol,* vol. 67, pp. 290-299, 2006.

[39] M. E. Larimer and J. M. Cronce, "Identification, prevention and treatment: A review of individual-focused strategies to reduce problematic alcohol consumption by college students," *Journal of Student Alcohol,* vol. 14, pp. 148-163, 2002.

[40] Z. Quigg, K. J. Ford, N. Butler, K. Hardcastle and K. Hughes, "Evaluation of the South Wales Know the Score #DrinkLessEnjoyMore Intervention," Centre for Public Health, Liverpool John Moores University, Liverpool, 2016.

[41] J. Stevens, Applied multivariate statistics for the social sciences, Mahwah, NJ: Lawrence Erlbaum, 1996.

[42] World Health Organization, "Global status report on alcohol and health 2014," World Health Organization, Geneva, 2014.

[43] World Health Organization, "Global status report on alcohol and health 2018," World Health Organization, Geneva, 2018.

[44] R. O. De Visser and J. A. Smith, "Young men's ambivalence toward alcohol.," *Social Science & Medicine,* vol. 64, no. 2, pp. 350-362, 2007.