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**General public's views on pharmacy public health services: Current situation and opportunities in the future**

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### Article

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## **TITLE**

General public's views on pharmacy public health services: Current situation and opportunities in the future

## **ABSTRACT**

**Objectives:** To explore the experience of and willingness to use seven pharmacy public health services related to cardiovascular risk among the general public in England.

**Study design:** Mixed-method study

**Methods:** A mixed methods study, involving a cross-sectional survey using multiple distribution methods followed by a focus group discussion (FGD) with a sample of survey respondents.

**Results:** From 3,596 approachable individuals, 908 questionnaires were completed, (response rate 25.3%). Few respondents (2.1-12.7%) had experienced any of the seven pharmacy public health services. About 40% stated they would be willing to use health check services, fewer (9.3-26.3%) were willing to use advisory services. More females, frequent pharmacy users and those in good health were willing to use services in general ( $P<0.05$ ). Smokers, overweight individuals and those with alcohol-related problems were most willing to use specific advisory services supporting their problems ( $P<0.05$ ). FGD identified barriers to service use; for example, frequent staff changes, seeing pharmacist as medicines suppliers and concerns about competence for these services.

**Conclusion:** The general public are receptive to pharmacy public health services. Pharmacists must consider barriers if uptake of services is to increase.

**Keywords:** general public, pharmacy public health services, mixed-methods, cardiovascular

## INTRODUCTION

In the last few decades, community pharmacists have begun to contribute significantly to public health in many countries.<sup>1</sup> Potential pharmacy public health services encompass interventions for health education, screening for and supporting non-communicable disease management such as weight management, smoking cessation service, screening blood pressure and blood sugar, etc.<sup>2</sup>

Cardiovascular disease (CVD) is one of the world leading causes of mortality. The total deaths of ischemic heart and cerebrovascular diseases are predicted to be 13.4% and 10.6% in 2030.<sup>3</sup> Published evidence has demonstrated that community pharmacy has potential to contribute to preventing CVD particularly through screening for CVD risk factors, but also by providing a range of activities such as support with lifestyle change and medication use.<sup>4, 5</sup> Studies in Australia, Thailand, England and elsewhere have shown that pharmacies can deliver such services thereby increasing access to CVD screening services.<sup>5-7</sup>

All community pharmacies in England must contribute to public health by providing public health campaigns,<sup>8</sup> principally through display and distribution of health leaflets.<sup>9</sup> In addition, local health organisations can choose to commission further public health services through community pharmacies depending on local needs.<sup>9</sup> Such services include for example stopping smoking assistance, screening for high alcohol intake and NHS health checks.<sup>10-12</sup>

The 'general public' includes both those with diagnosed medical conditions and those who perceive themselves to be healthy. Among this latter group, many may have undiagnosed problems, which increase their risk of CVD.<sup>13</sup> Prevention of CVD is a high priority in England and pharmacy-based services which can contribute to this agenda are becoming increasingly widespread. Because most people use a pharmacy at some time,<sup>14</sup>

pharmacies can provide opportunistic screening to help identify these issues and thus support public health programmes.

The general public includes both users of pharmacies and pharmacy services and non-users, any of whom may benefit from such services. Published evidence is however limited on how the general public actually views pharmacy public health service provision, since previous studies have mostly explored the views of users of pharmacies and pharmacy services. A systematic review found that pharmacy consumers had a generally positive view of the community pharmacist as a public health service provider, however, most were rarely offered unsolicited public health services.<sup>15</sup> Surveys which have explored the views of the wider public have mostly focused on individual services, including CVD screening services,<sup>16, 17</sup> weight management<sup>18</sup> and alcohol screening.<sup>19</sup> A national survey of public views in Australia found low awareness of pharmacy CVD screening services.<sup>16</sup> One small survey in Liverpool, England, which included the general public perceiving themselves as healthy, found they had little awareness of pharmacist's involvement in public health in general.<sup>20</sup> This is also true of findings from surveys which focus on specific services,<sup>16, 18</sup> and is reflected in low use of pharmacy public health services.<sup>15, 18</sup> Despite this, surveys do indicate potential acceptance of pharmacy public health services, among both pharmacy users<sup>10</sup> and the general public,<sup>19, 20</sup> but no work to date has explored what factors influence this.

This study, therefore, aimed to explore in a wide, cross-sectional survey, the experience of and willingness to use pharmacy public health services among the general public in England.

## **METHODS**

## **Study design**

The study was mixed methods and involved a cross-sectional survey followed by a focus group discussion (FGD), conducted in Sefton, a diverse area of England, which is ranked overall 83<sup>rd</sup> most deprived of the 354 English authority areas, but also includes locations with the lowest deprivation ranking.<sup>21</sup> At the time of the study, all pharmacies in this area were commissioned to provide smoking cessation services, selected pharmacies were commissioned to provide NHS Health Checks<sup>17</sup> and some also provided weight management services.<sup>22</sup>

## **Ethical issues**

Ethical approval was received from Liverpool John Moores University. (Ref: 09/PBS/005) Consent was obtained from all participants. Survey data were anonymous.

## **Survey**

### **Data collection**

The survey used multiple distribution modes to maximize representativeness of the general population.<sup>23, 24</sup> Questionnaires were administered by seven distribution methods. Two approaches were used; interviewer-assisted (street, door-to-door and telephone survey) and self-completion (single- and double-mailing, postal survey to public/private organizations and questionnaires dropped-off at public/private organizations). The variation in response rates and demographic details arising from different distribution methods are reported elsewhere.<sup>25</sup> The survey aimed to obtain 1,200 responses from the general public aged 18 years or over. Screening questions were used to exclude people under 18 and also health professionals, since their work experience in health had the potential to influence their views.

## **Instrument**

Services of interest

CVD is recognized as a major health priority in the study location, particularly in areas of high deprivation.<sup>26</sup> This survey included seven services of relevance to CVD prevention which could be provided by pharmacies, derived from the published literature.<sup>5, 20</sup> These were four services for health advice (smoking cessation, sensible drinking, losing weight, heart health) and three health checks (blood pressure, blood sugar and cholesterol monitoring).

#### Demographic and health variables

The questionnaire incorporated fourteen demographic and health-related variables to characterize respondents. Demographic characteristics were: gender, age groups, ethnicity, education status, work status, socioeconomic status and deprivation level. Socioeconomic status (SES) was condensed into three categories based on respondents' occupation; lower (un-skilled/manual occupations); middle (skilled manual/administrative occupations); and higher (managerial/professional occupations).<sup>27</sup> Deprivation level was grouped into five quintiles (1 is the highest and 5 is the lowest), based on where respondents live.<sup>21</sup> Health-related lifestyle variables were: smoking, alcohol use, fruit/vegetable consumption, exercise and general health. Seven chronic health conditions, related to the proposed pharmacy services, were also included: hypertension, diabetes, high cholesterol, obesity, heart disease, smoking- and alcohol-related problems. In addition, respondents were also characterized depending on the use of regular medication and of pharmacies. Pharmacy user type was defined by the frequency of pharmacy visits in the last 6 months. A frequent user was defined as an individual who had visited a pharmacy more than once a month while an infrequent user visited less than once a month or never used a pharmacy.

#### Questionnaire validation

The questionnaire was designed and iteratively reviewed by the research team before face validity testing to evaluate content and understanding by ten volunteers. Further piloting was conducted to test content validity and questionnaire reliability by both interviewer-assisted and self-completion, among 100 members of the general public in Liverpool. Content validity was intensively examined through cognitive interview techniques,<sup>28</sup> to ensure the suitability of the questionnaire. It was slightly revised prior to the fieldwork.

#### Outcome measures

Key outcome measures were experience of, and willingness to use, the seven pharmacy public health services. Respondents' experiences of each service was measured using bivariate (yes/no) options. Willingness to use the seven services in the future was measured categorically (yes, maybe, or no), then responses were dichotomized to positive (answered 'yes or maybe') or negative view (answered 'no').

#### Data analysis

Descriptive analysis was performed to illustrate the overall results of demographic characteristics, health variables and key outcomes. Binary logistic regression was used to determine associations between demographic and health variables and versus experience and willingness to use services to identify opportunity for pharmacy public health services. An odds ratio (OR) and its 95% confidence interval (95% CI) were used to interpret the significance of an association, using a *P*-value of less than 0.05 as the cut-off point for significance.

### **Focus group discussion**

#### **Recruitment of participants**

An invitation explaining the objectives of the FGD was enclosed with postal survey packs. Survey respondents who were interested in taking part returned a completed

participation form with their completed questionnaire to the research team. FGD invitations were additionally offered to interested participants when conducting surveys on the street and via telephone. Potential participants were selected from those agreeing to participate, based on SES to ensure group diversity. Postal and telephone contact was made to schedule the FGD once the survey findings had been analysed and summarized. All FGD participants were offered a £25 shopping voucher for their time and £5 cash for travel costs.

### **Conduct of the focus group**

Participants who agreed to attend the FGD were provided with a summary report of the survey findings a few days prior to the FGD. The report used simple descriptive results and bar charts to help participants understand the findings. The FGD was held in a neutral location and lasted approximately one hour. Written consent was obtained prior to audio recording the discussion. KS facilitated the FGD while a second person took field notes.

### **Focus group topic guide**

A topic guide was derived from the descriptive survey findings and was also included in the summary report, to enable participants to consider these issues prior to the FGD. Key points for discussion were;

#### *Use of pharmacy public health services*

- Why don't people use new pharmacy services?

#### *Willingness to use pharmacy public health services in the future*

- What makes people unlikely to use services related to health advice?
- Why are they more willing to use health check services?
- Why would elderly people be less willing to use pharmacy services when compare to younger groups?

- What may make people from more deprived areas more willing to use pharmacy services compared to those living in affluent areas?

### **Data analysis**

The discussion was transcribed verbatim and analysed thematically. NVivo version 9 was used to assist with managing the text data. A number of codes around potential themes were created inductively and reviewed to ensure appropriateness before creating themes.

## **RESULTS**

### **Survey results**

#### **Demographic characteristics**

A total of 4,988 general public were approached using seven different survey modes. Of these, 3,596 individuals were willing to consider taking part in the survey, 908 questionnaires were completed, yielding an overall response rate of 25.3%

This survey obtained views mostly from females (60.4%) and those aged between 35-64 (54.0%), which are similar to the population distribution of both the study area and England as a whole. (Table1) Almost all were white, which corresponded to the local population but is lower than national data. Respondents were less representative of both local and national populations in terms of education, with proportionately fewer respondents having only school-level education. Fewer than half (42.5%) were working, slightly lower than reported proportion in employment both locally and nationally. Based on their occupations, most respondents were classed as of high socioeconomic status (62.5%). However, based on postcode, the proportion of respondents within each of the five quintiles of deprivation was well matched to the Sefton profile (Table 1). The proportion of smokers (18.2%) and the distribution of general health status in the survey respondents were similar to

both local and national data, but the proportion of respondents who were increasing risk drinkers (39.0%), had a healthy diet (32.3%), were physically active (53.0%) and overweight (54.2%), was higher than local and national figures.

Most respondents (96.2%) were users of pharmacies, but about a third (35.8%) were infrequent users, including the 3.8% who never used a pharmacy. Respondents aged 35-64 years (49.6%) and school educated (49.5%) were likely to use pharmacy more frequently (Chi-square,  $P < 0.001$ ), while there were no differences apparent between genders. The top three chronic diseases respondents reported they were diagnosed with were hypertension (31.5%), obesity (28.4%) and high cholesterol (25.1%). Respondents with at least one self-reported diagnosis were more likely to also self-report poor health (Chi-square,  $P < 0.001$ ).

#### **Experience of, and willingness to use, pharmacy public health services**

Overall, few respondents (Figure 1) had experienced any of the individual pharmacy public health services, with the most frequent experience being having a blood pressure check (12.7%). However, approximately 40% stated they would be willing to use any of the health checks, while about 25% would maybe use them. Fewer respondents were willing to use a pharmacy for any of the advisory services, with healthy heart advice being most frequently selected of these four services. Overall, fewer than 20% of respondents stated they would use a pharmacy for specific lifestyle advice on smoking cessation, sensible drinking or losing weight (Figure 1).

#### **Factors affecting willingness to use pharmacy public health services**

Three factors had a major influence on willingness to use pharmacy public health services: greater willingness was found among females, frequent pharmacy users and respondents with self-rated fair or good health. Females were more likely to be willing to use four of the seven services (weight management services and all three health checks), frequent

pharmacy users were more willing to use smoking cessation services, advice on safe drinking, weight management, BP check and blood sugar check, while respondents who rated their health as poor were less willing to use all services except smoking cessation support compared to those rating their health as fair or good. Older people were in general slightly less willing to use all services, but this only reached statistical significance for smoking cessation services. There were trends towards reduced willingness to use services among those of higher SES, except smoking cessation which was favoured by those in the middle SES group. Education level and deprivation status did not appear to influence willingness to use services.

Specific behaviours and medical conditions also influenced willingness to use relevant services. Smokers were over sixteen times more likely to use a pharmacy for advice for stopping smoking than non-smokers (OR=15.96, 95%CI 8.70-29.27) and respondents with smoking-related problem were almost 5-times more likely to do so (OR=4.86, 95% CI 2.30-10.25). Willingness to seek advice for sensible drinking was also higher among smokers, however alcohol drinkers were less likely to want to use smoking cessation services compared to low risk drinkers, despite smoking and drinking behaviours being seen as complementary.<sup>29</sup> Persons with alcohol-related problems were almost three times more likely to express willingness to use a pharmacy for advice on drinking (OR=2.82 95%CI 1.02-7.75), while increasing risk drinkers were also more positive about this service than low risk drinkers. Weight management services were mostly favoured by those who were overweight or reporting obesity as a health problem, but also by those reporting diabetes. Hypertensive and diabetic persons were however less willing to use pharmacy for a blood pressure check, while diabetic respondents were less likely to use cholesterol checks.

## **Focus group results**

### **Participants**

Thirty survey respondents returned participation forms; two aged 18-40 years, 16 aged 41-60 years and 11 over 60 years old. However only seven, all aged over 40, agreed to take part when contacted by telephone and of those, only five respondents eventually participated, three of whom were male. Four participants held managerial/professional occupations and one was classified as having an unskilled/manual occupation.

### **Focus group findings**

Several potential barriers to the use of pharmacy public health services were raised by FGD members to explain the survey results. They believed that the public sometimes viewed community pharmacists as strangers because of frequent staffing changes or use of locums. This led to the consideration that this might reduce consumer confidence in pharmacists maintaining confidentiality of customers' personal information and discourage good rapport with regular pharmacy users.

*"...Well it's not if you use the same pharmacy, but you wouldn't trust them with personal information..." [P4]*

*"...Even if you use the same pharmacy, there's not always the same pharmacist there..."[P2]*

It was considered that the general public may be unsure of the competency of community pharmacists to provide health advice, as there was a perception that this needed well-trained professional staff. In contrast, participants suggested that providing formal health checks involving the use of instrumentation may contribute to customers having confidence in the results.

*“...if you look at the figures, both at the green [results for health checks] 39, 40, 40% - everything starts with the blue [results for health advice] and that drops down where the word ‘advice’ comes in. In other words, the other is just a test. And they don’t think that they [pharmacists]’re able to give them that advice...” [P4]*

It was agreed that people, particularly the elderly, who are already diagnosed with any CVD related-disease would have been followed up on a regular basis by their GPs, thus would not feel it was necessary (or appropriate) to seek services from other settings.

*“...a lot of elderly people are on some sort of medication from the GP so they automatically keep going back to the GP because they do have that trust in them and they don’t have the need to go to the pharmacy... [P1]*

Participants also inferred that middle-aged people may perceive themselves as being invincible. Moreover, perhaps, people in employment may have health check-ups regularly, advocated either by the company they work for or through private health insurance. Therefore, these health services might not be of interest to them.

*“...It’s just people think ‘I’m OK, I’m fit, I’m well’...” [P3]*

*“...also the middle aged group...they’re employed, those sort of things [health checks] are done through their work...because a lot of companies do look after those things...” [P1]*

Participants commented that people in more affluent areas were perhaps well-educated with higher income, and were thus able to live healthier lives. As a consequence, such people may have fewer health needs.

*“...People in the more deprived areas are not as healthy as those in the more affluent areas...maybe they don’t get the better foods; they get a lot of processed foods for*

*convenience and generally just smoke more and have a bit more pressure so they might have high blood pressure...” [P1]*

A lack of advertising of the availability of services was felt to be a factor contributing to low awareness among the general public. Additionally, they suggested that information regarding how pharmacy public health services related to other health care services was not clear.

*“...I just have a question: if...you go to the pharmacy and they say, ‘You’ve got high blood pressure’. What do they [community pharmacists] do with that result?...” [P5]*

In addition, participants considered that people have become accustomed for most of their lifetime to viewing a community pharmacy only for medicine supply and a pharmacist as a medicine expert. They felt that it may be difficult to change these attitudes, particularly in the elderly.

*“...I’m brought up in a village outside and there’s a village doctor and there’s a village chemist. You know, my parent told me that...the chemist just did the prescriptions....And it’s hard to break a lifetime habit...” [P4]*

## **DISCUSSION**

Almost all respondents in this study were pharmacy users, but their experience of individual pharmacy public health services was low, with only 10% or fewer of respondents having actually used any of these services. However there was an overall willingness to use these services with specific disease-related health checks being regarded more positively than services focusing on lifestyle. Frequent pharmacy users, females and those in better health were most likely to use any service, but specific services were viewed as acceptable by respondents with particular characteristics, behaviours and conditions. The FGD enabled

some of these factors to be explored further and highlighted key issues which could be barriers to the use of these services.

Other studies have investigated the general public's views on using specific pharmacy services for CVD screening,<sup>17</sup> weight management<sup>18</sup> and advice on alcohol consumption.<sup>20</sup> Our results suggest that pharmacy public health services in general appear to be underutilized, which concurs with these findings. Previous studies have suggested that in fact the public view pharmacy's role in a range of public health services as limited.<sup>17, 19</sup> The focus group findings have some resonance with the findings of other studies, in that previous work suggests concerns about privacy and confidentiality, competency<sup>15, 30</sup> and the potential for both these and good rapport to be adversely affected by frequent use of locums.<sup>30</sup> Other factors found to reduce willingness to use pharmacy services are lack of awareness of the availability of consultation rooms, lack of awareness of services and the busyness of pharmacies.<sup>15, 19, 31</sup> One further factor raised by FDG participants is that their lifetime view of the pharmacist as an expert on medicines<sup>31</sup> needs to change in order to accept public health services.

### **Strengths and limitations**

The survey questionnaire used in this study was comprehensively developed from the findings of qualitative work involving the general public and relevant published literature.<sup>13, 20, 31</sup> The findings represent the general public's (societal) perspective, rather than the views only of service users or pharmacy customers, as is the case with many other studies<sup>10, 15, 31</sup> seeking views on pharmacy services. Data were gathered using a range of different methods to maximize the diversity of the sample. Response rates for self-completion methods were fairly low (5.1-26.5%), but higher for interviewer-assisted approaches (28.5-34.5%), hence there is a possibility of non-responder bias, which is a common problem for health surveys.<sup>32</sup>

Moreover interviewer-assisted approaches could have led to social desirability bias. The survey respondents were reasonably representative of Sefton's population in terms of demographic characteristics, including deprivation status, but not SES. However the proportion of respondents reporting increasing risk drinking, eating well, being physically active and overweight differed slightly from those reported in public health data from both Sefton and England.<sup>26, 33</sup> Generalization of the study findings and extrapolation to the wider population may be limited, due to the localized setting. The study questionnaire incorporated standard tools to measure relevant lifestyle behaviours, such as AUDIT-C,<sup>34</sup> BMI calculation,<sup>35</sup> standard recommendations for eating healthily,<sup>36</sup> and exercise<sup>37</sup> and also included self-reported conditions relevant to the services being investigated. This allowed indicators of the 'need' for public health services to be mapped against willingness to use these services. The use of a FGD involving survey respondents provided an important mechanism which helped to explain the findings from the perspective of respondents i.e. the general public, rather than that of researchers.<sup>38</sup> However, we acknowledge there was insufficient participation from younger respondents and people from lower SES, who may have had different views.

## **CONCLUSION**

Although these results confirm that the general public has been slow to utilize pharmacy public health services, they suggest that the public are receptive to a wide range of services which could be offered in relation to reducing CVD. Inevitably, respondents with specific health needs showed greater willingness to use services specific to those problems, but overall willingness to use services was lower among males, infrequent users of pharmacies and those with self-reported poor health. Pharmacists need to consider these factors and the

barriers to service use identified in this and other studies to promote their services to relevant populations and maximize uptake.

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**Competing interests:** None declared

**Ethical approval:** Liverpool John Moores University (Ref: 09/PBS/005)

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**Table 1** Demographics characteristics and health of respondents

Survey data	Count	%	Local and national statistics (%)		
			Sefton	England	
Gender (N=899)					<b>Gender<sup>a</sup></b>
Male	356	39.6	47.0	49.1	Male
Female	543	60.4	53.0	50.9	Female
Age (N=900)					<b>Age<sup>a</sup></b>
18- 34 y	105	11.2	18.3	21.9	16-29
35 – 64 y	486	54.0	50.9	51.9	30-59
≥65 y	313	34.5	30.8	26.2	≥60
Ethnicity (N= 895)					<b>Ethnicity<sup>a</sup></b>
White	873	97.5	98.4	90.9	White
Non-white	22	2.5	1.6	9.1	Non-white
Education (N=870)					<b>Education<sup>b</sup></b>
School (primary or secondary school)	381	43.8	59.5	58.4	GCSE* achieved
College/Further education	277	31.8			
University (bachelor/postgraduate)	212	24.4			
Work status (N=899)					<b>Economic activity<sup>a</sup></b>
Not working	126	14.0	10.5	5.7	Unemployed
Retired	391	43.5			
Working (Full time/Part time)	382	42.5	55.7	60.6	Employed
Socioeconomic status (N=856)					
Lower	187	21.8		n/a	
Middle	134	15.7			
Higher	535	62.5			
Deprivation (N=820)					
1 (highest deprived)	188	22.9	23.7	19.8	
2	171	20.9	17.7	19.9	
3	148	18.0	23.4	20.1	
4	160	19.5	21.1	20.1	
5 (least deprived)	153	18.7	14.1	20.2	
Smoker (N=896)	163	18.2	19.3	21.2	Adult smoking <sup>b</sup>
Alcohol drink (N=876)					
Safe drinker	353	40.3			
Unsafe drinker	342	39.0	21.8	23.6	Higher risk drinker <sup>b</sup>
Fruit/vegetable intake (N=878)					
≥ 5 a day	283	32.3	26.5	28.7	Healthy eating <sup>b</sup>
Exercise (N=895)					
≥ 3 times a week	474	53.0	10.9	11.5	Physically active <sup>b</sup>
Weight (N=768)					
Normal	352	45.8			
Overweight (BMI ≥ 25 kg/m <sup>2</sup> )	416	54.2	23.9	24.2	Obese adults <sup>b</sup>
General Health (N=891)					<b>General health<sup>a</sup></b>
Poor	67	7.5	11.2	9.2	Not good
Fair	217	24.4	21.7	22.2	Fairly good
Good	607	68.1	67.0	68.6	Good
Taking medication regularly (N=892)	577	64.7			
Pharmacy user type (N=896)					
Infrequent users	321	35.8			
Frequent user	575	64.2			
Chronic health conditions					
Hypertension (N=887)	279	31.5			
Diabetes (N=884)	98	11.1			
High Cholesterol (N=879)	221	25.1			
Obesity (N=885)	254	28.4			
Heart Disease (N=886)	107	12.1			
Smoking related problem (N=884)	47	5.3			
Alcohol related problem (N=882)	23	2.6			

Source: \*GCSE: General Certificate of Secondary Education

<sup>a</sup>Sefton Socioeconomic data (Sefton Council Planning and Economic Regeneration Department 2006)

<sup>b</sup>Sefton Health Profile 2011 (The Network of Public Health Observatories 2009)

**Table 2** Associations between willingness to use pharmacy public health services and demographic and health variables

	Odds Ratio, 95% Confidence Interval													
	Stopping smoking		Sensible drinking		Weight management		Heart health advice		Blood pressure check		Cholesterol check		Blood sugar check	
<b>Gender (Reference = Male)</b>														
Female	0.94	(0.55-1.63)	0.82	(0.51-1.31)	1.92*	(1.29-2.85)	1.15	(0.80-1.66)	1.71*	(1.17-2.50)	1.88*	(1.28-2.75)	1.54*	(1.06-2.24)
<b>Age group (Reference = age ≤ 34 y)</b>														
35 – 64 y	0.40*	(0.19-0.88)	0.55	(0.28-1.06)	0.78	(0.42-1.46)	0.76	(0.41-1.38)	0.72	(0.36-1.42)	0.80	(0.40-1.58)	0.74	(0.38-1.43)
≥ 65 y	0.27*	(0.09-0.84)	0.39	(0.15-1.03)	0.57	(0.25-1.29)	0.55	(0.25-1.22)	0.51	(0.22-1.22)	0.51	(0.21-1.21)	0.44	(0.19-1.01)
<b>Work status (Reference = Not working)</b>														
Retired	0.60	(0.22-1.65)	0.74	(0.31-1.77)	0.55	(0.27-1.11)	0.86	(0.44-1.69)	0.66	(0.32-1.35)	0.79	(0.39-1.64)	0.69	(0.33-1.41)
Working	1.64	(0.74-3.64)	1.20	(0.61-2.36)	0.76	(0.42-1.38)	1.34	(0.76-2.37)	0.91	(0.48-1.72)	1.03	(0.55-1.94)	0.76	(0.41-1.43)
<b>Socioeconomic status (Reference = Lower)</b>														
Middle	2.56*	(1.09-6.00)	0.98	(0.49-1.98)	1.07	(0.58-1.99)	0.89	(0.49-1.62)	1.09	(0.57-2.08)	0.91	(0.48-1.74)	0.81	(0.43-1.51)
Higher	1.82	(0.85-3.94)	0.67	(0.36-1.24)	0.72	(0.42-1.22)	0.72	(0.43-1.18)	0.82	(0.48-1.40)	0.71	(0.41-1.21)	0.67	(0.39-1.13)
<b>Smoking (Reference = Non-smoker)</b>														
Yes	15.96*	(8.70-29.27)	1.96*	(1.14-3.38)	0.93	(0.56-1.56)	1.34	(0.82-2.21)	0.92	(0.55-1.54)	0.83	(0.49-1.40)	0.86	(0.52-1.44)
<b>Alcohol drink (Reference = Non-drinker)</b>														
Safe drinker	0.50*	(0.26-0.95)	0.92	(0.48-1.74)	0.82	(0.50-1.34)	1.11	(0.70-1.76)	1.58	(0.98-2.55)	1.67*	(1.03-2.70)	1.59	(0.99-2.56)
Unsafe drinker	0.33*	(0.16-0.68)	1.92*	(1.01-3.66)	0.93	(0.54-1.59)	1.08	(0.65-1.78)	1.37	(0.82-2.32)	1.48	(0.88-2.50)	1.34	(0.80-2.23)
<b>Weight (Reference = Normal)</b>														
Overweight	1.10	(0.66-1.86)	0.73	(0.47-1.15)	2.72*	(1.85-4.00)	1.26	(0.88-1.79)	1.33	(0.91-1.93)	1.27	(0.87-1.85)	1.13	(0.79-1.64)
<b>General Health (Reference = Poor health)</b>														
Fair	1.81	(0.62-5.34)	3.00	(0.93-9.62)	2.41*	(1.10-5.31)	2.48*	(1.20-5.12)	2.57*	(1.26-5.26)	2.61*	(1.27-5.38)	2.37*	(1.16-4.86)
Good	1.83	(0.64-5.26)	3.42*	(1.09-10.72)	2.21*	(1.03-4.74)	2.37*	(1.18-4.78)	3.33*	(1.67-6.65)	2.73*	(1.37-5.45)	2.71*	(1.36-5.39)
<b>Pharmacy user type (Reference = Infrequent user)</b>														
Frequent user	1.77	(1.01-3.10)	2.19*	(1.33-3.60)	1.73*	(1.16-2.60)	1.64*	(1.13-2.39)	1.57*	(1.05-2.33)	1.47	(0.99-2.19)	1.63*	(1.10-2.40)

Note: \*P-value < 0.05

1 **Table 3** Associations between willingness to use pharmacy public health services and chronic health conditions

Independent variables	Stopping smoking		Sensible drinking		Weight management		Heart health advice		Blood pressure check		Cholesterol check		Blood sugar check	
	N(%)	OR (95%CI)	N(%)	OR (95%CI)	N(%)	OR (95%CI)	N(%)	OR (95%CI)	N(%)	OR (95%CI)	N(%)	OR (95%CI)	N(%)	OR (95%CI)
<b>Hypertension</b>														
No	134(23.1)	1.00	134(23.2)	1.00	217(37.5)	1.00	309(53.4)	1.00	403(68.7)	1.00	403(68.9)	1.00	386(66.1)	1.00
Yes	59(22.6)	1.03 (0.69-1.55)	56(21.4)	1.00 (0.67-1.50)	108(41.1)	1.00 (0.71-1.41)	133(51.0)	0.89 (0.64-1.24)	166(60.8)	0.69(0.49-0.97)	165(60.9)	0.74(0.52-1.04)	155(57.4)	0.71 (0.52-1.03)
<b>Diabetes</b>														
No	179(23.9)	1.00	169(22.6)	1.00	276(36.8)	1.00	395(52.7)	1.00	513(67.2)	1.00	514(67.6)	1.00	489(64.4)	1.00
Yes	12(13.5)	0.42 (0.21-0.85)	21(23.6)	1.14 (0.64-2.05)	48(52.7)	1.78* (1.09-2.90)	46(51.1)	0.89 (0.55-1.43)	52(55.9)	0.62(0.38-1.00)	50(54.3)	0.59(0.36-0.95)	49(53.3)	0.66 (0.41-1.07)
<b>High cholesterol</b>														
No	146(23.2)	1.00	153(24.4)	1.00	241(38.4)	1.00	333(53.1)	1.00	422(66.2)	1.00	427(67.2)	1.00	410(64.7)	1.00
Yes	46(22.1)	1.08 (0.69-1.69)	37(17.7)	0.64 (0.40-1.01)	83(39.7)	0.86 (0.59-1.26)	107(51.2)	0.93 (0.65-1.34)	142(65.7)	1.30 (0.89-1.91)	136(63.6)	1.13 (0.77-1.66)	127(59.3)	1.02 (0.70-1.48)
<b>Obesity</b>														
No	146(24.3)	1.00	138(23.0)	1.00	200(33.3)	1.00	315(52.2)	1.00	413(67.3)	1.00	409(66.8)	1.00	389(63.7)	1.00
Yes	47(19.7)	0.75 (0.50-1.13)	52(21.8)	0.96 (0.65-1.42)	125(52.1)	2.22* (1.60-3.06)	127(53.4)	1.08 (0.79-1.49)	155(63.3)	0.93 (0.67-1.29)	158(65.0)	1.08 (0.77-1.50)	152(62.6)	1.11 (0.80-1.54)
<b>Heart disease</b>														
No	171(23.1)	1.00	170(23.0)	1.00	291(39.4)	1.00	387(52.3)	1.00	503(66.5)	1.00	508(67.6)	1.00	485(64.6)	1.00
Yes	21(21.2)	0.82 (0.46-1.43)	20(20.2)	0.87 (0.50-1.53)	34(33.7)	0.66 (0.41-1.06)	56(56.0)	1.20 (0.76-1.88)	65(63.7)	0.98 (0.61-1.55)	59(57.8)	0.74 (0.47-1.16)	56(54.9)	0.75 (0.48-1.18)
<b>Smoking related problems</b>														
No	169(21.3)	1.00	172(21.7)	1.00	309(38.9)	1.00	415(52.3)	1.00	539(66.5)	1.00	539(66.9)	1.00	513(63.7)	1.00
Yes	24(55.8)	4.86* (2.30-10.25)	18(40.9)	1.93 (0.90-4.12)	16(35.6)	0.68 (0.32-1.47)	25(56.8)	1.35 (0.67-2.72)	27(58.7)	1.01 (0.49-2.08)	26(56.5)	1.02 (0.49-2.09)	26(56.5)	1.14 (0.56-2.34)
<b>Alcohol related problems</b>														
No	180(22.1)	1.00	178(21.9)	1.00	316(38.7)	1.00	430(52.8)	1.00	554(66.6)	1.00	554(66.9)	1.00	528(63.8)	1.00
Yes	13(56.5)	2.05 (0.75-5.61)	11(50.0)	2.82* (1.02-7.75)	9(42.9)	1.17 (0.41-3.34)	9(45.0)	0.59 (0.22-1.61)	11(50.0)	0.51 (0.19-1.36)	10(45.5)	0.42 (0.15-1.13)	10(45.5)	0.44 (0.16-1.20)

2 Note: Table represents number and proportion of respondents who would be willing to use (yes and maybe) pharmacy public health services within categories. Odds ratio (OR)  
3 of 1.00 indicates a reference category. \**P*-value < 0.05

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