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Different Methods of Early Identification of Risky Drinking: A Review of Clinical Signs

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Hazardous Drinking Concepts, Limits, and Methods: Low Levels of
Awareness, Knowledge, and Use in the Swedish Population

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Running head: Hazardous Drinking Concepts, Limits, and Methods

Abstract

Aims: To investigate awareness and knowledge of hazardous drinking limits among the general population in Sweden and the extent to which people estimate their alcohol consumption in standard drinks to assess their level of drinking.

Methods: A population-based study involving 6000 individuals selected from the total Swedish population was performed. Data were collected by means of a postal questionnaire. The mail survey response rate was 54.3% ($n=3200$) of the net sample of 5891 persons.

Results: With regard to drinking patterns, 10% of the respondents were abstainers, 59% were sensible drinkers, and 31% were classified as hazardous drinkers. Most of the abstainers (80%), sensible drinkers (64%), and hazardous drinkers (56%) stated that they had never heard about the standard drink method. Familiarity with the hazardous drinking concept also differed between the three categories although approximately 61% of sensible and hazardous drinkers expressed awareness of the concept (46% of the abstainers). Knowledge about the limits for sensible drinking was very poor. Between 94% and 97% in the three categories did not know the limit. There was a statistically significant association between having visited health care within the last 12 months and being aware of the standard drink method and the hazardous drinking concept, but not with knowing the hazardous drinking limits. Similarly, there was a significant association between having had at least one alcohol conversation in health care within the last 12 months and being aware of the standard drink method and the hazardous drinking concept, but not with knowing the hazardous drinking limits.

Conclusion: The results can be seen as a major challenge for the health care system and public health authorities because they imply that a large proportion of the Swedish population does not know when alcohol consumption becomes a threat to their health. The current strategy to disseminate knowledge about sensible drinking limits to the population through the health care system seems to have failed and new means of informing the population are warranted.

INTRODUCTION

In the last three decades, alcohol prevention has become a public health strategy, based on the assumption that most alcohol-related harm at the population level is attributable to the large group of hazardous and harmful drinkers who are at physical, psychological, or social risk from alcohol intake or are already experiencing harm, rather than individuals with severe alcohol-related problems or alcohol dependence. There has been a shift in attention from treating solely dependent drinkers to secondary prevention efforts targeting individuals at risk of alcohol-related harm (Babor and Higgins-Biddle, 2000).

The shift towards a broader view of the alcohol problem has led to an increased expectation for health care providers to become more actively involved in secondary prevention through working with drinkers whose alcohol consumption exceeds recommended levels and therefore at increased risk of physical, psychological, and social harm. In the past, the role of health care providers was to identify persons with alcohol dependence and refer them for specialized treatment. Today, these professionals are charged with the responsibility to identify and intervene with drinkers who are not seeking help for alcohol-related problems, but who may attend general health care settings for reasons related to their drinking (Fleming and Graham, 2001).

However, implementation of secondary prevention efforts in routine health care has been slow. Research has identified numerous barriers to addressing alcohol issues. Many studies have shown that health professionals believe that they lack the necessary skills and knowledge to recognize and respond to drinkers, are uncertain as to whether or to what extent drinking problems come within their responsibilities, and have inadequate resources, including insufficient training or support from their workplaces (Nilsen, 2010). Because of the perceived sensitivity of the alcohol issue, many health professionals find it difficult to bring up the topic of alcohol consumption with patients who are not seeking help for alcohol-related problems (Lock *et al.*, 2002; Aira *et al.*, 2003). Alcohol is widely considered to be socially accepted, which contributes to the difficulties of raising the issue (Thom and

Tellez, 1986; Roche and Richard, 1991; Weller *et al.*, 1992; Rush *et al.*, 1995; Johansson *et al.*, 2002).

Also, there is a lack of agreement among health professionals on the point at which drinking becomes a problem (Webster-Harrison *et al.*, 2001; Johansson *et al.*, 2002).

Health authorities in many countries have set upper limits for what constitutes “sensible” weekly alcohol consumption (the terms “safe”, “responsible”, “moderate” and “low-risk” consumption are also sometimes used). When these limits are exceeded, drinking is considered hazardous or harmful. In Sweden, the upper limit for weekly sensible drinking is 14 standard drinks for men and 9 for women (one standard drink is 12 grams of pure alcohol); drinking more than 14 drinks for men and more than 9 for women is defined as hazardous drinking in Sweden. The limits tend to differ somewhat between countries and cultures. The Swedish weekly limits are fairly similar to the UK limits where men are advised not to drink more than 21 units per week or 4 units on any one day (1 unit is 8 grams of pure alcohol) and women not more than 14 units per week or 3 units on any one day. On the same level as in Sweden the US men are recommended not to drink more than 14 standard drinks per week or 4 on any one day (1 unit is 14 grams of pure alcohol) and women not more than 7 standard drinks per week or 3 units on any one day. In Denmark the sensible limits are somewhat higher than elsewhere; 21 units for men and 14 for women, where each unit consist of 12 g alcohol (*Grønbaek et al.*, 2001). However these limits has been slightly modified during 2010 since a sentence was added to the recommendation about a low risk level at 14 units for men and 7 for women.

Countries also differ with regard to how and the extent to which sensible and hazardous drinking limits are promoted to the general public. Swedish health authorities have not undertaken any campaigns aimed at raising the awareness of hazardous drinking limits among the wider population. However, between 2005 and 2010 the government supported a nationwide continuing professional education initiative, the Risk Drinking Project, which targeted health professionals in primary health care and occupational health services, with the aim of improving their competence concerning hazardous drinking and achieving

increased alcohol intervention activity (Nilsen and Holmqvist, 2010). Information about sensible limits has been published by the Swedish National Institute of Public Health and efforts have been made to facilitate the use of these limits as guidelines for health professionals in patient counselling. Information is also available in leaflets provided to patients in health care waiting rooms. Hence, the Swedish health care system has been the primary channel of information about hazardous drinking limits. In contrast to Sweden, health authorities in Denmark and the United Kingdom have made considerable efforts to disseminate information about hazardous drinking limits through a variety of channels, including advertising campaigns and by publishing the limits on the labels or packaging of alcohol beverages (Grønbaek *et al.*, 2001; Heather, 2007). In Denmark 67% of the male and 47% of the females in the population were aware of the sensible drinking limit after having disseminated information yearly for 10 years in a public campaign (Grønbaek *et al.*, 2001).

Knowledge about the recommended drinking limits and use of the standard drink method to estimate drinking could be important for individuals to become aware of and control their own consumption. It would be difficult for people to stay within sensible drinking limits if the levels at which drinking becomes hazardous are not widely known to the general population. However, research into the awareness and knowledge of drinking limits appears to be very limited. A literature search of medical databases revealed very few previous studies on general public awareness or knowledge about sensible or hazardous drinking limits. The issue has not been studied in a Swedish context. The aim of the present study was to investigate familiarity with the hazardous drinking concept, knowledge about the Swedish hazardous drinking limits, and the awareness and use of the standard drink method to estimate the level of drinking among the Swedish population.

METHODS

Study design and population

A cross-sectional sample representative of the adult population aged 18–64 years registered in the Swedish total population register (administered by Statistics Sweden) was surveyed. This register contains information for every person living in Sweden. There were 5.6 million individuals aged 18–64 years in January 2010.

A random sample of 6000 individuals was drawn from the total population. All individuals had an equal chance of being selected. Nineteen persons were removed from the sample as they had emigrated or died after the sample was drawn, yielding a net sample of 5891 individuals.

Comparison with national data from Statistics Sweden showed that there were more women among the responders than expected (55.9% versus 49.2%; $p<0.001$). The responders were older than the target population ($p<0.001$). There were fewer responses than expected in the age group 16–29 years (20.5% versus 25.2%; $p<0.001$), more responders than expected in the age group >49 years (36.5% versus 31.2%; $p<0.001$); the response rate in the 30–49 years age group was as expected.

Data collection

Data were collected by means of a mail questionnaire sent in January 2010 to the nationally representative sample of 5891 individuals. Three reminders were sent between January and April 2010.

Following completion of the primary mail survey, a secondary follow-up survey was undertaken by telephone with a random sample of 385 individuals who did not respond to the mail questionnaire. These individuals answered a few questions concerning sociodemographic variables and alcohol consumption to allow for comparison with the responders to the primary survey.

Questionnaire

The entire questionnaire comprised 27 main questions concerning sociodemographics, alcohol consumption, strength of alcohol habit (*data not used in the analysis of the present paper*) drinking motives, motivation to change current drinking, health, quality of life, awareness and knowledge concerning risk drinking issues, faith in health care, attitudes and beliefs concerning alcohol-related consultations in health care. The questions had undergone testing in a Statistics Sweden laboratory that specializes in testing survey questionnaires. The questionnaire took approximately 10 minutes to complete.

Data concerning alcohol consumption was obtained from three drinking variables in accordance with the three-item AUDIT-C, a three-question alcohol screening instrument adapted from the original AUDIT developed by the World Health Organization for use in primary health care and similar settings (Aasland *et al.*, 2008): frequency of drinking, typical quantity of drinking, and frequency of heavy episodic drinking (HED) in the past 12 months. Respondents who identified themselves as abstainers to the question about frequency of drinking did not reply to any further questions about drinking.

Frequency of drinking was measured as follows: never; less often than monthly; approximately once a month; 2–3 times per month; 1–2 times per week; 3–4 times per week; and daily or almost every day. Typical quantity of drinking was measured as follows: 1–6 standard drinks (one response item per drink); 7–9 standard drinks; and 10 or more standard drinks. One Swedish standard drink equals 12 grams of pure alcohol. Responses regarding frequency and typical quantity of drinking were combined to calculate weekly consumption, according to a method suggested by Seppä *et al.* (1995), whereby drinking 1–2 times per week is counted as 2 times per week and a typical quantity of 6–7 standard drinks is counted as drinking 7 drinks, thus yielding a weekly consumption of 14 drinks for this person. HED was defined as consuming 4 drinks or more on one occasion for women and 5 drinks or more on one occasion for men. This standard is widely applied in the international literature (Dawson *et al.*, 2005; Reinert and Allen,

2007). Frequency of HED was categorized as follows: never; less often than monthly; approximately once a month; 2–3 times per month; 1–2 times per week; 3–4 times per week; and daily or almost every day.

Three categories of alcohol consumers were constructed on the basis of the answers to the three drinking variables: abstainers; sensible drinkers; and hazardous drinkers. Abstainers were those who answered that they did not drink alcohol in the past 12 months to the frequency of drinking question. Sensible drinkers drank alcohol in the past 12 months, but did not reach the hazardous level. Hazardous drinking was defined as having a weekly consumption of more than 9 drinks for women and more than 14 for men and/or engaging in HED once a month or more often. This composite hazardous drinking definition has been promoted by the Swedish National Institute of Public Health and is widely regarded as the official threshold for hazardous drinking in Sweden.

Three questions regarding awareness, knowledge, and limits for hazardous drinking were used: (1) awareness and use of the standard drink method; (2) familiarity with the hazardous drinking concept; and (3) knowledge about the hazardous drinking limits for women and men. The response alternatives for the first question, “Do you use the standard drink method to estimate your alcohol consumption?” were: “Yes”; “No, but I have heard about it”; and “No, I have never heard about it”. The response alternatives for the second question, “Are you familiar with the concept of hazardous drinking”, were “yes” or “no”. The third question required the respondent to state whether they knew the weekly limit for hazardous drinking (in standard drinks) for men and women by answering “yes” or “no”. Those who answered “yes”, were asked to state the number of standard drinks for men and women in free text. The responses were classified into three categories: “actually knows the limit” (answered “yes” and provided the correct number of weekly standard drinks for both men and women); “believes one knows the limit” (answered “yes”, but provided an incorrect number of weekly standard drinks for men or women); and “does not know” (answered “no” to the initial question). The correct number is more than 9 standard drinks per

week for women and more than 14 standard drinks per week for men. Answers of 9 and 10 standard drinks per week for women and 14 and 15 standard drinks per week for men were considered correct.

Those who drank at a hazardous level (according to the composite measure, as described above) and answered that they had never heard about the standard drink method and that they were not familiar with the hazardous drinking concept were labelled “unaware hazardous drinkers”, a category that was constructed to analyse how this group of people differed from all others (abstainers and sensible drinkers) in a multiple regression analysis. This group was analysed because it is an important target group for provision of information about the hazardous drinking concept and limits as well as the standard drink method.

Statistical analysis

The differences in age, sex, educational level, and alcohol consumption between the primary mail survey respondents and the secondary telephone survey respondents were analysed by cross-tabulation and statistical significance was assessed by chi-squared test.

The distribution of drinking pattern was estimated for different sociodemographic groups and previous alcohol discussion in health care (Table 1), and in relation to the respondents’ awareness and knowledge about sensible drinking issues (Table 2). Differences between groups were analysed with the chi-squared test.

Logistic regression was used to estimate the multivariate adjusted odds ratio of being an unaware hazardous drinker in different groups defined by sociodemographic characteristics and previous alcohol discussion in health care. The multivariate analyses included age, sex, country of birth, educational level, employment and marital status, children at home and previous alcohol discussion in health care. In the logistic regression, the overall interaction between sex together with the sociodemographic characteristics

and previous alcohol discussion in health care was statistically significant ($p=0.006$). Logistic regression models were therefore performed separately for men and women (Table 3).

Multivariate logistic regression analysis was conducted to assess the risk of having at least one health care visit in the last 12 months in relation to age, sex, and each of the predictors (awareness and use of the standard drink, familiarity with the hazardous drinking concept, and knowledge of hazardous drinking limits for men and women). This adjustment was performed in order to control for age and sex that might confound the predictors (Table 4).

A p -value $<5\%$ was considered to be statistically significant. The statistical analyses were performed with SPSS version 17.0 for Windows.

RESULTS

Response rates and comparison of respondents to the primary and secondary surveys

The response rate for the primary mail survey was 54.2% ($n=3200$) of the net sample of 5891 persons. The secondary telephone survey of non-responders to the mail survey achieved a response rate of 35.3% ($n=136$) of the net sample of 385 individuals. Refusal to participate was the most frequent reason for non-participation in the secondary survey (32.7%), followed by non-contacts (inability to reach the respondent; 28.8%), and illness, physical/mental problems or language problems of the respondent (3.1%).

In general, the secondary survey responders were younger ($p=0.001$) than those who responded to the primary survey, but the two groups did not differ with statistical significance ($p<0.05$) in terms of sex ($p=0.072$) or educational level ($p=0.166$). The secondary survey responders drank less frequently than the primary survey responders ($p<0.001$), but to a higher degree they consumed a larger typical quantity when they did drink ($p=0.018$). The two groups, responders to the mailed questionnaire and responders to the non-responder telephone interview, did not differ with statistical significance ($p<0.05$) on the proportions of the three drinking categories (abstainers, sensible drinkers, hazardous drinkers) ($p=0.161$) or the frequency of engaging in HED ($p=0.279$).

Characteristics of the three drinking categories

Table 1 presents the sociodemographic data for the respondents. Of the 3071 respondents, 55% were women and 45% were men. Eighty-eight percent were born in Sweden. Approximately half (48%) of the respondents had a secondary education, and 38% had a university degree. Seventy percent of the respondents were professionally employed and approximately 11% were students.

With regard to drinking patterns, 10% of the respondents were abstainers, 59% were sensible drinkers, and 31% were classified as hazardous drinkers, according to the composite hazardous drinking definition

described in the Methods section. The three drinking categories differed with statistical significance for all the sociodemographic variables.

About one-third of all three drinking categories had not visited health care in the last 12 months. A slightly larger proportion (14%) of hazardous drinkers than sensible drinkers (12%) had had a conversation about alcohol in health care in the last 12 months.

Awareness, knowledge, and use related to hazardous drinking issues

Table 2 provides information regarding the respondents' awareness, knowledge, and use of hazardous drinking issues. Awareness and use of the standard drink method differed between the abstainers, sensible drinkers and hazardous drinkers ($p < 0.001$). However, responses for sensible and hazardous drinkers were quite similar, with approximately 5–6% in both groups stating that they used the method. Most of the abstainers (80%), sensible drinkers (64%), and hazardous drinkers (56%) stated that they had never heard about the concept.

Familiarity with the hazardous drinking concept also differed between the three categories ($p < 0.001$) although approximately 61–62% of both sensible and hazardous drinkers expressed awareness of the concept (46% among the abstainers).

Knowledge about the limits for hazardous drinking was very poor among all three categories. Of the hazardous drinkers, 1.5% knew the hazardous drinking limit for men and 1.1% knew the corresponding limit for women. Between 94% and 97% in the three categories did not know the limit. Differences were not statistically significant for the limits for men ($p = 0.554$) or for women ($p = 0.325$).

Table 3 presents the results of a multivariate logistic regression, performed separately for men and women, for which odds ratios of being an unaware hazardous drinker (i.e. a hazardous drinker who has never heard about the standard drink method and is not familiar with the hazardous drinking concept) were computed. Few of the associations were statistically significant. However, it was three times more

likely that a woman aged 18–29 years compared with a woman aged 50–64 years (reference category) was an unaware hazardous drinker ($p=0.001$). For men of the same age, the corresponding odds ratio was 1.8 ($p=0.03$). A male student was less likely (OR 0.44; $p=0.03$) than a working male to be an unaware hazardous drinker. Similarly, a woman with children at home was less likely (OR 0.31; $p=0.001$) than a woman with no children at home to be an unaware hazardous drinker.

Table 4 shows the results of a multivariate logistic regression that examines the odds ratios of having at least one health care visit in the last 12 months in relation to awareness and use of the standard drink method, familiarity with the hazardous drinking concept, and knowledge of men's and women's hazardous drinking limits. According to the age and sex-adjusted model, those who had not visited health care in the past 12 months were more less likely to be aware of the standard drink method (neither using it nor having heard about it) than those who had visited health care during this period (OR 0.67; $p=0.03$).

A similar multivariate logistic regression as in Table 4 was computed to examine the odds ratios of having had at least one conversation about alcohol while visiting health care in the past 12 months in relation to awareness and use of the standard drink method, familiarity with the hazardous drinking concept, and knowledge of hazardous drinking limits for men and women. The age- and sex-adjusted model showed that it was less likely that those who had had such a conversation were ignorant of the standard drink method (OR 0.60; $p=0.03$) and were unfamiliar with the hazardous drinking concept (OR 0.70; $p=0.003$).

DISCUSSION

This study investigated familiarity with the hazardous drinking concept, knowledge about the Swedish hazardous drinking limits, and awareness and use of the standard drink method to estimate the level of drinking. Although the sample of participants was done randomly by the Statistics Sweden and furthermore we had fewer responders in the younger age group than expected, we still got a somewhat unexpected high percentage with hazardous drinking. The official National Statistics in most cases reveals a proportion on about 20 % for men and 12-15 % for women. However we defined heavy episodic drinking as 5 standard glasses or more for men and 4 or more for women whereas the official statistics define this as 6 or more for both men and women. This could partly explain the difference since the great majority of those who was classified as hazardous drinkers were drinking heavily episodic once a month or more often. Very few national research surveys has been performed in Sweden, but in our previous research in emergency departments were also found a high proportion (36%) with hazardous drinking using the same definition in this study (Trinks et al., 2010).

We found that awareness and use of the standard drink method was very low in the Swedish population. Only one-third of the sensible and hazardous drinkers had heard about the method, and not more than 6% of the hazardous drinkers actually used the method to estimate their drinking.

Men aged 18–29 years were more likely (than those aged 50–64 years) to be hazardous drinkers and be unaware of the standard drink method. On the other hand, being a male student (compared with a working male) showed an opposite relationship. Most universities in Sweden have had information campaigns in recent years to spread awareness and knowledge about the standard drink method. However, the same trend did not apply for female students, who did not stand out as being more knowledgeable than women with other employment. The 18–29 years age group comprised nearly one-third of the hazardous drinkers, which underscores the importance of offering alcohol interventions this age category. Unfortunately only raising the awareness about sensible drinking limits to this age group might not be enough to promote a change in drinking behaviour. This is supported in a small study in the UK among female university

students where a high level of awareness of sensible drinking limits was not found to influence drinking behavior. The study highlights the need to consider at least three vital factors before one could expect a change in drinking behavior; awareness of sensible drinking limits, understanding the content of the recommendation and willingness to respond to the message. In this case the students considered the message irrelevant for the drinking behaviour (Gill and O`May, 2006).

Since there has been no public campaign concerning sensible drinking limits most of the information about the standard drink method in Sweden likely comes from contacts with the health care system or from information provided in colleges or universities. Antenatal care in Sweden uses the AUDIT to assess the alcohol consumption of all pregnant women as a basis for a discussion about the health consequences of drinking during pregnancy. Considering that this routine is widely implemented across Sweden (Holmqvist, 2009), it was somewhat surprising that women aged 18–29 years were over-represented among the group of unaware hazardous drinkers.

The findings on familiarity with the concept of hazardous drinking were somewhat more positive than those regarding the awareness and use of the standard drink method. Approximately three-fifths of the sensible and hazardous drinkers stated that they were familiar with the concept, in contrast to less than half of the abstainers. However, knowledge was clearly lacking when it came to translating this somewhat abstract concept into hazardous drinking limits. Only about 1–2% of the sensible and hazardous drinkers knew the these limits although approximately 4% of these drinkers believed they knew the limits, i.e. they stated that they knew the limits but they could not provide the correct number of standard drinks (even allowing for slightly inaccurate answers; 9 and 10 standard drinks per week for women and 14 and 15 standard drinks per week for men were considered correct).

Most (94–95%) of the sensible and hazardous drinkers admitted that they did not know the limits. Thus, somewhat surprisingly it seems that the health care system has not had much of an effect on people's awareness of the standard drink method despite the large-scale Risk Drinking Project which

reached a significant proportion of health professionals in Swedish primary health care and occupational health services between 2005 and 2010 (Nilsen and Holmqvist, 2010). To the defence of the Risk Drinking Project, individuals who had visited health care within the last 12 month did demonstrate greater awareness of the standard drink method and familiarity with the hazardous drinking concept. In addition, patients who had had an alcohol conversation in health care in the past 12 months showed greater awareness and use of the standard drink method and familiarity with the hazardous drinking concept. Overall, however, the effect of the Risk Drinking Project on the population's awareness, knowledge and use of hazardous concepts, limits, and methods thus far appears to be modest.

Previous research

Previous efforts in Denmark have shown that it is possible to raise public awareness of hazardous drinking limits. After 10 years of systematic campaigns by health authorities during 1990–2000, 67% of the men and 47% of women were aware of hazardous drinking limits (Grønbaek *et al.*, 2001). In addition, hazardous drinkers were more knowledgeable about the limits than sensible drinkers and abstainers, showing that an important target group for the information had been reached. In a study from the United Kingdom (Gill and O'May, 2007), just under half of all participants did not know the hazardous drinking limits for their gender, with a somewhat higher proportion of correct answers for women than for men. Approximately 20% of the participants used the standard drink method to estimate their drinking. We have not been able to find investigations into these issues from any other countries.

A few previous studies have investigated knowledge among health professionals on recommended drinking limits. Primary health care physicians in a Finnish study by Aalto and Seppä (2007) stated levels that were generally lower than the recommended upper sensible limits for weekly drinking. A UK study (Webster-Harrison *et al.*, 2001) reported positive findings, as approximately half of the general practitioners and practice nurses correctly stated the official governmental hazardous drinking limits, and

the remaining 50% stated the lower level set earlier by the Royal College and the British Medical Association.

It is somewhat surprising that so few scientific studies have dealt with the issues investigated in this study, not least considering the amount of articles about brief alcohol interventions that rely on the standard drink method as a starting point for estimations of individuals' consumption. Researchers have been important agents of change in the move toward an increased emphasis on secondary alcohol prevention, but our study findings suggest that the general public is lagging far behind in terms of awareness, knowledge, and use of hazardous drinking concepts, limits, and methods, which might impede the effectiveness of a population approach to the alcohol problem. Sweden has chosen not to have a public information campaign as opposed to the UK and Denmark due to a fear of promoting an increase in consumption among individuals not exceeding the sensible limits. To this date no official sensible level of drinking has been disseminated to the general population but the health care service has been offered written material on sensible drinking limits to be used by staff from the National Institute of Public Health (Andersson AM et al., 2011). In some way this has been supported by many physicians that do not want to screen for hazardous drinking since they state that an exact level of sensible drinking limits is difficult to determine and varies from person to person (Reinholdz et al., 2011). However, quite recently a discussion has been initiated by the National Institute of Public Health in order to determine an official level of sensible drinking that probably will be promoted to the general population. However this still has to be decided upon. Our findings imply that educational initiatives on these issues should not only target health professionals but should also aim to raise awareness and increase knowledge among the wider public.

Limitations

The nature of this study involves a number of limitations that must be considered when interpreting the results. With a cross-sectional design, causal inferences are inherently problematic. A national survey

questionnaire filled in at home may lead to a higher willingness to disclose socially undesirable behaviours such as excessive alcohol consumption (Sudman, 2001).

Response bias must also be considered. Our response rate of 54% is similar to other population-based health- and alcohol-related mail surveys in Sweden on which official statistics on patterns of and trends in alcohol consumption are based. The group of responders differed somewhat from the target population (i.e. the 5.6 million people aged between 18 and 64 years in Sweden), with women and older people being over-represented and men and younger people being under-represented. The loss of younger men means that the estimates of alcohol consumption in our sample are low because this group generally has more detrimental drinking patterns than older women.

An attempt was made to assess potential differences between the primary mail survey responders and non-responders to the mail survey by conducting a secondary telephone-based survey among a number of non-responders to the questionnaire. The response rate to the secondary survey was quite low (35.3%), although it should be noted that as many as 28.8% could not be reached. Non-contacts have become a considerable problem in telephone surveys. The primary and secondary survey responders did not differ significantly in terms of the proportions of the three drinking categories (abstainers, sensible drinkers, and hazardous drinkers).

Conclusion

Although the standard drink method was introduced in Sweden some time ago as a tool for providing advice to patients seeking health care, only around 5% of the population uses the method and more than half of the population have never heard about it. Younger people aged between 18 and 29 years and, in particular, young women with hazardous drinking, are ignorant of the standard drink method. Very few know the recommended drinking limits in use in Sweden. These findings constitute a major challenge to the health care system and public health authorities because they show that a large proportion of the

Swedish population does not know when alcohol becomes a possible threat to their health. The current strategy to disseminate knowledge about sensible drinking limits to the population through the health care system seems to have failed and new means of informing the population are warranted.

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Table 1. Sociodemographic characteristics and health care visits of the respondents

Variables	Total no. (%)	No. of abstainers	No. of sensible drinkers	No. of hazardous drinkers	<i>p</i> -value (chi-squared test)
Sex	3071	318	1803	950	<0.001
Male	1392 (45.3)	106 (33.3)	737 (40.9)	549 (57.8)	
Female	1679 (54.7)	212 (66.7)	1066 (59.1)	401 (42.2)	
Age group (years)	3020	316	1769	935	<0.001
18–29	620 (20.5)	68 (21.5)	250 (14.1)	302 (32.3)	
30–39	600 (19.9)	71 (22.5)	382 (21.6)	147 (15.7)	
40–49	708 (23.4)	62 (19.6)	479 (27.1)	167 (17.9)	
50–64	1092 (36.2)	115 (36.4)	658 (37.2)	319 (34.1)	
Country of birth	3061	314	1799	948	<0.001
Sweden	2680 (87.6)	196 (62.4)	1616 (89.8)	868 (91.6)	
Other	381 (12.4)	118 (37.6)	183 (10.2)	80 (8.4)	
Educational level	3059	314	1799	946	<0.001
Primary education	422 (13.8)	74 (23.6)	220 (12.2)	128 (13.5)	
Secondary education	1480 (48.4)	149 (47.5)	819 (45.5)	512 (54.1)	
University	1157 (37.8)	91 (29.0)	760 (42.2)	306 (32.3)	
Employment	3019	307	1776	936	<0.001
Working	2114 (70.0)	127 (41.4)	1351 (76.1)	636 (67.9)	
Student	328 (10.9)	51 (16.6)	119 (6.7)	158 (16.9)	
Unemployed	174 (5.8)	27 (8.8)	98 (5.5)	49 (5.2)	
Sick-listed (<3 months)	50 (1.7)	11 (3.6)	30 (1.7)	9 (1.0)	
Retired	134 (4.4)	32 (10.4)	65 (3.7)	37 (4.0)	
Parental leave/sabbatical	93 (3.1)	35 (11.4)	51 (2.9)	7 (0.7)	
Other	126 (4.2)	24 (7.8)	62 (3.5)	40 (4.3)	
Marital status	3060	317	1800	943	<0.001
Married/cohabiting	2094 (68.4)	220 (69.4)	1325 (73.6)	549 (58.2)	
Living apart	188 (6.1)	14 (4.4)	86 (4.8)	88 (9.3)	
Single	778 (25.4)	83 (26.2)	389 (21.6)	306 (32.4)	

Variables	Total no. (%)	No. of abstainers	No. of sensible drinkers	No. of hazardous drinkers	<i>p</i> -value (chi-squared test)
Children at home	3055	317	1794	944	<0.001
Yes	1350 (44.2)	140 (44.2)	908 (50.6)	302 (32.0)	
No	1705 (55.8)	177 (55.8)	886 (49.4)	642 (68.0)	
Alcohol discussion in health care within the last 12 months	3014	304	1778	932	<0.001
Have not visited health care	1033 (34.3)	109 (35.9)	599 (33.7)	325 (34.9)	
Yes (have visited the health care and had a discussion about alcohol)	384 (12.7)	42 (13.8)	209 (11.8)	133 (14.3)	
No (have visited the health care but did not have a discussion about alcohol)	1597 (53.0)	153 (50.3)	970 (54.6)	474 (50.9)	

Table 2. The respondents' awareness and knowledge of sensible/hazardous drinking issues

Variables	Abstainers		Moderate drinkers		Hazardous drinkers		<i>p</i> -value (chi-squared test)
	n	%	n	%	n	%	
Awareness and use of the standard drink method (N=3012)	292	100	1782	100	938	100	<0.001
Uses it	1	0.3	95	5.3	58	6.2	
Does not use it, but have heard about it	58	19.9	546	30.6	356	38.0	
Does not use it, have never heard about it	233	79.8	1141	64.0	524	55.9	
Familiarity with the hazardous drinking concept (N=3023)	300	100	1785	100	938	100	<0.001
Yes	137	45.7	1104	61.8	570	60.8	
No	163	54.3	681	38.2	368	39.2	
Knowledge of hazardous drinking limit for men (N=2937)	293	100	1738	100	906	100	0.554
Actually knows the limit	2	0.7	25	1.4	14	1.5	
Believe they know the limit	8	2.7	69	4.0	29	3.2	
Does not know the limit	283	96.6	1644	94.6	863	95.3	
Knowledge of hazardous drinking limit for women (N=2948)	293	100	1747	100	908	100	0.325
Actually knows the limit	3	1.0	32	1.8	10	1.1	
Believe they know the limit	7	2.4	71	4.1	35	3.9	
Does not know the limit	283	96.6	1644	94.1	863	95.0	

Table 3. Multivariate logistic regression of being an unaware hazardous drinker^a for different sociodemographic variables and alcohol discussion in health care for men and women

Variables	Men (N=1296)				Women (N=1551)			
	n	OR ^b	95% CI	p value	n	OR ^b	95% CI	p value
Age group (years)								
50–64	476	1			537	1		
40–49	319	1.14	0.71–1.84	0.58	360	0.73	0.27–1.98	0.54
30–39	256	0.85	0.50–1.44	0.55	320	1.97	0.94–4.13	0.07
18–29	245	1.80	1.05–3.07	0.03	334	3.09	1.61–5.91	0.001
Country of birth								
Other	148	1			190	1		
Sweden	1148	0.95	0.55–1.62	0.84	1361	0.75	0.39–1.44	0.39
Educational level								
University	430	1			657	1		
Secondary education	681	1.44	0.97–2.14	0.07	698	1.10	0.66–1.85	0.71
Primary education	185	1.39	0.79–2.43	0.25	196	1.44	0.72–2.87	0.31
Employment								
Working	975	1			1033	1		
Student	122	0.44	0.22–0.91	0.03	183	1.08	0.58–1.98	0.82
Unemployed	75	0.95	0.48–1.89	0.89	91	1.00	0.42–2.36	1.00
Sick-listed (> 3 months)	17	0.36	0.05–2.82	0.33	28	0.00	–	1.00
Retired	50	1.49	0.67–3.29	0.33	69	1.36	0.49–3.76	0.56
Parental leave/sabbatical	5	0.00	–	1.00	84	0.28	0.04–2.25	0.23
Other	52	1.42	0.68–2.96	0.36	63	0.27	0.04–1.99	0.27
Marital status								
Married/cohabitating	875	1			1076	1		
Live apart	83	1.59	0.85–2.98	0.15	91	0.92	0.40–2.16	0.85
Single	338	1.32	0.87–2.03	0.20	384	1.07	0.65–1.76	0.80
Children at home								
No	728	1			843	1		

Variables	Men (N=1296)				Women (N=1551)			
	n	OR ^b	95% CI	p value	n	OR ^b	95% CI	p value
Yes	568	0.95	0.62–1.45	0.81	708	0.31	0.15–0.63	0.001
Alcohol discussion in health care within the last 12 months								
No	632	1			883	1		
Yes	154	1.29	0.78–2.13	0.33	210	1.05	0.53–2.06	0.89
Have not visited health care	510	0.91	0.63–1.30	0.59	458	0.98	0.60–1.60	0.93

CI, confidence interval; OR, odds ratio.

^aDefined as a hazardous drinker who had never heard about the standard drink method and was not familiar with the hazardous drinking concept.

^bORs are adjusted for all other variables in the table.

Table 4. Odds ratios of having at least one health care visit in the last 12 months in relation to awareness and use of the standard drink, familiarity with the hazardous drinking concept, and knowledge of hazardous drinking limits for men and women

Variables	Model 1 (crude)				Model 2 (age and sex adjusted)			
	n	OR	95% CI	<i>p</i> -value	n	OR	95% CI	<i>p</i> -value
Awareness and use of the standard drink method								
Uses it	163	1			158	1		
Does not use it, but have heard about it	994	0.75	0.52–1.09	0.13	978	0.77	0.53– 1.13	0.18
Does not use it, have never heard about it	1949	0.64	0.45–0.92	0.02	1906	0.67	0.47– 0.97	0.03
Familiarity with the hazardous drinking concept								
Yes	1866	1			1825	1		
No	1256	0.84	0.73–0.98	0.03	1232	0.88	0.76–1.03	0.11
Knowledge of men’s hazardous drinking limit								
Actually knows the limit	45	1			43	1		
Believe they know the limit	107	0.95	0.44–2.05	0.90	106	0.99	0.46–2.15	0.98
Does not know the limit	2880	0.77	0.40–1.47	0.43	2820	0.81	0.42–1.57	0.53
Knowledge of women’s hazardous drinking limit								
Actually knows the limit	48	1			47	1		
Believe they know the limit	115	1.01	0.47–2.15	0.99	113	1.04	0.49–2.24	0.92
Does not know the limit	2880	0.70	0.37–1.34	0.28	2820	0.75	0.39–1.44	0.39

CI, confidence interval; OR, odds ratio.