Self-Reported Alcohol Intake Using Two Different Question Formats in Southeastern New England

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Background. Quantitative measures of alcohol intake are not always available in population studies.

Method. The authors evaluated whether a question on alcohol intake embedded within a general health survey could be used as a surrogate marker for alcohol intake. We compared alcohol intake assessed with a food frequency questionnaire (FFQ) with alcohol intake assessed with a simple dichotomous survey question in a population-based sample.

Results. The study population consisted of 755 men and 1164 women from two communities in southeastern New England in the USA. There was strong agreement between the two alcohol questions for the classification of nondrinkers (98.1%). When participants were classified according to the quantity of alcohol consumed on the FFQ, the ability of the simple question to identify drinkers improved in a dose-response fashion. The Kappa statistic was 0.08 (P < 0.001), 0.38 (P< 0.001), and 0.81 (P < 0.001) for low, medium, and high consumers of alcohol, respectively.

Conclusions. These results suggest that the survey alcohol question provides a useful qualitative measure of categorizing nondrinkers and identifying drinkers who consume more than one drink per day. In population studies where quantitative measures of alcohol intake may not be available a survey alcohol question may prove useful when alcohol intake is likely to confound results, and adjustment of the data is needed.

Keywords: alcohol consumption, self-reports

Self-reports of alcohol consumption may underestimate actual alcohol intake.† Various methods have been used to assess self-reported alcohol intake including specific alcohol questionnaires, daily diet records of alcohol intake, and general dietary questionnaires.‡ Self-administered food-frequency questionnaires have also been used to assess alcohol consumption.§ King recently compared the use of a self-administered semiquantitative food frequency questionnaire (FFQ) with an alcohol questionnaire and found that reported alcohol consumption was higher on the FFQ.¶ She concluded that a food frequency questionnaire may be a better instrument for enhancing self-reporting of alcohol intake as opposed to a questionnaire specifically targeting alcohol use.¶

Quantitative measures of alcohol intake are not always available for participants in population-based surveys. There is some evidence that questions on alcohol consumption embedded within the context of general diet questionnaires may enhance self-reporting of alcohol intake.¶ We evaluated whether a simple dichotomous question on recent alcohol intake embedded within a general health survey could be used to categorize drinkers and nondrinkers in a population-based sample. We specifically compared the use of the survey question with the use of the FFQ in a population-based sample.

METHODS

The Pawtucket Heart Health Program (PHHP) and the survey methods have been described in detail previously.|| Since 1981, PHHP has conducted six biennial surveys in Pawtucket, RI and a similar comparison community. For the present analyses, data from surveys four (1987–1989), five (1989–1990), and six (1992–1993) were used.
Subjects
Of the 7060 individuals surveyed, 3202 were randomly selected to receive the FFQ. Of those chosen, 2053 (64%) completed the FFQ. Limited or inability to read or understand English (42%), no time to complete the FFQ (15%), difficulty in reading the FFQ because of print size or lack of understanding the questions (8%), or no specific reason (35%) led to 1149 individuals not completing the FFQ. A total of 134 individuals who had extremely high or low scores for total food energy or who had 10 or more missing questions on the FFQ were excluded because of probable errors in reporting dietary intakes. The final population consisted of 755 men and 1164 women.

Measures
FFQ. Alcohol consumption was quantified for each person using a self-administered FFQ developed by Willett.7 The subjects were asked how often, on average over the past year, they consumed each type of alcoholic beverage. There were nine possible responses for each beverage. The options ranged from 'never or less than once per month' to 'six or more times per day'. A weekly alcohol score was computed for each type of alcoholic beverage by summing the total number of drinks per week of each type of alcoholic beverage. Abstainers were classified as nondrinkers if they reported that they never drank (or drank alcohol less than once per month). Among people who drank, the number of 12 oz cans or bottles of beer per week, the number of 4 oz glasses of wine per week, and the number of drinks containing one drink or shot of liquor per week were tabulated separately. Subjects were classified by consumption of any beer, any wine, or any liquor. Drinkers were also classified based on the quantity of alcohol consumed: low consumption of alcohol included individuals who consumed between one drink per month and one drink per week, medium consumption of alcohol included individuals who consumed between two drinks per week and one drink per day, and high consumption of alcohol included individuals who consumed more than one drink per day.

Alcohol Survey Question. During the PHHP interview, before phlebotomy for cholesterol measurement, subjects were asked whether they 'had any alcohol to drink in the last 24 hours such as beer, wine, or any kind of liquor'.

Statistical Analyses
Data analyses were performed using the Statistical Analysis System8 and S-Plus.9 Chi-squared tests and test of differences of proportions were used to compare frequencies between the study participants and the participants not selected for the FFQ for categorical variables. Student's t-tests for independent samples were used to test differences between the groups for continuous variables. The Kappa statistic was used to measure agreement between the two alcohol questions.10 Using the guidelines of Fleiss,10 a Kappa statistic of 0.4 or more was used to indicate fair to good reproducibility.

RESULTS
The characteristics of the participants who completed the FFQ were compared to individuals who were not selected to receive the FFQ in order to determine whether bias resulted (Table 1). Neither male nor female study participants who completed the FFQ differed from individuals not selected to receive the FFQ with respect to percentage of individuals reporting alcohol consumption within the past 24 hours. Individuals who completed the FFQ were more likely to be younger, white and better educated compared to individuals not selected to receive the FFQ. Fewer male participants were current smokers compared to men not selected to receive the FFQ. In addition, more female participants were current smokers and had a lower BMI compared to women not selected to receive the FFQ.

Comparison between the FFQ and the PHHP survey alcohol question for nondrinkers and drinkers by alcoholic beverage categories is presented in Table 2. Among nondrinkers, there was strong agreement between the two alcohol questions (98.1%). Among drinkers, the strongest agreement was for individuals who consumed beer (42.6%) or liquor (44.6%). The Kappa statistic ranged from 0.28 (P < 0.001) for any alcohol to 0.44 (P < 0.001) for any alcohol or 0.44 (P < 0.001) for liquor.

Per cent agreement between the FFQ and the PHHP survey alcohol question by quantity of alcohol consumed is presented in Table 3. The Kappa statistic was 0.08 (P < 0.001), 0.38 (P < 0.001) and 0.81 (P < 0.001) for low, medium and high consumers of alcohol, respectively.

DISCUSSION
In the present study we compared the use of two different alcohol questions to assess alcohol consumption in a population-based sample from southeastern New England. The simple question identified nondrinkers with a high level of agreement. However, there was poor agreement between the PHHP survey alcohol question and the FFQ when people were classified as drinkers or nondrinkers of beer, wine, or liquor. The
agreement between the PHHP survey alcohol question and the FFQ was fair for consumption of liquor. When the FFQ was used to classify individuals according to quantity of alcohol consumed, the ability of the simple question to identify drinkers correctly was found to improve in a dose-response relationship. The survey question correctly identified only a small portion of drinkers with low and medium consumption of alcohol while it identified the majority of drinkers with high consumption of alcohol.

A limitation in interpreting the present study must be considered. The time reference used to ascertain alcohol consumption differed for the two alcohol questions and thus may have attenuated the results. The FFQ assessed alcohol consumption over a one-week period whereas the PHHP survey alcohol question ascertained alcohol consumption over the past 24 hours. Individuals whose alcohol intake was low or medium may consume alcohol irregularly and may not have consumed alcohol within 24 hours prior to being interviewed thus
Table 3: Per cent agreement between the semi-quantitative food frequency questionnaire and the PHHP survey alcohol question for nondrinkers and low, medium and high consumers of alcohol

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Nondrinkers</th>
<th>Drinkers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% agreement (No.)</td>
<td>Nondrinkers</td>
</tr>
<tr>
<td>Alcohol question</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Nondrinker</td>
<td>98.1c</td>
<td>91.5b</td>
</tr>
<tr>
<td>(673)</td>
<td>(387)</td>
<td>(335)</td>
</tr>
<tr>
<td>Drinker</td>
<td>9b</td>
<td>8.5c</td>
</tr>
<tr>
<td>(13)</td>
<td>(36)</td>
<td>(196)</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>(686)</td>
<td>(423)</td>
</tr>
</tbody>
</table>

*L = 1 drink/month to 1 drink/week; Medium = 2 drinks/week to 1 drink/day; High = >1 drinks/day.

*c Subjects for whom the two questions were discordant.

Any alcohol; Kappa statistic = 0.28 (P < 0.001); low; Kappa statistic = 0.08 (P < 0.001); medium: Kappa statistic = 0.38; High: Kappa statistic = 0.81 (P < 0.001).

Results suggest that in the absence of a detailed alcohol assessment, the PHHP survey alcohol question provides a useful qualitative measure to categorize nondrinkers and identify drinkers who consume more than one drink of alcohol per day. While the survey alcohol question is not useful to quantify alcohol consumption, it may be useful for statistical adjustment purposes in the absence of more precise measures. In population studies, where quantitative measures of alcohol intake may not be available, a survey alcohol question may prove useful when alcohol intake is likely to confound results, and adjustment of the data is needed.

Acknowledgements
This research was supported in part by Grant No. HL23629, The Pawtucket Heart Health Program, from the National Heart, Lung, and Blood Institute of the US Department of Health and Human Services.

References
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Lessening the agreement between the two alcohol questions. On the other hand, drinkers who consume large amounts of alcohol on a regular basis may have been more likely to have consumed alcohol within the 24 hours prior to being interviewed, resulting in better agreement between the two alcohol questions. This is consistent with our finding of the simple question's ability to detect heavy or regular drinkers. These results are in contrast with previous studies which have found that heavy drinkers tend to underreport their alcohol intakes more than light drinkers.1,12

Various methods have been used to validate self-reports of alcohol intake including the use of collateral reports (e.g. other individuals report on the drinking behaviour of the subject and their report is compared with the individual's self-report), diaries, various interviewing techniques, and laboratory tests.12,13 However, it has not been feasible to use most of these measures for the purpose of screening because of problems of timing and expense. For the current study, the survey alcohol question was a quick method to determine whether alcohol had been consumed within the past twenty-four hours. By using the simple question, it has been suggested that memory recall is enhanced as well as diminishing the subject's need to answer in a socially desirable manner.14

Our investigation was limited since we did not have more specific information to quantify consumption of alcohol for the total population. Nevertheless our...


*(Revised version received January 1996)*