

Determinants of Early Reductions in Drinking in Older At-Risk Drinkers Participating in the Intervention Arm of a Trial to Reduce At-Risk Drinking in Primary Care

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OBJECTIVES: To describe differences between older at-risk drinkers, as determined using the Comorbidity Alcohol Risk Evaluation Tool, who reduced drinking and those who did not after an initial intervention and to determine factors associated with early reductions in drinking.

DESIGN: Secondary analyses of data from a randomized controlled trial.

SETTING: Seven primary care sites.

PARTICIPANTS: Subjects randomized to the intervention group who completed the first health educator call approximately 2 weeks after enrollment (n = 239).

INTERVENTION: Personalized risk reports, booklets on alcohol-associated risks, and advice from physicians, followed by a health educator call.

MEASUREMENTS: Reductions in number of alcoholic drinks.

RESULTS: Thirty-nine percent of the sample had reduced drinking within 2 weeks of receiving the initial intervention. According to the final multiple logistic regression model, those who were concerned about alcohol-related risks (odds ratio (OR) = 2.03, 95% confidence interval (CI) = 1.01–4.07), read through the educational booklet (OR = 2.97, 95% CI = 1.48–5.95), or perceived that their physicians discussed risks and advised changing drinking behaviors (OR = 4.1, 95% CI = 2.02–8.32) had greater odds of reducing drinking by the first health educator call.

CONCLUSION: Concern about risks, reading educational material, and perception of physicians providing advice to reduce drinking were associated with early reductions in

alcohol use in older at-risk drinkers. Understanding these factors will enable development of better intervention strategies to reduce unhealthy alcohol use. *J Am Geriatr Soc* 58:227–233, 2010.

Key words: alcohol; physician advice; at-risk drinking

Excessive alcohol consumption is a costly public health problem and is a growing concern in older adults in the United States.^{1,2} The National Institute on Alcohol Abuse and Alcoholism (NIAAA) defines at-risk alcohol use as drinking more than four drinks on any occasions or more than 14 drinks per week for men younger than 65 and more than three drinks on any occasions or more than seven drinks per week for women and men aged 65 and older.³ In one study conducted in primary care, 7.9% of older adults were found to drink in excess of the NIAAA guidelines.⁴ However, amount of alcohol use alone may not adequately describe potentially harmful drinking in older persons.⁵ Because of physiological changes that increase alcohol's effects,⁶ as well as more comorbidities and greater use of medications, even small quantities of alcohol have the potential to increase adverse outcomes in older adults.^{4–9} In a population-based sample, approximately 10% of older adults were classified as at-risk drinkers using a paradigm that takes into consideration not only how much alcohol is consumed, but also what comorbidities are present and what medications are used, and such drinking was associated with greater risk for mortality.¹⁰ The 2000 U.S. Census estimated that adults aged 65 and older will increase to more than 71 million persons and constitute 19.6% of the population by 2030.¹¹ Therefore, the magnitude of health consequences associated with unhealthy alcohol use in older persons is likely to grow as the number of older adults increases in the population.

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Characteristics that have been associated with less alcohol consumption in adults include female sex, older age, greater social support, and greater readiness to change.^{9,12–14} Some studies have found that adults of all ages who drink more alcohol and have more problems associated with drinking are more likely to seek help and express motivation to change,^{13,15,16} although one study of older problem drinkers found that those with lower alcohol use and fewer alcohol-related problems were more successful in reducing alcohol use.¹⁷ These conflicting data, as well as studies finding that different treatment modalities for reducing alcohol use often resulted in similar outcomes,^{18,19} suggest that factors affecting change are not well understood and may vary according to age group.²⁰

A better understanding of factors associated with reductions in drinking in older at-risk drinkers may enable development of better intervention strategies. To explore factors associated with early reductions in drinking, this study examined data from participants in the intervention arm of a randomized trial, the Healthy Living As You Age (HLAYA) Study, that was designed to test the efficacy of an intervention to reduce at-risk drinking in older adults in primary care settings.

METHODS

HLAYA Study

The HLAYA Study was a 12-month randomized, controlled clinical trial to determine whether screening and brief intervention targeted to at-risk older drinkers in primary care settings were efficacious in reducing at-risk drinking. Adults aged 55 and older in seven participating primary care sites were screened using the Comorbidity Alcohol Risk Evaluation Tool, derived from the Alcohol-Related Problems Survey.^{21,22} Individuals were identified as at-risk drinkers for seven possible types of risks: amount of alcohol use, driving after drinking, binge drinking, someone being concerned about their drinking, interaction between alcohol and medications, symptoms, and comorbidities. Participants' risk scores could range from 1 to 7. Before subject enrollment, one of the study investigators provided participating physicians with 30 minutes of instruction on how to provide brief advice to reduce drinking modeled after NIAAA's "Helping Patients Who Drink Too Much: A Clinician's Guide."²³ Physicians were asked to indicate whether they gave advice on a study form after seeing each of their patients assigned to the intervention arm of the study.

In total, 310 older at-risk drinkers were randomized to the intervention group. At baseline, which occurred at the time of a regularly scheduled visit with their physicians, subjects completed questionnaires with items on sociodemographic, health-related, and alcohol consumption characteristics. They received a booklet about alcohol and aging; a report containing personalized feedback about their risks associated with alcohol use; advice from their physicians; and approximately 2 weeks after the initial visit, the first of up to three telephone calls from a health educator. The health educator reviewed drinking behaviors, discussed particular risks associated with drinking, and facilitated behavioral change to reduce at-risk drinking.

During the call, the health educator also determined whether the subject had already reduced the amount of drinking from baseline.

Study Sample

The study sample consisted of subjects in the intervention arm who completed the first health educator call ($n = 239$, 77.1% of intervention group subjects). The sample was divided into two groups according to whether they had reduced their drinking ($n = 93$, 38.9% of study sample) or not ($n = 146$, 61.1% of study sample) as assessed at the first call.

Sociodemographic and Health-Related Variables

Sociodemographic variables examined included age, sex, race (non-Hispanic white vs other), living situation (with someone vs alone), education (\leq high school vs $>$ high school), annual income (\leq \$50,000 vs $>$ \$50,000), and occupation (retired vs not retired). Health-related variables included self-perceived current health (poor or fair vs good, very good, or excellent), and ability to do strenuous and heavy work (yes vs no).

Alcohol-Related Variables

Baseline questionnaires and first health educator call data were used to extract alcohol-related characteristics. Variables from the baseline questionnaires included average number of alcoholic drinks consumed per week, frequency of alcohol use (daily vs nondaily), number of baseline risks (range 1–7), and types of alcohol-related risks. Variables from the health educator call data included attempts to cut down on drinking before enrollment (yes vs no).

Intervention-Related Variables

Intervention-related variables were collected during the health educator calls. All questions had yes or no responses. Subjects were asked whether they were aware of their risks before receiving the personalized risk report, whether they were concerned about their risks, and whether they read through the educational booklet given to them at baseline. In addition, subjects were asked whether their physicians had discussed alcohol-related risks and advised any change in drinking behavior during the baseline visit.

Statistical Analyses

Sociodemographic and health-related characteristics for the entire intervention sample were described using means and standard deviations for continuous variables and number of respondents and percentages for categorical variables. Bivariate analyses were used to determine whether there were differences in sociodemographic, health-related, alcohol-related, and intervention-related characteristics between those who had reduced drinking and those who had not at the time of the first health educator call. The chi-square test was used to test for differences between categorical variables, and the *t*-test was used for continuous variables. To determine the extent of agreement between physicians and subjects about whether advice was given to reduce or to abstain from drinking during the baseline clinic visits,

Table 1. Baseline Sociodemographic and Health-Related Characteristics of Intervention Sample Who Received a Health Educator Call (n = 239)

Characteristic	Individuals Who Had Reduced Drinking by First Call (n = 93)	Individuals Who Had Not Reduced Drinking by First Call (n = 146)	P-Value
Age, mean \pm standard deviation	69.0 \pm 7.5	68.4 \pm 6.0	.54
Sex, n (%)			.92
Male	67 (72)	106 (72.6)	
Female	26 (28)	40 (27.4)	
Race or ethnicity, n (%)			.005
Non-Hispanic white	72 (78.3)	133 (91.1)	
Hispanic or nonwhite	20 (21.7)	13 (8.9)	
Living situation, n (%)			.08
With spouse or others	74 (79.6)	101 (69.2)	
Alone	19 (20.4)	45 (30.8)	
Education, n (%)			.046
Up to high school	29 (31.2)	29 (19.9)	
More than high school	64 (68.8)	117 (80.1)	
Income, \$, n (%) (n = 180)			.81
< 50,000	41 (56.2)	62 (57.9)	
\geq 50,000	32 (43.8)	45 (42.1)	
Employment status, n (%)			.65
Working	26 (28)	37 (25.3)	
Retired or homemaker	67 (72)	109 (74.7)	
Self-rated health status, n (%)			< .001
Poor or fair	18 (19.4)	6 (4.11)	
Good, very good, or excellent	75 (80.7)	140 (95.9)	
Able to do strenuous and heavy work, n (%)	62 (66.7)	110 (75.3)	.15

patients' reports obtained during the telephone calls and physicians' reports were compared.

Odds ratios and 95% confidence intervals (CIs), derived from multiple logistic regression analyses, were used to study associations between sociodemographic, alcohol-related, and intervention-related factors and reduction or no reduction in drinking at the time of the health educator call. Income was not included in the final logistic regression model because data were missing for a substantial number of subjects (n = 59, 24.7% of sample), although bivariate analyses did not find a significant difference in income between participants who had and had not reduced their drinking ($P = .81$). Preliminary analyses showed that estimations derived from a full model, which included all the variables used in the bivariate analyses (except income), did not differ significantly from estimations derived from a reduced model, which included only variables found to be statistically significant in the bivariate analyses. Therefore, to arrive at a parsimonious model, the reduced model was chosen as the final multiple logistic regression model. The Hosmer-Lemeshow test was computed for the goodness-of-fit statistic.²⁴ The final logistic regression model was used to calculate predicted outcomes for the entire sample, which allowed the magnitude of effects to be shown using simple percentages. All analyses were conducted using SAS version 9.1 (SAS Institute, Inc., Cary, NC) and Stata/SE version 10.1 (Stata Corp., College Station, TX).

RESULTS

Sample Sociodemographic and Health-Related Characteristics

Two hundred thirty-nine people in the intervention group completed the first health educator call. Their average age was 68.7 ± 6.6 , 72.4% were male, and 86.1% were non-Hispanic white; 90% of subjects rated their health status as good, very good, or excellent. At baseline, 68.2% of these older drinkers drank daily, and the average number of alcoholic beverages consumed per week was 15.5 ± 7.4 drinks. The average number of baseline risks was 2.9 ± 1.7 .

At the time of the first health educator call, which occurred 2 weeks after enrollment, 93 individuals (38.9% of the intervention group who completed the first telephone call) had already reduced drinking from their baseline report. Bivariate analyses comparing sociodemographic characteristics showed that at-risk drinkers who reduced drinking were more likely to be Hispanic or nonwhite, have lower levels of education, and have worse self-rated health status than individuals who had not reduced drinking. There were no significant differences in sex, living situation, income, retirement status, or ability to do strenuous and heavy work (Table 1).

Sample Alcohol-Related Characteristics

As shown in Table 2, there were statistically significant differences in baseline alcohol-related factors between the two

Table 2. Baseline Alcohol-Related Characteristics of Intervention Sample Who Received a Health Educator Call (n = 239)

Characteristic	Individuals Who Had Reduced Drinking by First Call (n = 93)	Individuals Who Had Not Reduced Drinking by First Call (n = 146)	P-Value
Average number of alcoholic drinks per week, mean \pm SD	13.4 \pm 7.9	16.8 \pm 6.7	<.001
Frequency of use, n (%)			.03
Daily	56 (60.2)	107 (73.3)	
Not daily	37 (39.8)	39 (26.7)	
Previous attempts to reduce drinking, n (%) (n = 234)	47 (52.8)	97 (66.9)	.03
Type of risk, n (%)			
Amount of alcohol	36 (38.7)	80 (54.8)	.01
Disease and alcohol	42 (45.2)	77 (52.7)	.25
Symptoms and alcohol	51 (54.8)	92 (63)	.20
Medication and alcohol	61 (65.6)	109 (74.7)	.13
Binge drinking	18 (19.4)	41 (28)	.12
Others concerned	12 (12.9)	26 (17.8)	.31
Drink and drive	23 (24.7)	31 (21.2)	.52
Average number of risks at baseline, mean \pm SD	2.6 \pm 1.5	3.2 \pm 1.7	.01

SD = standard deviation.

groups. Those who reduced drinking consumed less alcohol, drank less frequently, had fewer baseline risks, and were less likely to have previously attempted to cut down on drinking. In terms of specific alcohol-related risks, individuals who reduced drinking were less likely to be at risk because of amount of alcohol use alone (Table 2).

Sample Intervention-Related Characteristics

At-risk older drinkers who reduced drinking by the first call were less aware of their alcohol-related risks before receiving the personalized risk report and expressed more concern about risks after learning about them. They were more likely to report having read through the educational booklet. Furthermore, individuals who reduced drinking were more likely to report that their physicians discussed alcohol-related risks and advised changing their drinking behavior (Table 3).

Agreement Between Physicians' and Subjects' Reports

Comparing data from physicians' reports and data from health educator calls, agreement between physicians and subjects about whether advice was given occurred in 60.5% of the cases ($\kappa = 0.04$, 95% CI = -0.07 to 0.15). Of

the agreements, 125 cases agreed on giving and receiving advice, and 16 cases agreed on not giving and not receiving advice. Seventy people reported that advice was not provided when their physicians indicated that advice was given. Conversely, physicians did not report giving advice to 38 subjects, and of those, 22 subjects reported receiving advice.

Multivariate Analyses Predicting Early Reductions in Number of Alcoholic Drinks

In the multivariate regression model, the odds of reducing alcohol use by the time of the first call were twice as great for individuals who were concerned about alcohol-related risks after receiving feedback, almost three times as great for individuals who read through the alcohol educational booklet, and four times as great for individuals who perceived that their physicians discussed alcohol-related risks and advised changing drinking behavior (Table 4). Race, education, self-rated health status, amount and frequency of alcohol use, and number of risks were not significantly associated with the odds of having reduced or not reduced drinking by the first call.

Table 3. Intervention-Related Characteristics of Intervention Sample Who Received a Health Educator Call (n = 239)

Characteristic	n (%)		P-Value
	Individuals Who Had Reduced Drinking by First Call (n = 93)	Individuals Who Had Not Reduced Drinking by First Call (n = 146)	
Aware of risk before intervention (n = 229)	59 (67.8)	114 (80.3)	.03
Concern about risk after receiving information (n = 229)	51 (58)	51 (36.2)	.001
Read through booklet	56 (65.9)	56 (41.2)	<.001
Reported that physician discussed risks and advised changes (n = 228)	63 (70.0)	51 (37.0)	<.001

Table 4. Multiply Adjusted Logistic Regression Model Predicting Early Reductions in Alcohol Consumption (n = 202)

Characteristic	Odds Ratio (95% Confidence Interval)	P-Value
Non-Hispanic white	0.87 (0.29–2.63)	.81
Living with partner or spouse	1.33 (0.61–2.90)	.47
More than high school education	0.77 (0.35–1.72)	.52
Number of alcoholic drinks per week	0.97 (0.91–1.04)	.39
Daily use of alcohol	1.02 (0.44–2.36)	.96
Attempt to quit in past	0.68 (0.34–1.36)	.28
Risk score at baseline	0.89 (0.69–1.15)	.37
Good, very good, or excellent self-rated health	0.30 (0.07–1.21)	.09
Being aware of risk before intervention	0.58 (0.25–1.32)	.19
Concerned about risk	2.03 (1.01–4.07)	.045
Read through educational booklet	2.97 (1.48–5.95)	.002
Reported that physician both discussed risks and advised change	4.10 (2.02–8.32)	<.001

Hosmer-Lemeshow test: $P = .23$.

According to the final multiple logistic model, if all individuals in this sample perceived that their physicians discussed risks and advised change, 50.7% of these at-risk older drinkers would be predicted to have reduced drinking by the time of the first health educator call. Alternatively, if none of the subjects perceived that their physicians were involved in the process, only 24.6% would be predicted to have reduced drinking. Therefore, according to the final model, an individual's perception of physician involvement was predicted to increase the number of older drinkers who reduced alcohol use approximately 2 weeks after enrollment by 26.1 percentage points.

DISCUSSION

Thirty-nine percent of the older at-risk drinkers in the intervention arm of this clinical trial had already reduced their drinking approximately 2 weeks after enrollment at the time of the first health educator call. Before the call, individuals in the intervention group had received personalized reports; visits with their physicians, who were trained to give advice to reduce drinking; and educational booklets on alcohol and aging. At the time of the first telephone call, older at-risk drinkers who had already reduced drinking were more concerned about their risk status and more likely to have read through the educational booklet than those who had not reduced drinking.

Other studies have found that problem drinkers often identify their own determination and commitment as major factors leading to eventual reduction of alcohol use.^{25,26} Being more concerned about alcohol-related risks and spending time to read through the booklet suggest higher intrinsic motivation and determination to change. The current study found that the strongest influence on early reduction in drinking was drinkers' perceptions of whether their physicians discussed the risks of and advised changes in their drinking behavior. Other studies of behavioral

change also found that providers can play an important role. One study found that brief physician advice in community-based primary care settings decreased alcohol use and health resource utilization in problem alcohol drinkers.²⁷ In smoking cessation, physician advice was associated with greater readiness to quit, especially if providers emphasized the negative health consequences associated with the risky behavior.²⁸

The stages-of-change model, which describes motivational states in individuals, is a framework often used in the field of addiction and behavioral change. Stages of change represents a dimension of the transtheoretical model of intentional behavior change and consists of five stages: precontemplation, contemplation, preparation, action, and maintenance.^{14,29,30} Applying this framework, 39% of older at-risk drinkers in this study can be classified in the action phase, because they have already taken steps to reduce drinking. An individual's stage of change is an important intermediary, because studies have found that the amount of progress and successful outcome after treatment is closely linked with stage of change.^{14,31} Understanding determinants that promote reaching the action phase can lead to more successful reductions in risky behavior.

Studies have identified factors, such as older age, having a partner, and experiences with specific alcohol-related adverse consequences, that were associated with higher readiness to change.¹³ The analyses in the current study did not find a significant association between age or living situation and early reductions in drinking in older at-risk drinkers. Others have also found that acute health problems and stress from health-related problems were linked with successful remission in problem drinkers¹⁷ and that emphasizing negative health consequences of the undesirable behavior can be an effective strategy to increase an individual's readiness to quit.²⁸ The current study found that worse self-rated health status was associated with early reduction in drinking in bivariate analyses, but this relationship did not remain significant after controlling for other covariates in the multivariate model.

The relationship between the amount and severity of problems associated with alcohol use and eventual successful reduction in drinking behavior is less certain in the literature. Some studies have suggested that individuals with heavy alcohol consumption and more alcohol-associated problems are more likely to engage in alcohol-related discussion and express higher motivation to seek help.^{13,15,16} Conversely, others have found that those with lower alcohol use and fewer alcohol-related problems are more likely to express intention to change heavy drinking and to achieve remission.^{12,17} The current study found that older at-risk drinkers who reduced drinking drank less alcohol and drank less frequently in the bivariate analyses, although the association between baseline alcohol quantity and frequency and early reductions in drinking behavior did not remain significant in the multivariate model, possibly because these older at-risk drinkers consumed less alcohol, even at baseline, than drinkers in other studies of problem drinking. This lower baseline consumption can make it more difficult to detect a statistically significant difference between groups.

Discordance was observed between many individuals' perceptions of whether physicians delivered advice and

physicians' reports of whether they provided alcohol-related advice. Patients' perceptions of physician involvement was found to be the most important predictor of early change. The disagreement between the two sources suggests a possible gap in communication between providers and patients. A study evaluating interaction between providers and patients who screened positive for risky drinking in a primary care setting found that physicians often asked questions and gave information regarding risk of alcohol use, but few provided additional advice or gave supportive statements.¹⁶ Important elements of effective brief intervention, such as providing explicit advice to change drinking and discussing ambivalence toward change, did not occur during those clinic visits.¹⁶ The patient-physician interaction was not monitored in this study, but it is possible that missing elements of effective intervention could have led to a finding of disagreement between individual's recall and physician's documentation of advice giving. Further research would be useful to determine whether there are methods to improve physician delivery of alcohol-related intervention and whether better communication between providers and at-risk drinkers can lead to more-successful outcomes in reducing alcohol misuse.

There are several limitations of this study. Information regarding reduction in drinking was obtained from patients' own reports during the health educator call. Use of self-report could result in reporting bias and possibly overestimate the number of at-risk drinkers who reduced alcohol use. Also, not every subject in the intervention arm completed the first health educator call. This could bias the result if drinkers with missing information were different from drinkers who completed the telephone call, although comparisons of sociodemographic and alcohol-related factors from these two groups did not reveal significant differences between them. The patient-physician interaction was not monitored during the baseline visit, and therefore the quality of their communication at that visit cannot be assessed. Furthermore, the sample consisted mainly of non-Hispanic white men, and findings may need to be replicated in more-diverse groups of older adults for further generalization.

In conclusion, this study found that early reduction in drinking was common in older at-risk drinkers who received written and oral information and physician advice. Furthermore, subjects' concern about drinking and perception that their physicians had recommended cutting down on drinking were associated with early reduction in amount of alcohol use. Those who had more alcohol-related problems and had made previous attempts to reduce alcohol use were less likely to have made early reductions in alcohol use. These individuals may need additional counseling to reduce drinking. The findings from this study help to explain factors associated with reductions in alcohol consumption in older at-risk drinkers. The findings also provide the first data regarding determinants associated with reductions in alcohol use in older drinkers identified as at-risk drinkers not only because of the amount they drink, but also considering their comorbidities and medication use that may increase alcohol-related risks. This study adds to the existing literature suggesting that advice from a healthcare provider is a powerful motivator to reduce risky drinking.

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