

Perceived Health Status, Alcohol-Related Problems, and Readiness to Change Among Medically Hospitalized, Alcohol-Dependent Patients

Scott H. Stewart, MD, MS¹
Gerard J. Connors, PhD²

¹Center for Drug and Alcohol Programs, Department of Psychiatry, and Division of General Internal Medicine, Department of Medicine, Medical University of South Carolina, Charleston, South Carolina

²Research Institute on Addictions, University at Buffalo, State University of New York, Buffalo, New York

OBJECTIVE: Alcohol dependence is prevalent among medically hospitalized patients, and acute illness has the potential to increase motivation to change and provide a therapeutic window for treatment of alcohol dependence. This study evaluated the correlations of readiness to change drinking behavior with perceived physical and mental health status and specific alcohol-related consequences of medical inpatients.

DESIGN AND MEASUREMENTS: The study was a cross-sectional survey of 50 clinically recognized and subsequently confirmed alcohol-dependent patients admitted to general internal medicine teaching services with no evidence of chronic cognitive functional deficits. We estimated correlations of process-of-change variables (problem recognition, ambivalence about change, and taking steps to change drinking) with measures of patient perception of general physical and mental health status and self-reported alcohol-related consequences.

RESULTS: Problem recognition ($r = -0.31$, $P = .028$) and ambivalence about change ($r = -0.41$, $P = .003$), but not taking steps to change drinking ($r = -0.26$, $P = .072$) were significantly associated with perceived physical health. Perceived mental health was not associated with these variables, but greater alcohol-specific consequences were typically associated with greater recognition, ambivalence, and intent to change.

CONCLUSIONS: Among alcohol-dependent patients with acute medical illness requiring hospitalization, poorer perceived health status was associated with increased recognition of drinking problems and thoughts about changing drinking behavior. Future research should evaluate if problem recognition and ambivalence modify treatment involvement and outcomes following hospitalization and if hospital-based interventions designed to link medical conditions and their treatment to alcohol dependence enhance recognition and ambivalence. *Journal of Hospital Medicine* 2007;2:372–377. © 2007 Society of Hospital Medicine.

KEYWORDS: alcoholism, inpatient, health behavior

Alcohol dependence is commonly associated with severe medical disease¹ and is common among hospitalized medical patients. A nationally representative hospital sample found current alcohol use disorders to have a prevalence of 7.4%; most of those with these disorders were alcohol dependent.² However, depending on the communities served by specific hospitals, prevalence can be much higher among medical inpatients,^{2–5} with studies finding problem drinking in as many as 28% of such patients. Although heavy drinking and the psychosocial problems that characterize alcohol dependence cause disease and interfere with disease management, remission is often difficult to achieve. As a

Supported in part by a Career Development Award from the National Institute on Alcohol Abuse and Alcoholism (K23AA014188).

result, although inpatient care of such patients probably does not differ from the average,⁶ this population is at high risk for poor health outcomes, as illustrated by factors such as suboptimal chronic disease management,⁷ preventable hospitalization,⁸ and increased mortality.^{9,10} Remission involves a major behavior change that has been conceived of as a progression of stages, including precontemplation, contemplation, preparation, action, and maintenance.¹¹ Clinically, this process encompasses an initial lack of awareness of the problem, followed by problem recognition and ambivalence about change, an increasing desire to change and concrete attempts at behavior change, and eventually long-lasting behavioral improvements. The work described in this article was based on the broad hypothesis that acute illness and other alcohol-related consequences will accelerate the process of change and that it might be possible to utilize this effect of acute illness to improve treatment outcomes for medically ill, alcohol-dependent patients. If so, then measures of the change process should be correlated with measures of health status and alcohol consequences, correlations that were estimated in this study. If such measures are correlated and future research supports a causal relationship, then the link between illness and desire to change at the time of hospitalization could be exploited to help motivate changes in drinking and involvement in alcohol dependence treatment following hospital discharge.

METHODS

Study Design and Patients

Fifty clinically suspected and subsequently confirmed medical inpatients with current alcohol dependence were surveyed. Exclusion criteria were having chronic cognitive impairment, determined clinically; being non-English speaking, and living in an institutional setting prior to hospitalization. Patients with suspected alcohol dependence were consecutively identified through consultation with attending internists, senior residents, and nurse case managers staffing internal medicine inpatient services of a university-affiliated public hospital. Patients were identified by these hospitalist teams on the basis of their usual clinical care during the admission and acute care process. Thus, they were identified by characteristics such as alcohol-related disease, self-reported heavy drinking, abnormalities in laboratory test results such as transaminases and MCV, intoxication and withdrawal, or known his-

tory of dependence. However, the method of identification was not specifically tracked. Research staffers approached such patients to request participation in and obtain informed consent for participation in a survey of inpatients with acute medical conditions and possible drinking problems. Those who provided informed consent were interviewed by a member of the research team for DSM-IV current alcohol dependence¹² using a brief assessment instrument that covered all 7 dependence criteria. Patients who met 3 or more criteria during the past year were considered alcohol dependent and were asked to complete additional surveys. The study protocol was approved by the appropriate university institutional review board and by the director of research at the medical center.

Process of Change Variables

The Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES) was developed to capture certain key elements of the process of change in persons with alcohol dependence, including recognition of the drinking problem, ambivalence about change, and planning or initiating changes to alter drinking behavior.¹³ The SOCRATES is a 19-item instrument consisting of 3 scales (Recognition, Ambivalence, and Taking Steps). Each scale score is the sum of several items, with all items having 5 ordinal responses ranging from strongly disagree to strongly agree. The Recognition scale is composed of 7 items (score range 7-35) that estimate an individual's recognition of his or her alcohol use as an important problem, desire to change, and perception of harm related to drinking. The Ambivalence scale contains 4 items (score range 4-20) that ask respondents if they wonder if they are alcoholic, drink too much, are hurting others, and are in control of their drinking. Degree of wondering (as opposed to knowing) about such issues is considered a reflection of uncertainty, or ambivalence, and higher scores suggest that the patient is at a more contemplative stage of change. The Taking Steps scale has 8 items (score range 8-40) that assess if positive change has already been initiated and the desire for help to prevent relapse.

Perceived Overall Health Status Variables

Perceived physical and mental health status were estimated using the Medical Outcome Study Short Form-12 physical and mental subscales, continuous measures that were standardized to the 1998 U.S. adult population.¹⁴

Perceived Alcohol-Related Adverse Consequences

To assess the consequences attributed to alcohol by the patient, we administered the Short Inventory of Problems.¹⁵ This is a 15-item instrument that assesses consequences in 5 domains (physical, interpersonal, intrapersonal, impulse control, and social responsibility). Each domain is measured by a 3-item subscale with 4 ordinal responses ranging from never (score = 0) to daily or almost daily (score = 3), so the subscale scores range from 0 to 9. The physical subscale asks subjects if their physical health has been harmed by drinking, if their physical appearance has been harmed by drinking, and if they have not eaten properly because of drinking. Given the premise that poor health would accelerate the process of change, we were particularly interested in the physical subscale, but evaluated all adverse-consequence domains as correlates of the change variables.

Other Descriptive Variables

The admission diagnoses of each participant were recorded. Demographic factors, determined by self-report or from the medical record, were age, sex, ethnicity (Hispanic, non-Hispanic black, non-Hispanic white), years of education, and health insurance. Previous 4-week alcohol consumption was measured using alcohol timeline follow-back methodology.¹⁶ This method defines a standard drink and, with the help of memory cues, asks the patient to estimate how much alcohol was consumed on each day. Percent drinking days (days on which any amount of alcohol was consumed) and average number of drinks per drinking day were calculated from the resulting daily drinking record.

Analysis

Because not all scales were normally distributed, we calculated Spearman correlation coefficients to estimate the association of the change variables (SOCRATES subscales) with perceived health variables (SF-12 subscales and SIP physical subscale) and the other adverse consequence domains of the SIP. Although the study was underpowered for subset analyses, we did explore confounding by age, sex, and ethnicity when the unadjusted association between a health or adverse consequence variable with a SOCRATES subscale was statistically significant ($P < .05$). We also added adjustment for alcohol consumption (ie, percent drinking days and average drinks per drinking day) when these con-

TABLE 1
Characteristics of the Study Group

Male	40 (80%)
Mean age (SD)	50 (11)
Ethnicity	
Hispanic	8 (16%)
Non-Hispanic black	13 (26%)
Non-Hispanic white	29 (58%)
Mean years of education (SD)	11.6 (2.1)
Health insurance	
Only public	35 (70%)
Private	5 (10%)
None	10 (20%)
Mean percent drinking days (SD)	68 (35)
Mean number of drinks/drinking day (SD)	8.4 (4.9)
Most common admission diagnoses	
Liver disease	8 (16%)
Pancreatitis	7 (14%)
Withdrawal seizure	7 (14%)
Chest pain and/or myocardial infarction	6 (12%)
Drug overdose	5 (10%)
Infection	4 (8%)
Other	13 (26%)

sumption measures were associated with the process-of-change variables. Because the distributions of the problem Recognition and Ambivalence scores were censored at their upper limits, tobit regression, a method appropriate for censored outcomes, was used to compare adjusted and unadjusted associations. The Taking Steps scores were approximately normally distributed, and ordinary least-squares regression was used for multivariable analyses.

RESULTS

We identified 117 potential participants, accounting for 6% of total admissions ($n = 1964$) during the 7-month recruitment period (late 2004 through mid-2005). Of this total, 20 (17%) refused or withdrew prior to completing the study questionnaires, 17 (14.5%) were not eligible because of chronic cognitive impairment, 15 (12.8%) were discharged prior to being interviewed, 14 (12%) did not meet current alcohol dependence criteria (4 of whom met abuse criteria), and 1 (<1%) did not speak English. The remaining 50 subjects were included in this analysis. Characteristics of this group are listed in Table 1. They were primarily male, and socioeconomic status (assessed on the basis of education and health insurance) was low relative to the general population.¹⁷ Persons listed as having public insurance only were mainly covered by state

TABLE 2
**Summary of Change, Overall Health Status, and Alcohol-
 Consequences Variables**

Variable*	Mean (Standard Deviation), Range
Process-of-change variables (SOCRATES)	
Problem recognition	28.9 (6.2), 10-35
Ambivalence	15.3 (3.8), 4-20
Taking steps to change	30.6 (5.9), 14-40
Overall health perceptions (SF-12)	
Perceived physical health status	42.5 (8.4), 29-58
Perceived mental health status	39.2 (8.3), 18-55
Alcohol-related consequences (SIP)	
Physical	5.7 (2.8), 0-9
Interpersonal	5.5 (3.1), 0-9
Intrapersonal	5.3 (2.8), 0-9
Impulse control	4.0 (2.4), 0-9
Social responsibility	5.1 (3.0), 0-9

*Change variables were estimated using the Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES). Physical and mental health status were estimated using these subscales from the Medical Outcomes Study Short-Form 12 (SF-12) with scores standardized to the 1998 U.S. adult population. Alcohol-related consequences were estimated using subscales from the Short Inventory of Problems (SIP).

Medicaid plans with or without Medicare. The less common diagnoses listed as “other” in Table 1, pertaining to no more than 2 patients, include arrhythmia, upper gastrointestinal bleeding, gout, electrolyte imbalance, hypoglycemia, diabetic ketoacidosis, diarrhea, stroke, and congestive heart failure. Measures of alcohol consumption were consistent with the clinical diagnosis of current alcohol dependence.

Of the components of the change process measured, the Recognition and Ambivalence subscales tended to have high scores. Thirty percent of subjects had the highest possible score on the Recognition scale, and 16% had the highest possible score on the Ambivalence scale. The scores for taking steps to change were more evenly distributed. A description of the study variables is included in Table 2.

The unadjusted correlations of alcohol problem recognition, ambivalence, and taking steps to change drinking with each perceived health status and alcohol-consequence variable are shown in Table 3. Problem recognition was modestly and inversely associated with overall perception of physical health as measured by the SF-12 but was not associated with perceived mental health. All the SIP subscales had strong univariate associations with problem recognition ($P < .001$ for each subscale).

Problem recognition was associated with both percent drinking days ($r = 0.39$, $P = .005$) and average drinks per drinking day ($r = 0.34$, $P = .0191$). Adjustment for age, sex, and ethnicity did not modify the associations of recognition with perceived health and adverse consequences. Additional adjustment for percent drinking days eliminated the significant association with overall physical health from the SF-12 (35% reduction in the regression coefficient, adjusted $P = .100$). A similar reduction in the association between problem recognition and overall physical health was observed for average drinks per drinking day (36% reduction in the regression coefficient, adjusted $P = .102$). All SIP subscales remained strongly associated with problem recognition despite the additional adjustment for alcohol consumption measures (all adjusted P values ≤ 0.001).

Ambivalence was associated with overall perception of physical health ($P = .003$) but not perceived mental health. All SIP subscales were associated with ambivalence (all $P < .010$). Alcohol consumption measures were not significantly associated with ambivalence (for percent drinking days, $r = 0.25$, $P = .083$; for average drinks per drinking day, $r = 0.24$, $P = .106$). Adjustment for age, sex, and ethnicity did not alter these findings.

Taking steps to change drinking behavior was not significantly associated with overall perceptions of physical and mental health. The physical ($P = .002$), interpersonal ($P = .006$), and intrapersonal ($P = .034$) SIP subscales were associated with taking steps to change. Alcohol consumption measures were not significantly associated with taking steps (percent drinking days, $r = 0.19$, $P = .196$; average drinks per drinking day, $r = 0.24$, $P = .105$). Adjustment for age, sex, and ethnicity, had minimal impact on the associations between taking steps and the physical, interpersonal, and intrapersonal SIP subscales.

DISCUSSION

This study evaluated the association of recognition of problem drinking, ambivalence about change, and taking steps to change with measures of perceived health status and alcohol-related consequences. The results suggest that most medically hospitalized patients with clinically recognized alcohol dependence are highly cognizant of their drinking problem and wonder about the consequences of their drinking, and many feel they either have taken or will take steps to change their drink-

TABLE 3
Correlation of Process-of-Change Variables with Perception of Health and Alcohol Consequences*

	SOCRATES process-of-change variables		
	Recognition	Ambivalence	Taking Steps
Perceived health (SF-12) [†]			
Physical	-0.31 (-0.54, -0.03)	-0.41 (-0.61, -0.14)	-0.26 (-0.50, 0.03)
Mental	-0.06 (-0.33, 0.23)	0.10 (-0.19, 0.37)	-0.09 (-0.19, 0.36)
Alcohol consequences (SIP) [‡]			
Physical	0.72 (0.55, 0.83)	0.44 (0.18, 0.64)	0.42 (0.16, 0.63)
Interpersonal	0.69 (0.51, 0.81)	0.62 (0.41, 0.76)	0.38 (0.11, 0.60)
Intrapersonal	0.66 (0.46, 0.79)	0.40 (0.13, 0.61)	0.30 (0.02, 0.53)
Impulse control	0.54 (0.31, 0.71)	0.37 (0.10, 0.59)	0.24 (-0.04, 0.49)
Social responsibility	0.57 (0.34, 0.73)	0.48 (0.22, 0.66)	0.19 (-0.10, 0.44)

*Estimates are Spearman correlations with 95% confidence intervals in parentheses.

[†]Estimated from SF-12 as described in text.

[‡]Estimated from Short Inventory of Problems (SIP) as described in text.

ing behavior. Overall physical health perceptions during hospitalization were correlated with problem recognition (possibly mediated by heavy drinking) and ambivalence, but not with taking steps to change. Conversely, specific alcohol-related physical and other consequences were often correlated with each process of change.

The SOCRATES results for this group were similar to those found in a large group of alcohol-dependent persons participating in a large treatment trial.¹⁸ Relative to the distribution of SOCRATES scores in that group, 42% of this hospital sample would be above the median for recognition, 66% for ambivalence, and 44% for taking steps to change.¹⁹ This finding, coupled with the correlations of problem recognition and ambivalence (but not taking steps to change) with perceived physical health, suggests that medical hospitalization presents a unique opportunity for fostering change by moving ambivalent patients toward initiating change. However, additional research is needed to establish that these change processes during hospitalization predict participation after hospitalization in available treatment programs or other objective indicators of positive behavioral change.

Several limitations should be considered in interpreting our results. The participants represent clinically recognized and subsequently confirmed alcohol-dependent patients. Results might differ for those initially detected by systematic screening, for example, by using a heavy-drinking-day item, as recommended by the NIH,²⁰ or biomarkers.²¹ It is possible that such patients would have fewer ap-

parent alcohol-related consequences and may thus be less contemplative of change. In addition, our sample was recruited from a single hospital, and was primarily male and socioeconomically disadvantaged. Results may not generalize to other groups. Although we did not find any evidence that age, sex, and ethnicity altered the relationships examined in this work, the study was not adequately powered for firm conclusions about this. Finally, although the study demonstrated an association of perceived health status with readiness to change drinking, a causal relationship may not exist. Theoretically, poorer health would increase recognition, ambivalence, and intent to change, but close measurement of these variables over time would be required to establish this.

In conclusion, clinically recognized alcohol-dependent patients with acute medical illness typically are highly cognizant of their drinking problems and often wish to change at the time of hospitalization. This is linked to perceptions of physical health and a variety of alcohol-related consequences. The association of recognition, ambivalence, and intention to change at the time of hospitalization with postdischarge treatment participation and outcomes should be evaluated further. If these factors do predict such outcomes, intervention studies aimed at enhancing the process of change during hospitalization will be warranted.

Address for correspondence and reprint requests: Scott H. Stewart, MD, Center for Drug and Alcohol Programs, 67 President Street, P.O. Box 250861, Charleston, SC 29425; Fax: (843) 792-7353; E-mail: stewartsh@muscc.edu

REFERENCES

1. Saitz R. Medical and Surgical Complications of Addiction. In: Graham AW, Schultz TK, Mayo-Smith MF, et al., eds. *Principles of Addiction Medicine*. 3rd ed. Chevy Chase, MD: American Society of Addiction Medicine; 2003:1027-1052.
2. Smothers BA, Yahr HT, Sinclair MD. Prevalence of current DSM-IV alcohol use disorders in short-stay, general hospital admissions, United States, 1994. *Arch Intern Med*. 2003;163:713-719.
3. Schneekloth TD, Morse RM, Herrick LM, Suman VJ, Offord KP, Davis LJ Jr. Point prevalence of alcoholism in hospitalized patients: continuing challenges of detection, assessment, and diagnosis. *Mayo Clin Proc*. 2001;76:460-466.
4. Dawson NV, Dadheech G, Speroff T, Smith RL, Schubert DS. The effect of patient gender on the prevalence and recognition of alcoholism on a general medicine inpatient service. *J Gen Intern Med*. 1992;7:38-45.
5. Moore RD, Bone LR, Geller G, Mamon JA, Stokes EJ, Levine DM. Prevalence, detection, and treatment of alcoholism in hospitalized patients. *JAMA*. 1989;261:403-407.
6. Fiellin DA, O'Connor PG, Wang Y, Radford MJ, Krumholz HM. Quality of care for acute myocardial infarction in elderly patients with alcohol-related diagnoses. *Alcohol Clin Exp Res*. 2006;30:70-75.
7. Braithwaite RS, McGinnis KA, Conigliaro J, et al. A temporal and dose-response association between alcohol consumption and medication adherence among veterans in care. *Alcohol Clin Exp Res*. 2005;29:1190-1197.
8. Arozullah AM, Lee SY, Khan T, et al. The roles of low literacy and social support in predicting the preventability of hospital admission. *J Gen Intern Med*. 2006;21:140-145.
9. Miller NS. Mortality risks in alcoholism and effects of abstinence and addiction treatment. *Psychiatr Clin North Am*. 1999;22:371-383.
10. Bridevaux IP, Bradley KA, Bryson CL, McDonnell MB, Fihn SD. Alcohol screening results in elderly male veterans: association with health status and mortality. *J Am Geriatr Soc*. 2004;52:1510-1517.
11. Connors GJ, Donovan DM, DiClemente CC. *Substance Abuse Treatment and the Stages of Change*. New York: Guilford Press; 2001.
12. American Psychiatric Association. *Diagnostic and Statistical Manual* 4th ed. (text revision). Washington, DC: American Psychiatric Association; 2000.
13. Miller WR, Tonigan JS. Assessing drinkers' motivation for change: The Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES). *Psychol Addict Behav*. 1996;10:81-89.
14. Ware JE, Kosinski M, Turner-Bowker DM, Gandek B. *How to Score Version 2 of the SF-12 Health Survey (With a Supplement Documenting Version 1)*. Lincoln, RI: QualityMetric Inc.; 2002.
15. Miller WR, Tonigan JS, Longabaugh R. *The Drinker Inventory of Consequences (DrinC): An Instrument for Assessing Adverse Consequence of Alcohol Abuse*. NIAAA Project MATCH Monograph Series. Washington, DC: U.S. Government Printing Office; 1995.
16. Sobell LC, Sobell MB. Timeline Follow-back: A technique for assessing self-reported ethanol consumption. In: Allen J, Litten R, eds. *Measuring Alcohol Consumption: Psychosocial and Biological Methods*. Totowa, NJ: Humana Press; 1992:41-72.
17. Current Population Survey, 2005 Annual Social and Economic Supplement. U.S. Census Bureau. Available at pubdb3.census.gov/macro/032005/health/h01_000.htm. Accessed January 22, 2007.
18. Project MATCH Research Group. Matching alcoholism treatments to client heterogeneity: Project MATCH post-treatment drinking outcomes. *J Stud Alcohol*. 1997;5:7-29.
19. Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES). In: Allen J, Wilson V, eds. *Assessing Alcohol Problems. A Guide for Clinicians and Researchers*. 2nd ed. Bethesda, MD: U.S. Department of Health and Human Services, National Institute of Alcohol Abuse and Alcoholism; 2003:576-582.
20. Helping patients who drink too much: a clinician's guide. U.S. Dept. of Health and Human Services, National Institute on Alcohol Abuse and Alcoholism, NIH Pub. No. 05-3769, 2005. Available at www.niaaa.nih.gov/Publications/EducationTrainingMaterials. Accessed November, 29, 2006.
21. Allen JP, Sillanaukee P, Strid N, Litten RZ. Biomarkers of heavy drinking. In: Allen J, Wilson V, eds. *Assessing Alcohol Problems. A Guide for Clinicians and Researchers*. 2nd ed. Bethesda, MD: U.S. Department of Health and Human Services, National Institute on Alcohol Abuse and Alcoholism; 2003:37-53.