SHORT COMMUNICATION

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Factors Influencing Readiness to Change Among Hazardous Drinkers in South Korea

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ABSTRACT

The present study was conducted to identify clinical factors influencing the readiness to change (RTC) among hazardous drinkers. The data were derived using the Korean Research for Development of Alcohol Addiction Diagnosis and Assessment System. We investigated RTC using a questionnaire on subjects who had never sought help for an alcohol problem. Subjects were then divided into two groups: the precontemplation group (those who had never considered that they had a problem) and the more than contemplation group (those who were at least open to the idea they might have a problem). Measured variables were personal characteristics, lifetime alcohol use history, and responses to the Drinker Inventory of Consequences, Alcohol Use Disorder Identification Test, Alcohol Dependence Scale, Motivational Structure Questionnaire for Alcoholics, and the Alcohol Outcome Expectancies Scale. Behavioral, psychiatric, and psychological factors were evaluated according to the responses to the Rosenberg Self-Esteem Scale, Zung Self-Rating Depression Scale, Barratt Impulsiveness Scale, State-Trait Anxiety Inventory, and State-Trait Anger Expression Inventory. The valid sample comprised 129 hazardous drinkers, of which 74 were classified as precontemplation, and 55 were in the contemplation group. The results of the binary logistic analysis showed that being unmarried or separated as well as having higher scores for impulse control and social responsibility were independently associated with an increased likelihood of hazardous drinkers being in the contemplation group, and the final model explained 30.5% (Nagelkerke R^2) of the variation in membership of the contemplation group.

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INTRODUCTION

In 2015, the annual alcohol consumption per capita and monthly alcohol consumption rate of South Koreans were 8.9 L and 60.6%, respectively, ranking highest among all Organization for Economic Cooperation and Development member states.[1] Further, the lifetime prevalence rate of alcohol use disorders (AUD) was 12.2% (Korea Ministry of Health and Welfare, 2016).[2] The vast majority of Korean hazardous drinkers (HDs) do not perceive a need for drug treatment, and only 12.1% of HDs used mental health services (Korea Ministry of Health and Welfare, 2016).[2] Korean National Data indicate that the treatment gap, i.e., the proportion of HDs who have never sought help, is large. It is important to reduce the treatment gap because, if not properly mediated, HDs' drinking patterns become fixed and can develop into more chronic alcohol problems or AUD (Collins et al. 2010).[3]

Numerous studies have demonstrated that, for HDs, recognizing their alcohol problem and seeking help is related to their readiness or motivation to change (RTC).[4] RTC is a critical element that extends throughout the process of stopping or modifying excessive drinking and addictive behaviors.[5] It is a part of the transtheoretical model of change (TTM),[6] which conceptualizes motivation as a multidimensional series of stages that are part of a larger process of intentional behavior change. The TTM proposed five stages of change: precontemplation, contemplation, preparation, action, and maintenance. According to the model, movement back and forth between the various stages represents a recursive learning process. The individual continues to redo the tasks at various stages in order to achieve a level of successful completion that assists sustained change of the addictive behavior.[7]

In particular, the behavior change that reduces the treatment gap in general or public health settings requires a movement in RTC from the precontemplation to the contemplation stage.[8] Individuals in the precontemplation

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stage exhibit very little or no desire to change and are unaware of any problems associated with their behavior, even when there is information suggesting that there is a problem.[9] The move to the contemplation stage is demonstrated in the individual's cognitive patterns and verbal behavior by the appearance of tentative language (e.g., "might"). This involves a risk-reward analysis leading to decision-making, so that individuals recognize their behavior as a problem, and begin to think about taking future actions to make a change.[9]

Previous studies delineating drinking behavior changes in a naturalistic context have found that the majority of HDs are in the precontemplation stage in their problem recognition and awareness of negative consequences, and they continue to drink.[10] A previous longitudinal study that examined whether RTC predicted subsequent drinking behavior on a weekly basis over the course of 11 weeks in a sample of female college students found that on weeks when students reported more RTC relative to their average levels, they also reported both intentions to drink less in the future and actual reductions in drinks per week the following week .[11] Another study identified that increased RTC is negatively associated with alcohol use and alcohol-related consequences using hierarchical linear modeling.[12] A further study reported on cross-lagged effects between RTC and alcohol use over the course of a 24-month period.[3] Kim et al.[13] (2007) reported that it is attributed to factors such as alcohol permissive environments, lack of knowledge, and defensive mechanisms specific to HDs including denial or ambivalence.[13]

Therefore, this study was conducted to identify the clinical factors that influenced RTC of HD in a naturalistic context. We expected that the current drinking pattern and dependency, drinking related problem, drinking history, and psychiatric conditions would affect the RTC of HD. To reflect the naturalistic context, we investigated the RTC of subjects who have never sought help for alcohol problems. The subjects' RTC was measured and then they were divided into two groups, the precontemplation group and the contemplation group.

MATERIALS AND METHODS

Study Overview

The data were derived using the Korean Research for Development of Alcohol Addiction Diagnosis and Assessment System (RDADAS). The RDADAS was developed as an effective diagnostic and intervention system based on the actual situations of Korean alcohol users for implementation in a mobile application. The study was conducted in 13 hospitals (7 general hospitals and 6 psychiatric hospitals). The subjects were recruited through public advertising from January 2016 to November 2017 and comprised adults who consumed alcohol regularly.

Subjects

In this study, inclusion criteria were (1) age: ≥18 and ≤60 years old and (2) confirmed HD for at least three months. All subjects recorded their alcohol consumption every time they drank for three months while participating in this study, and so HDs were identified by their drinking record. The National Institute of Alcohol Abuse and Alcoholism (NIAAA) criteria[14] were applied to indicate if respondents were HDs. NIAAA defines it as consuming more than 21 standard drinking (SD) per week or 7 SD per day for men, and 14 SD per week or 5 SD per day for women. Exclusion criteria were respondents who (1) were diagnosed as having or were being treated for an alcohol problem; (2) had a mental disorder (e.g., mental impairment, ongoing memory disorders, or dementia) that could influence understanding of survey contents; (3) had a physical disease (e.g., cirrhosis) or head injuries that could influence understanding of survey contents; and (4) did not understand the survey contents. Among 723 subjects included in the data registry of RDADAS, the valid sample comprised 129 subjects. The RTC of the subject was measured and then they were divided into two groups, the precontemplation group and the contemplation group.

Variable Measurement

The primary measure of RTC was evaluated using Rollinick's 12-item Readiness to Change Questionnaire (RTCQ).[15] The RTCQ was designed for heavy drinkers in general hospitals. Thus, it is considered to be more suitable for the study of the general public who are not diagnosed as having AUD or do not recognize their alcohol problem. In RTCQ, questions 1, 5, 10, and 12 are about the precontemplation stage, questions 3, 4, 8, and 9 are about the contemplation stage, and questions 2, 6, 7, and 11 are about the action stage. Each item was cored independently and then summed up according to the stage. The respondent's highest score among the three scale scores was regarded as the current stage. The history of the patient's first drinking experience, first high-risk drinking experience, and first blackout from drinking were investigated. Data regarding the subjects' personal characteristics were investigated: age, gender, marital status, employment status, occupation, co-residence, and educational attainment. Drinking patterns and amounts were evaluated using the respondents' drinking records and the Alcohol Use Disorder Identification Test (AUDIT).[16] The factors associated with drinking were evaluated according to the responses to the Motivational Structure Questionnaire for Alcoholics (MSQ-A),[17] Alcohol Outcome Expectancies Scale (AOES),[18] and Alcohol Dependence Scale (ADS).[19] MSQ-A was developed to identify maladaptive motivational patterns for problem drinkers. AOES was developed to identify the perceptions of physical and social effects one might experience when engaging in alcohol consumption. The scale was categorized into two broad categories: positive and

negative. ADS was developed to assess severity of the alcohol dependence syndrome. It includes the subscales "loss of control overconsumption," "compulsive drinking," and "withdrawal" in adult alcohol-dependent patients. Drinking consequences were measured with the subscale and total scores of the Drinker Inventory of Consequences (DrInC).[20] DrInC was developed for the purpose of harm reduction in prevention and treatment by subdividing heterogeneous "alcohol problems." It has a 50-question substructure consisting of interpersonal, intrapersonal, impulse control, social responsibility, and control categories. Among these, the impulse control subscale comprises driving, risk-taking behavior, trouble with law, and damage to property after drinking; the social responsibility subscale consists of getting into trouble, money problems, or job loss due to drinking. Other psychiatric conditions were evaluated according to the responses to the Rosenberg Self-Esteem Scale (SES),[21] Zung Self-Rating Depression Scale (SDS),[22] Barratt Impulsiveness Scale-11 (BIS),[23] State-Trait Anxiety Inventory (STAI),[24] and State-Trait Anger Expression Inventory (STAXI).[25] All of the scales had been previously translated into Korean, and their validity and reliability have been confirmed for Korean populations.[26-32]

Statistical Analysis

Personal and clinical characteristics and the assessment scales' scores were compared between two groups categorized as precontemplation and contemplation according to the RTCQ. Independent *t*-tests assessed statistically significant differences between those groups regarding the means of the continuous variables, and the chi-squared (χ^2) for contingency test was used to assess statistically significant differences in categorical variables. A binary logistic regression analysis was performed to estimate the influence of predictive factors on the likelihood of being in the contemplation stage. In this analysis, the dependent variable was contemplation, and precontemplation was the reference category. The statistically significant clinical variables were tested as covariates. Goodness of fit indices were used to determine and validate the final model. The statistical significance cut-off value was set at $P < .05$ (two-tailed test) for all tests. All statistical analyses were performed using SPSS 24.0 for Windows (SPSS Inc., Chicago, IL, USA).

Ethical Considerations

All the subjects voluntarily agreed to participate in the survey, and written informed consent was obtained after the study's purpose and methodology were explained to them. This study was conducted after receiving approval from the Institutional Review Board of Bugok National Hospital (BNH IRB No. 5-018). Private information was coded and symbolized and limited to use for purposes other than RDADAS.

RESULTS

Baseline Characteristics of the Participants

As shown in Table 1, mean age and education attainment in the sample were 35.0 years (standard deviation [SD]=6.17) and 13.1 years (SD=2.3), respectively. Of those surveyed, 89 (69.0%) were male and 40 (41.0%) were female; 92 (62.3%) were married and 37 (28.7%) were unmarried or separated; 112 (86.8%) were employed and 17 (13.2%) were unemployed; and 99 (76.7%) were co-resident with someone and 30 (23.3%) were living

Table 1. Comparison of Demographic and Clinical Characteristics

	Total Sample ($N=129$)	PC ($N=74$)	C ($N=55$)	Coefficients	*P* value
Age, years, mean (SD)	35.0 (6.17)	35.1(5.60)	34.9 (6.91)	$t=0.147$	.893
Gender				$\chi^2=0.625$	.449
Male, *n* (%)	89 (69.0)	49 (55.1)	40 (44.9)		
Female, *n* (%)	40 (31.0)	25 (62.5)	15 (37.5)		
Marital status, *n* (%)				$\chi^2=10.713$	.002
Married	92 (61.3)	60 (65.2)	32 (34.8)		
Unmarried or separated	37 (28.7)	14 (37.8)	23 (62.2)		
Employment, *n* (%)				$\chi^2=0.439$	0.698
Employed	112 (86.8)	64 (57.1)	48 (42.9)		
Unemployed	17 (13.2)	10 (58.8)	7 (41.2)		
Co-residence, *n* (%)				$\chi^2=11.968$	.001
Yes	99 (76.7)	65 (65.7)	34 (34.3)		
No	30 (23.3)	9 (30.0)	21 (70.0)		
Education,years, mean (SD)	13.1(2.3)	13.1 (2.0)	13.0 (2.7)	$t=0.140$	.889

Chi square test was done for categorical variables and Independent *t*-test was done for continuous variables.
PC: precontemplation group; C: more than contemplation group.

alone. According to the result of RTCQ, 74 subjects (57.4%) were classified as precontemplation, and 55 (42.6%) were in contemplation.

Differences in Personal Characteristics by HD

According to the analysis, subjects who were unmarried or separated had a statistically significant higher percentage of being in the contemplation stage (χ^2=10.713, P=.002), as well as subjects who were not co-resident (χ^2=11.968, P=.001). No statistically significant difference was found in age (t=0.147, P=.893), gender (χ^2=0.625, P=.002), employment status (χ^2=0.439, P=.698), and educational attainment (t=0.140, P=.889). Hence, using the analysis of covariance for continuous variables and binary logistic regression analyses for discrete variables, the two group differences, adjusting for the effects of marital status and co-residence, were analyzed (Table 1).

Differences in Assessment Scales' Scores

As shown in Table 2, scores of AUDIT (t=-3.639, P<.001) and ADS (t=-3.601, P<.001); and total consequences (t=4.121, P<.001), impulse control (t=4.875, P<.001), and social responsibility (t=2.256, P=.026) on DrInC, SDS (t=2.732, P=.007) were statistically significantly higher in the contemplation group, and age of first blackout (t=2.097, P=.038) was younger. However, after adjusting for the effect of marital status and co-residence, there were statistically significant differences in impulse control (adjusted P=.001) and social responsibility (adjusted P=.013) on the DrInC. No statistically significant differences

Table 2. Comparison of Assessment Scale Scores

	Total Sample (N=129)	PC (N=74)	C (N=55)		Unadjusted P value	Adjusted P value*
AUDIT, mean (SD)	15.0 (5.6)	13.5 (5.0)	17.0 (5.8)	t=-3.639	<.001	.078
ADS, mean (SD)	31.9 (3.7)	31.0 (3.2)	33.3 (3.9)	t=-3.601	<.001	.195
First drinking, years, mean (SD)	16.3 (2.5)	16.5 (2.5)	15.9 (1.7)	t=1.272	.206	.388
First HD, years , mean (SD)	18.3 (2.4)	18.4 (2.8)	18.0 (1.7)	t=0.697	.487	.668
First blackout, years, mean (SD)	21.7(4.4)	22.6 (5.1)	20.2 (2.9)	t=2.097	.038*	.082
DrInC						
Total consequences	49.2 (15.5)	45.9 (14.9)	53.8 (16.9)	t=-4.121	<.001	.424
Impulse control	8.0 (6.1)	5.3 (4.3)	11.2 (6.5)	t=-4.875	<.001	.001
Social responsibility	5.7 (3.0)	5.2(2.2)	6.4(3.8)	t=-2.256	.026	.013
Physical	10.5 (5.2)	10.2 (4.6)	10.6 (5.3)	t=-0.444	.658	.834
Intrapersonal	11.2 (6.3)	10.9 (6.6)	11.6 (6.4)	t=-1.067	.288	.496
Interpersonal	13.7 (6.8)	13.4(6.8)	13.8 (6.7)	t=-0.261	.795	.075
MSQ-A, mean (SD)						
Enhancement	6.1 (3.1)	6.4 (3.5)	5.7 (2.5)	t=-1.235	.219	.341
Coping	7.0 (4.1)	6.7 (4.6)	7.3 (3.2)	t=-0.793	.429	.512
Conformity	4.6 (2.8)	4.3 (3.0)	4.9 (2.4)	t=-1.196	.234	.431
Social	10.2 (2.7)	10.3 (2.8)	10.0 (2.6)	t=0.666	.507	.859
AOES, mean (SD)						
Positive expectancy	60.8 (13.5)	62.2 (15.9)	59.1 (9.2)	t=1.348	.180	.269
Negative expectancy	45.7 (11.7)	46.0 (11.7)	45.4 (11.6)	t=0.308	.759	.833
SES, mean (SD)	26.0 (1.8)	26.1 (1.8)	25.9 (1.7)	t=0.643	.521	.740
SDS, mean (SD)	41.1 (3.7).	40.4 (3.2)	42.1 (4.0)	t=-2.732	.007	.157
BIS, mean (SD)						
Non planning impulsiveness	24.8 (3.9)	24.8 (3.4)	24.6 (4.5)	t=0.284	.777	.971
Motor impulsiveness	15.9 (3.2)	15.6 (3.3)	16.3 (3.1)	t=-1.143	.255	.582
Attention impulsiveness	16.7 (2.9)	16.3 (2.9)	17.0 (2.8)	t=-1.252	.213	.475
STAI, mean (SD)	40.8 (5.3)	41.4 (5.1)	40.1 (5.7)	t=1.414	.160	.225
STAXI, mean (SD)	18.8 (4.6)	18.9 (5.3)	18.6 (3.6)	t=0.394	.363	.694

Chi square test was done for categorical variables and Independent t-test was done for continuous variables.
*Adjusted for the effects of marital status and co-residence.
PC: precontemplation group; C: more than contemplation group; ADS: Alcohol Dependence Scale; AOES: Alcohol Outcome Expectancies Scale; AUDIT: Alcohol Use Disorder Identification Test; BIS: Barratt Impulsiveness Scale; DrInC: Drinker Inventory of Consequences; MSQ-A: Motivational Structure Questionnaire for alcoholics; SD: standard deviation; SDS: Jung Self rating Depression Scale; SES: Rosenberg Self Esteem Scale; STAI: State Trait Anxiety Inventory; STAXI: State Trait Anger Expression Inventory 14.

Table 3. Results of the Logistic Regression Estimations of the Influences of the Clinical Factors on the Odds of More Than Contemplation

	B	Standard error	Wald	*P* value	Odd ratio	95% CI
Marital status (unmarried/separated)	1.939	0.863	1.796	.025	2.929	2.281-3.371
Co-residence (yes)	1.059	0.589	3.669	.055	1.885	0.976-2.529
Impulse control (DrInC)	0.191	0.071	7.221	.008	1.412	1.022-1.737
Social responsibility (DrInC)	0.195	0.048	16.246	.027	1.215	1.105-1.336

Binary logistic regression analysis was done.
B: Unstandardized regression coefficient, DrInC: Drinker Inventory of Consequences.

were observed between the two groups in age of first drinking years ($t=1.272$, $P=.206$) and first HD ($t=0.697$, $P=.487$), MSQ-A, AOES, SES ($t=0.643$, $P=.521$), BIS, STAI ($t=1.414$, $P=.160$), and STAXI ($t=0.394$, $P=.363$).

Logistic Regression Analytical Results

The Hosmer-Lemeshow goodness of fit test validated the model ($\chi^2=8.123$, $P=.330$). Forward selection of the model was performed to avoid issues related with multicollinearity. As shown in Table 3, the final model explained 30.5% (Nagelkerke R^2) of the variability in the contemplation group and showed that being unmarried or separated ($P=.025$, odds ratio (OR)=2.929, 1.046; 95% CI, 2.281-3.371) and higher scores for impulse control ($P=.008$, OR, 1.412; 95% CI, 1.022-1.737) and social responsibility ($P=.027$, OR=1.215; 95% CI, 1.105-1.336) in DrInC were independently associated with an increased likelihood of HDs' contemplation (Table 3).

DISCUSSION

The purpose of this study was to identify factors influencing HDs' RTC, and we found that being unmarried or separated as well as having higher scores for impulse control and social responsibility in DrInC were significant factors to increase the likelihood of HDs' contemplation.

In this study, it was identified that the occurrence of social problems or social pressure affected RTC. This is similar to many previous studies, which identified social pressure as an important factor behind people entering addiction treatment.[33] Klag et al.[34] focused on formal social pressure, for example, treatment mandates handed down through the judicial system.[34] Storbjork et al.[35] conducted comparative studies on alcohol problems in general and in clinical populations to identify the relative strength of factors in predicting entering and the clinical populations. The results clearly show unemployment/institutionalization and unstable living situation as the major contributors behind people in the alcohol addiction treatment.[35] From the results of the abovementioned studies, the relationship between alcohol use and alcohol related social problems or crime is well documented. This has contributed to the increased popularity and willingness to utilize more forceful means to pressurize people with AUD into treatment. Therefore, the recognition and education driven by social pressure resulting from alcohol use may be more useful in reducing the treatment gap, by increasing self-recognition of alcohol problems and RTC.

In this study, being unmarried or separated was found to be a significant factor for increased likelihood of HDs' contemplation, and living alone was also statistically significant ($P=.055$). This means that the presence of a spouse or family member acts as a barrier to RTC. Although not investigated in detail in this study, it is possible that co-dependency was the cause of this. Co-dependency is a term used in the chemical dependency field to describe the enabling behavior of all family members, especially partners, of an alcoholic.[36] The essential insight behind the co-dependence construct emerged out of the treatment of alcoholics. Family members, typically the spouse of the alcoholic, inadvertently supported the behavior that they were apparently trying to control. By intervening and protecting the alcoholic (e.g., lying to the alcoholic's boss, cleaning up messes, and paying unpaid bills), the spouse unintentionally contributes in the alcoholic's irresponsibility and loss of control.[37] However, these attempts of restoring control had the effect of preventing the alcoholic from experiencing the uncomfortable consequences of his/her own behavior. As the spouse increasingly took over areas of the alcoholic's life and functioning, the alcoholic's tendency to deny the destructiveness of his/her behavior intensified.[38] There was no direct investigation of family members in this study. It is necessary to identify the influence of characteristics of family members on the occurrence of HDs RTC, including the personality, attitude toward drinking, and family functions of family members.

The results of this study identified that AUDIT or ADS that are directly related to alcohol addiction and AUD were not found to have no significant effect on RTC. Many studies have already found that being a HD is the single most influential factor in the occurrence of alcohol dependency and AUD, and AUDIT and ADS have proven to be useful screening tools.[39,40] Our previous study on distinctive correlates of HD also confirmed that AUDIT and ADS are significant variables.[41] However, AUDIT and ADS did not have a significant effect on RTC, which could reflect the treatment gap mentioned. In order to reduce the treatment gap, education for AUDIT and ADS should be continued so

that they can be used and distributed; however, it may be more effective to include in those scales the process of identifying social problems and social pressure caused by alcohol.

This study has several limitations. First, the measure of alcohol consumption was derived from the subjects' personal drinking records, and it did not account for biomarkers such as mean cell volume, carbohydrate deficient transferrin or gamma glutamyl transferase that might be able to measure individuals' drinking status. Second, the evaluations were based solely on self-reports, which may have resulted in an increased risk of recall bias. Third, the clinical significance of our findings may be relatively small. It cannot be ruled out that the study's large sample size or the broad inclusion criteria influenced our findings. Fourth, the Bonferroni correction to reduce family-wise error due to multiple comparisons was not performed during the data analysis. Thus, the clinical relevance of our findings should be interpreted with caution, particularly regarding the level of significance used to classify findings as "significant." Finally, other related problems, such as current smoking, hypochondriasis, and suicidal ideation, which are risk factors for HDs, presented by Park et al.,[42] were not part of this study.

Despite these limitations, this study identified influences on RTC in Korean HDs. We found that being unmarried or separated, and having higher scores for impulse control and social responsibility on DrInC were significant factors for increased likelihood of contemplation. In this context, it would be useful for HDs to identify social problems or social pressure caused by alcohol use in order to increase their RTC.

Informed Consent: Written informed consent was obtained from all participants who participated in this study.

Conflict of interest: The authors have no conflicts of interest to declare.

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Ethical Committee Approval: Ethical committee approval was received from the Institutional Review Board of Bugok NationalHospital (BNH IRB No. 5-018).

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