The development of the student pharmacist chemical health scale (SPCHS)

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ABSTRACT

Background: The Student Pharmacist Chemical Health Scale (SPCHS) is a tool designed to evaluate substance use behaviors and risk factors for substance abuse among student pharmacists. Methods: It was administered to a sample of student pharmacists at the University of Georgia (UGA) as a preliminary component of a longitudinal study evaluating student pharmacists nationwide. Results: This final scale was found to have a high degree of internal consistency and showed appropriate content and face validity for the domains tested. Conclusions: Future analyses will center on further validating the SPCHS in known groups of pharmacists with substance use disorders.

KEYWORDS

substance use disorder, Medical professional students, student pharmacist chemical health scale (SPCHS)

INTRODUCTION

Considerable attention in recent years has been given to the problem of substance use disorders (SUD) (i.e., substance abuse and dependence) in health care professionals and students.[1-7] Substance use disorders represent a critical problem facing health care professionals and have been well characterized in the nursing and medicine professions.[5,6,8-26] Surprisingly, however, few studies in the past decade have explored SUD and related behaviors among pharmacists.[27-36] The Student Pharmacist Chemical Health Scale (SPCHS) was developed by the lead author to assess characteristics of substance abuse among a representative, nationwide sample of student pharmacists. The purpose of this paper is to describe the development of the SPCHS, first administered at the University of Georgia (UGA) College of Pharmacy in 2012.

BACKGROUND

Substance use disorders pose a significant public health problem that impacts individual and societal wellbeing.[37] The term SUD embraces both substance abuse and addiction, which are related to maladaptive patterns of alcohol and drug use.[1] According to the results of the 2011 National Survey on Drug Use and Health (NSDUH), around eight percent of the population aged 12 years and older were estimated to experience a SUD in the past year.[38] The rates among college or university graduates and high school graduates were 6.4 and 8 percent, respectively, with the prevalence of SUD decreasing with increasing levels of educational attainment.[38] In contrast to the NSDUH findings, it has also been suggested that the prevalence of SUD among student pharmacists approximates that of the general population.[3]

Notwithstanding the differences in SUD prevalence estimates, the problem of SUD is widespread and its risk is shared by the health professions. Although health care providers and students are expected to display healthy habits, data indicates that they are not invulnerable to SUD, with one report estimating that one in eight individuals will face the problem of alcohol and drug dependence during their lifetime.[4] Among health professions, pharmacy represents a group at high risk for experiencing SUD, where pharmacists' ready access to drugs combined with stressful working and studying environments often pose significant risk factors for the

development of SUD.[39] Recent studies suggest several other risk factors that may contribute to the development of SUD among student pharmacists (Table 1).[40-49]

Table 1. Potential Factors Contributing to the Development of Substance Use Disorders

1. Age of First Use (of alcohol or drugs)	5. Impulsivity
2. Current Alcohol Use (AUDIT Scores)	6. Protective Factors
3. Trauma History	7. Negative Proscriptions
4. Family History of SUD and Psychiatric Illness	8. Genetic Use Patterns

METHODS

The study was approved by the UGA Institutional Review Board. The SPCHS is a tool designed to identify student pharmacists at high risk for developing SUD. The scale is comprised of eight constructs (Table 1) and contains a total of 88 questions, requiring no longer than 30 minutes to complete.

The pilot administration of the SPCHS gathered information from a sample of pharmacy students (n = 405) in their first, second, and third years of professional study (approximately 18 to 35 years of age) at the UGA College of Pharmacy during the first week of fall semester 2012 (Table 2). Because a small percentage of professional year four (P4) students were able to complete the survey, their data was excluded in this analysis. Students were informed of the survey through scheduled weekly professional meetings incorporated into the pharmacy curriculum. The survey was administered in a clinical skills laboratory setting as a voluntary component of their psychiatric training module. Students were given an opportunity to withdraw their survey at the beginning and end of the administration period. Study participants included those who volunteered to complete and submit the survey.

Data were collected using Qualtrics®, (version 34799; Qualtrics Labs, Inc.; Provo, Utah), a web-based survey platform that records survey responses and builds datasets that can be exported to statistical software applications for analysis. Before beginning the computerized survey, study volunteers received directions for completing the survey and information describing the importance of their participation. A generic username and password accessing the survey were provided by researchers to ensure participant anonymity.

Table 2. Demographic Characteristics of Respondents

Characteristic	%	No.
Age (mean in years)	23.5	
Gender		
Female	35	139
Male	64	256
Marital Status		
Single, Never Married	79	313
Single, Divorced	1	3
Currently Married	17	66
NMCRR[a]	3	13
Ethnicity		
White	66	262
African American	6	23
Asian/Pacific Islander	24	94
Hispanic	1	3
Other	3	13
Current Year of Study		
1st Professional Year (P1)	35	139
2nd Professional Year (P2)	37	145
3rd Professional Year (P3)	27	106
4th Professional Year (P4)	1	5

[a] ***Non-marital committed residential relationship***

Data Collection

Measures Included in the SPCHS

Substance use and dependence. Questions from the Alcohol Use Disorders Identification Test (AUDIT) were incorporated into the questionnaire (the reliability and validity of which has been documented)[40] to assess the magnitude of alcohol dependence among respondents. A total score of 8 or more indicates the presence of harmful alcohol use with higher scores corresponding to greater severity of alcohol-related problems.[50] Guidelines published by the World Health Organization (WHO) suggest that scores can be categorized according to low (below 8), medium (8 to 15) and high (16 and above) levels of alcohol-related problems.[50] Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria were also used to identify respondents engaging in behaviors diagnosable as alcohol dependence.[1]

Family history of alcohol/substance abuse and psychiatric illness. Information was also collected regarding respondent family histories of alcohol/substance abuse and psychiatric illness. The SPCHS question, "Please indicate which, if any, of the family members you either suspect has difficulties in these areas and/or has received treatment," assessed the presence of alcohol/substance abuse and psychiatric illness among first-degree relatives (grandparents,

parents, siblings, children, and current spouse). Respondents were given a choice of four possible responses that included, "problem, but no treatment," "problem treated," "no problem," and "unknown."

Trauma history. Information regarding the presence of a traumatic life event and its association with alcohol/substance abuse was assessed using a dichotomous, six-question scale developed locally and used for patient evaluation. For example, the construct included items such as, "turning to alcohol or drugs sometimes helps me cope with the memory of a tragic event," "the use of alcohol or drugs has led to traumatic events in my life," "I have quit smoking but want to start again after a traumatic event," and "have you ever experienced a significant traumatic event in your lifetime?"

Impulsivity. Characteristics of impulsive behavior were assessed using the five-factor model of impulsivity (UPPS-P), the validity and reliability of which are documented.[42,51] The five-factor model of impulsivity includes positive urgency, negative urgency, sensation seeking, lack of premeditation, and lack of perseverance.[52] The impulsivity construct was comprised of 59 items and was the largest single component of the SPCHS.

Negative proscriptions. A six-question scale was used to assess respondents for characteristics of negative proscriptive behavior. Perceptions regarding prescription drug misuse as an abuse of pharmacist authority, pharmacists self-medicating as needed, drug knowledge as a hedge against drug addiction, risk of addiction, choosing medications for oneself without the aid of prescriber, and familiarity with dispensing potentially addictive substances were assessed through Likert scale responses.

Protective factors. An 11-item scale comprised of Likert responses assessed respondent religiosity and home support and included items such as, "I regularly attend church," "I consider myself to be spiritual," "I feel loved at home," and "I talk to my parents/spouse/significant other about things that bother me."

Genetic use patterns. Items assessing patterns of substance use and abuse (alcohol, nicotine, cocaine, and heroin) were taken from the Kreek-McHugh-Schluger-Kellogg scale.[44]

ANALYSIS

The SPCHS 2012 data were retrieved from Qualtrics® and analyzed using the Statistical Analysis Software (SAS, version 9.4, Cary, North Carolina). With the exception of discrete variables, missing data were replaced using mean substitution. The SPCHS was assessed for content and face validity and was found to appropriately approximate the constructs represented. A preliminary reliability analysis was conducted to assess the overall reliability and internal consistency of the various subscales. A factor (or subscale) analysis was then conducted to determine which questions contributed most to the consistency of each factor. Subscales were then adjusted either by deleting unnecessary questions or rearranging questions among various subscales to achieve greater internal consistency. A second reliability analysis was subsequently performed to determine the reliability of the revised SPCHS.

RESULTS

Of 405 surveys originally submitted, 395 were evaluable (97.5 percent response rate). A preliminary reliability analysis of the SPCHS was performed and yielded an overall alpha coefficient of 0.88. Table 3 summaries the reliability coefficients of the various subscales of the preliminary SPCHS.

A factor analysis was performed using maximum likelihood estimation (Tucker & Lewis Reliability Coefficient = 0.85) to assess which questions contributed most to each factor. The analysis revealed that the current SPCHS accounted for approximately 80% of the variance in data. The Trauma History scale was not associated with loading factors and was removed from the SPCHS. Family History of Substance Use Disorders scale was revised to reflect the contributions of questions assessing the substance use disorders and psychiatric illness in adulthood families (e.g., children, spouse, or other family member). The Genetic Use Patterns scale (or the Kreek-McHugh-Schluger-Kellogg Scale) was revised to include three specific components due to the abundance of questions in the initial administration of the SPCHS that garnered no response. The revised Genetic Use Patterns scale encompassed questions specifically regarding nicotine, cocaine, and heroin use. Three of the subscales used in the SPCHS remained unchanged, specifically the survey components utilizing the Impulsivity (UPPS-P), Protective Factors, and Current Alcohol Use (AUDIT) scales. Table 3 summarizes the domains included in the revised version of the SPCHS with their reliability coefficients. The overall reliability of the revised scale was 0.91.

Table 3. Internal Consistency of the Preliminary and Revised SPCHS

Scale	Preliminary Scale Coefficient	Revised Scale Coefficient
Negative Proscriptions	0.14	NA[a]
Family History of SUD	0.28	0.88[b]
Trauma History	0.53	NA[a]
Family History of Psychiatric Illness	0.56	NA[c]
Current Alcohol Use	0.77	0.8
Protective Factors	0.86	0.86
(Impulsivity) Negative Urgency	0.85	0.85
(Impulsivity) Lack of Premeditation	0.85	0.85
(Impulsivity) Lack of Perseverance	0.75	0.75
(Impulsivity) Sensation Seeking	0.88	0.88
(Impulsivity) Positive Urgency	0.95	0.95
Genetic Use Patterns	0.76	0.77
Overall	0.88	0.91

[a] Deleted in the revised SPCHS.
[b] Questions pertaining to childhood family (mother, father, siblings, grandparents) were deleted in the revised SPCHS. Questions relating to adulthood family (children, spouse, other) were included in this scale with mirror questions regarding psychiatric illness. This scale was renamed Family History of SUD: Adulthood Family.
[c] Questions pertaining to childhood family (mother, father, siblings, grandparents) were deleted in the revised SPCHS. Questions relating to adulthood family (children, spouse, other) were included in the Family History of SUD: Adulthood Family scale.

DISCUSSION

The SPCHS is a unique instrument designed to assess the addiction risk in student pharmacists using several demographic and validated humanistic measures. Overall, the reliability of the SPCHS (0.91) was found to exceed the minimum acceptable standard (0.7).[53] Although the instrument reflected acceptable face and content validity when evaluated by addiction experts, the distinctive value of the SPCHS also served as a limiting factor in terms of preliminary validation efforts. No known groups of pharmacists or student pharmacists with substance use disorders were incorporated into the pilot administration, and no known gold standard evaluation exists to offer a comparison. Further evaluation will seek to incorporate pharmacists in multiple jurisdictions that participate in Pharmacist Recovery Networks (PRN) with the ultimate aim of discerning and refining the discriminating capability of the SPCHS.

The Negative Proscriptions, Trauma History, and Family History of Psychiatric Illness scales were either deleted entirely (as in the case of the first two) or substantially curtailed (as in the case of the last) in the revised SPCHS. Factor analysis did not reveal substantive loading questions (0.5 or greater for this analysis) for the Negative Proscriptions and Trauma History scales, and only three questions pertaining to psychiatric illness in the adulthood family (children, spouse, other) were incorporated into similar scale (i.e., Family History of Substance Use Disorders: Adulthood Family) based on loading factor data. Future work involving the SPCHS will refine these components for greater internal consistency and construct validity.

The current form of the SPCHS was found to account for approximately 80% of the variance in observations. It can only be hypothesized, however, that the inclusion of a perceived stress scale would have accounted for a significant balance in data variance. The perception of stress is an important consideration in evaluating substance use disorders in pharmacists.[28, 54] Stressful working environments student pharmacists experience during school or upon graduation are regarded as contributors toward the development of substance use disorders.[28,53] Although the SPCHS did not include a measure for this construct, future revisions will evaluate this noteworthy component.

CONCLUSION

Early recognition of substance use disorders in student pharmacists is key to providing sufficient care to this important population. This is the main objective for developing the SPCHS. It is hoped that analyses of predisposing factors for substance use disorders among student pharmacists may also result in a greater awareness within pharmacy profession. Future studies will seek to revise and evaluate the Trauma History and Family History of Psychiatric Illness scales. Additionally, future versions of the SPCHS will incorporate a perceived stress scale, since job- and academic-related stressors represent significant variables potentially leading to or reinforcing substance abuse. Further analysis of the SPCHS will also incorporate known groups of pharmacists with substance use disorders for a more substantive validation. It is expected that the SPCHS will become an essential component in substance use disorders curricula, prevention strategies, and early intervention programs for student pharmacists.

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