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Psychometric Testing of the Revised Oncology Nurses Health Behaviors Determinants Scale

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Abstract

Background: Chemotherapy exposure is an occupational risk that affects oncology nurses and is linked to several negative health consequences. Oncology nurses' adherence to chemotherapy handling guidelines is critical to protect themselves from this hazardous drug exposure. Several personal and workplace-related factors affect nurses' adherence to these guidelines.

Objective: The purpose of this study was to test the psychometric properties of the revised Oncology Nurses Health Behaviors Determinants Scale that measures factors affecting nurses' adherence to chemotherapy handling guidelines.

Methods: A quantitative cross-sectional design was used. One hundred and twenty-three oncology nurses were recruited through convenience sampling from two hospital settings in the Midwest United States and through social media. Participants completed three online surveys: 1) Revised Hazardous Drugs Handling Questionnaire; 2) Revised Oncology Nurses Health Behaviors Determinants Scale; and 3) a demographic questionnaire.

Results: Exploratory factor analysis revealed a conceptually reasonable seven-subscale structure of the revised Oncology Nurses Health Behaviors Determinants Scale. The psychometric properties of the scale were supported by convergence validity, regression model testing, and

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Ethical Considerations

The study was reviewed and approved by the University of Cincinnati institutional review board (IRB# 2022–0545). Waiver of the signed consent document was obtained. The study investigators completed their required training in human subject research.

Summary Statement:

Workplace-related factors and resources and nurses' health beliefs influence nurses' adherence to safe chemotherapy handling guidelines.

Conflict of Interest:

The authors of this article have no conflicts of interest to disclose.

internal consistency reliability. Oncology nurses reported adherence to chemotherapy handling guidelines at 55% of the time. The cues to action in the workplace, nurses' perceived barriers, institutional response to chemotherapy exposure incidents, and personal protective equipment availability and accessibility were associated with oncology nurses' adherence to chemotherapy handling guidelines.

Conclusion: The revised Oncology Nurses Health Behaviors Determinants Scale demonstrates reliability and validity and can be used to measure factors at workplace and personal levels that affect nurses' adherence to chemotherapy handling guidelines.

Keywords

Adherence; antineoplastic agents; chemotherapy; occupational exposure; hazardous drugs

Healthcare professionals are exposed to hazardous drugs at work while handling these substances. Chemotherapy exposure is an occupational risk for oncology nurses and is linked to negative health consequences such as cancer, allergies, and fertility problems.^{1,2} The purpose of this study was to test the psychometric properties of the revised Oncology Nurses Health Behaviors Determinants Scale (HBDS-ON). Establishing evidence of reliability and validity for this scale ensures its proper utility to measure personal and workplace-related factors affecting nurses' adherence to chemotherapy handling guidelines.

Chemotherapy Exposure Among Oncology Nurses

Oncology nurses are exposed to chemotherapy drugs through direct contact without a barrier or protection.¹ To protect oncology nurses against chemotherapy exposure, healthcare institutions must ensure that the workplace environment complies with safety regulations regarding chemotherapy handling by implementing engineering control and offering specific equipment, policies, and education.^{1,3,4} Additionally, oncology nurses should follow the safety guidelines when handling chemotherapy.^{1,3,4} Previous studies show that nurses' adherence to chemotherapy handling guidelines is insufficient to protect them from the hazards of chemotherapy exposure.^{4,5} Numerous factors related to the work environment and personal beliefs affect nurses adherence to chemotherapy handling guidelines.⁴ Instruments with evidence of reliability and validity should be used to measure these factors and assess if interventions are needed.

The Oncology Nurses' Health Behaviors Determinants Scale (HBDS-ON) is an instrument that was developed by Abu-Alhaija et al.^{6,7} to measure the factors that influence nurses' adherence to chemotherapy handling guidelines. The scale was developed based on the Health Belief Model as a theoretical framework and relevant content in the literature.⁷ According to the Health Belief Model, the individual factors affecting health beliefs and the cues to action in the environment influence the likelihood that the individual executes a health behavior.^{8,9} Further, modifying factors such as knowledge and demographic factors affect the individual's health beliefs.^{8,9} The HBDS-ON contains 29 items distributed in six subscales reflecting personal factors affecting health beliefs as well as workplace factors that influence nurses' adherence to safe chemotherapy handling guidelines. These subscales are the perceived threats of chemotherapy exposure, perceived self-efficacy to adhere

to chemotherapy handling guidelines, perceived benefits of adherence to chemotherapy handling guidelines, perceived barriers of adherence to the guidelines, cues to adhere to the guidelines, and personal protective equipment (PPE) availability and accessibility.⁶

The six subscales of the original HBDS-ON demonstrated evidence of internal consistency reliability (Cronbach's alpha between 0.70–0.88). Also, the scale showed evidence of content validity and construct validity.^{6,7} However, the findings of convergence validity revealed that the scores of three out of the six subscales in the HBDS- ON (perceived threat, perceived benefits, PPE availability and accessibility) were not associated with the adherence to chemotherapy handling guidelines scores.⁶ Therefore, there was a need to revise the scale by adding more items representing factors affecting nurses' adherence to chemotherapy handling guidelines that were not captured by the original scale.

A prior qualitative descriptive study was conducted to obtain the viewpoints of oncology nurses and oncology nurse managers on factors that influence chemotherapy exposure for oncology nurses. Participants were recruited through purposive sampling from two medical centers in the Midwest region in the United States. Semi-structured interviews were conducted with the participants. Participants were asked about the determinants influencing nurses' chemotherapy exposure at the personal and workplace levels. The interview questions were created based on the Health Belief Model.^{8,9} The interview transcripts were analyzed using the content analysis method¹⁰ to extract themes related to determinants of nurses' chemotherapy exposure. A detailed description of this preliminary work and the findings are available at Abu-Alhaija et al.¹¹

The extracted themes were used to develop new items for the revised HBDS-ON by the principal investigator. Fifteen items were added to the HBDS-ON representing the content domains of the perceived threat of chemotherapy exposure, cues to adhere to chemotherapy handling guidelines, and personal protective equipment and chemotherapy-specific equipment. The added items were reviewed by the study co-investigators before final inclusion in the scale. The total number of items in the revised HBDS-ON was 44 at this stage. A new response category "not applicable" was added to the response scale in the revised HBDS-ON.

Purpose and Hypotheses

The purpose of this study was to test the psychometric properties of the revised HBDS-ON. Below are the hypotheses:

Hypothesis 1:

The revised HBDS-ON shows evidence of internal consistency reliability (Cronbach's alpha > 0.7).¹²

Hypothesis 2a:

The revised HBDS-ON has evidence of construct validity through exploratory factor analysis (based on factors' eigenvalues) by showing a structure similar to the conceptual structure of the Health Belief Model.^{8,9,12}

Hypothesis 2b:

The revised HBDS-ON has evidence of construct validity through convergence validity by demonstrating correlations between the revised HBDS-ON scores and the adherence to chemotherapy handling guidelines scores.¹²

Hypothesis 2c:

The revised HBDS-ON shows evidence of construct validity through regression model testing of a model built based on the relationships in the Health Belief Model.¹²

Methods**Study Design**

A quantitative cross-sectional design was employed in this study. Online surveys were distributed to participants through REDCap (Research Electronic Data Capture), an app used for research data collection and management.¹³ The reporting guidelines, Strengthening the Reporting of Observational Studies in Epidemiology (STROBE), tailored for quantitative observational studies was used in reporting this study.¹⁴

Participants and Setting

Participants were recruited through convenience sampling from two medical centers in the Midwest United States. Inclusion criteria for participating were 1) being 18 years or older, 2) working in oncology settings as a nurse for at least 3 months, and 3) being responsible for handling chemotherapy drugs at work. Nurses in inpatient and outpatient infusion settings were eligible to participate. An email invitation that contained information about the study and a link to the consent form and the surveys in REDCap was sent to potential participants in these two medical centers. Additionally, participants were recruited through social media (i.e., Facebook) as described in Oudat and Bakas.¹⁵ A Facebook page was created for this study. The study flyer with the link to the study in REDCap was posted on the page and advertised to target oncology nurse population in the United States. Participants could view the study information and complete the surveys by accessing the link in the flyer. Data were collected between March 2023 and June 2023. Each participant was paid a \$15 e-gift card as compensation for their time.

Sample Size

There is a variety of recommendations on the sample size for factor analysis. In general, larger samples yield more generalizable factors particularly when the number of factors cannot be estimated theoretically prior to analysis.^{12,16} A simple rule is to use the number of respondents per item ratio. Tinsley and Tinsley¹⁶ suggested a ratio of 5–10 subjects per item up to 300 subjects. To assess for sample adequacy, the Kaiser-Meyer-Olkin (KMO) test was used. A KMO value > 0.5 is recommended. Also, Bartlett's Test of Sphericity was computed to evaluate if the data is suitable for factor analysis based on the relationships between the variables.¹⁷

Procedures and Measures

Participants completed three surveys. First was the Revised Hazardous Drugs Handling Questionnaire. This questionnaire was used to measure the level of adherence to chemotherapy handling guidelines in terms of percent of time using a scale from 0–5 (5=Always, 4=76–99%, 3=51–75%, 2=26–50%, 1=1–25%, 0= Never). This questionnaire's Cronbach's alpha is 0.83.¹⁸ Second was the Revised Oncology Nurses Health Behaviors Determinants Scale. This is the scale that was psychometrically tested in this study. It contained 44 items and was used to measure the determinants affecting nurses' adherence to chemotherapy handling guidelines. The response scale was a Likert type response scale from 1–5 (strongly disagree to strongly agree) with a “not applicable” option. Third was a demographic questionnaire, which collected data on participants' age, gender, race, level of education, and years of experience.

Data Analysis

The Statistical Package for Social Sciences (SPSS) version 29 was used to run the analysis.¹⁹ Descriptive statistics were computed to analyze the demographic characteristics of the participants as well as the other variables measured by the study surveys. The reliability of the revised HBDS-ON was tested through internal consistency reliability (Cronbach's alpha).¹⁷ To evaluate meeting Cronbach's alpha assumption of tau-equivalence (equal contribution of each item in explaining the latent variable), the dimensionality of the scale and subscales was assessed through Exploratory Factor Analysis, and the item-total correlations for each subscale were assessed through item analysis.^{12,17} The construct validity of the scale was measured through: 1) exploratory factor analysis using principal axis factoring and varimax rotation, with a factor loading more than 0.4 being considered significant, 2) convergence validity testing of Pearson's correlation between the revised HBDS-ON subscales' scores and the Revised Hazardous Drugs Handling Questionnaire scores, and 3) regression model testing based on a model that was built from the relationships between constructs in the Health Belief Model (figure 1).^{8,9,17}

Based on the findings from factor analysis and reliability testing, items that did not psychometrically perform well were deleted. The items were deleted based on the criteria: 1) increased Cronbach's alpha of the subscale if the item is deleted, 2) secondary or no significant item loadings on the extracted factors, and/or 3) high ceiling effects.

Results

Descriptive Statistics

One hundred and twenty-three oncology nurses participated in the study. The mean age for participants was 36.9 years (SD=11.2), the mean of years of nursing experience was 12.2 years (SD=11.3), and the mean of years of oncology experience was 8.5 years (SD=8.8). Most participants were female (n=118, 95.9%), White (n=113, 91.9%), and holding Bachelor's degrees (n=79, 65.3%). Table 1 provides further details on the sample characteristics. Based on the Revised Hazardous Drugs Handling questionnaire scores, the nurse participants reported adherence to chemotherapy handling guidelines at 54.5% of the time (SD=21.4; range: 0%–100%).

Factor Analysis

The results of KMO test indicated a suitable sample adequacy (KMO value= 0.74), and Bartlett's Test of Sphericity showed that the variables in the dataset are correlated (χ^2 (630)=1995.43, $p<.001$). These results indicated that the data were suited for factor analysis.

The exploratory factor analysis results indicated that 9 factors have eigenvalues greater than 1. The scree plot method (visualizing the eigenvalues of the extracted factors through a line graph) suggested four- or seven-factor structure where the line started to flatten. After testing several factor structure solutions, the seven-factor structure was found as the solution that resonates conceptually. This seven-factor structure explained 59.9% of the variance related to factors affecting adherence to chemotherapy handling guidelines among oncology nurses. Based on table 2, the first factor includes 11 items and represents the variable, cues to adhere to chemotherapy handling guidelines, (eigenvalue=8.2, variance explained=22.9). Seven items related to perceived barriers to adhere to chemotherapy handling guidelines loaded in the second factor (eigenvalue=3.6, variance explained=10.1). The third factor includes 7 items that represent the perceived efficacy to adhere to chemotherapy handling guidelines (eigenvalue=2.9, variance explained=8.0). The fourth factor contains 6 items measuring the perceived threat of chemotherapy exposure complications (eigenvalue=2.0, variance explained=5.6). Two items representing institutional response to chemotherapy exposure incidents loaded in the fifth factor (eigenvalue=1.8, variance explained=4.9). The sixth factor includes two items that assess the variable PPE availability and accessibility (eigenvalue=1.6, variance explained=4.5). Only one item loaded in the seventh factor and represents equipment-related problems (eigenvalue=1.4, variance explained=3.9). This factor structure informed the structure of the subscales in the revised HBDS-ON. Table 3 presents the descriptive statistics for the revised HBDS-ON subscales.

Reliability Analysis

Cronbach's alpha was not calculated for the whole scale because the exploratory factor analysis results revealed a multidimensional structure. Thus, it was calculated only for the subscales. Item-total correlations had minimal variation for most of the items in each subscale, which supports the tau-equivalence assumption of Cronbach's alpha. Cronbach's alpha values from the first to the sixth subscales were 0.88, 0.81, 0.80, 0.82, 0.70, 0.59 respectively. The internal consistency reliability could not be assessed for the seventh factor because it contains only one item. Based on the results from factor analysis and reliability testing, eight items that did not psychometrically perform well were deleted from the revised HBDS-ON, two of these items were from the original HBDS-ON.

Convergence Validity

The correlations between the subscales' scores and the adherence to chemotherapy handling guidelines show that five of the variables represented by the subscales have significant relationships with the adherence score. These variables are the cues to adhere to chemotherapy handling guidelines ($r=0.52$, $p<0.001$), perceived barriers to adhere to chemotherapy handling guidelines ($r=0.27$, $p=0.004$), perceived efficacy to adhere to chemotherapy handling guidelines ($r=0.31$, $p=0.001$), institutional response to chemotherapy exposure incidents ($r=0.20$, $p=0.042$), and PPE Availability and Accessibility

($r=0.19$, $p=0.044$). Table 4 presents the correlations between each of the subscales and the handling score (Bivariate r).

Regression Model Testing

The results of ANOVA test indicate that the regression model is a good fit for the data ($F(7,97)=5.70$, $p<.001$). The result of regression analysis indicates that the only variable that significantly predicts the adherence score is the cues to adhere to chemotherapy handling guidelines ($B=1.12$, $p<.001$). Other variables that represent the remaining subscales were not significant predictors of nurses' adherence to chemotherapy handling guidelines. The model explains 29.1% of the variance in the adherence to chemotherapy handling score. The results of the regression model are presented in Table 4.

Discussion

The purpose of this study was to psychometrically test the revised HBDS-ON. Several items representing workplace and personal factors that affect nurses' chemotherapy exposure were added to the original HBDS-ON. The results of psychometric testing of the revised HBDS-ON indicate that the scale shows evidence of internal consistency reliability and construct validity through factor analysis, convergence validity, and regression model testing.

The findings of the factor analysis show that the final structure of the revised HBDS-ON is similar to the original HBDS-ON and the structure proposed by the Health Belief Model.^{6,8,9} The factor representing the cues to adhere to chemotherapy handling guidelines explained the largest component of the variance of the variable measured by the revised HBDS-ON. Different from the original scale, the revised HBDS-ON includes subscales representing determinants in the workplace affecting nurses' adherence to chemotherapy handling guidelines. These subscales are the institutional response to chemotherapy exposure incidents and equipment-related problems. The items in these subscales were added to the instrument based on the results from obtaining the perspectives of oncology nurses and nurse managers. Exploratory factor analysis testing showed that the factors representing these subscales reflect dimensions of variability in determinants of nurses' adherence to chemotherapy handling guidelines. Future revisions of the scale should involve adding more items to these new subscales to better describe the latent variables underlying them.

Convergence validity and regression model testing provided further evidence of the revised HBDS-ON construct validity. Improved upon the original HBDS-ON, scores of five subscales in the revised HBDS-ON significantly correlated with the adherence score. These results indicate that the cues to adhere to chemotherapy handling guidelines, perceived barriers to adhere to chemotherapy handling guidelines, institutional response to chemotherapy exposure incidents, and PPE availability and accessibility influence oncology nurses' adherence to chemotherapy handling guidelines, with the cues to adhere to the guidelines being a significant predictor of oncology nurses' adherence to these guidelines. Similar findings involving the relationships between oncology nurses perceived barriers and some types of cues to action in the workplace and their adherence behaviors were found in the study by Abu Sharour et al.²⁰ Additionally, findings from previous research support the

importance of the institutional policies and PPE availability and acceptability on oncology nurses' adherence to chemotherapy handling guidelines.^{4,18,21}

Interestingly, the internal consistency reliability testing supported the revised HBDS-ON subscales' internal consistency. All subscales except PPE Availability and Accessibility subscale have acceptable levels of internal consistency. One reason that internal consistency reliability for PPE Availability and Accessibility subscale is below the acceptable level is the short length of the subscale which contains only two items. Given the equipment-related problems subscale only contained on item, the internal consistency reliability could not be calculated.

Limitations

One of this study's limitations is the social desirability bias that might influence oncology nurse participants to provide responses that are socially desirable. Additionally, selection bias might influence the study results; oncology nurses who were interested in providing information about their handling practices might not be representative of all oncology nurses. Other limitations are the small sample size, homogeneity of participants' characteristics, recruiting participants through convenience sampling with the majority being from large medical centers in urban areas. This limits the generalizability of the study results to other populations or healthcare settings. Quantitative cross-sectional study design is another limitation because this study design limits the ability to draw conclusions on the cause-and-effect relationships between the variables.

Implications for Nursing Practice and Research

Oncology nurses' adherence to chemotherapy handling guidelines is critical to protect themselves from the hazards of chemotherapy exposure at workplace. Several factors have been found affecting nurses' adherence to these guidelines. Healthcare institutions should consider these factors and relevance of the Health Belief Model when developing and implementing policies to promote oncology nurses' occupational safety. Additionally, healthcare institutions should offer resources in the workplace to enhance oncology nurses' readiness to adhere to the guidelines when handling chemotherapy.

The findings of this study highlight the importance of the cues to adhere to chemotherapy handling guidelines in the workplace in promoting nurses' adherence to these guidelines. Even nurses possessing favorable health beliefs toward the adherence to safe chemotherapy handling practices would not be capable of following the handling guidelines when necessary equipment and workplace resources are unavailable. Within the workplace, a wide range of prompts can enhance oncology nurses' readiness to adhere to safe practices when handling chemotherapy such as educational resources, hazard labels, monitoring nurses' adherence to the handling guidelines, and the influence of coworkers.

Implications for future research include further testing of the revised HBDS-ON using confirmatory factor analysis to verify the structure of the instrument with a larger and more heterogeneous sample of oncology nurses. Also, developing and testing interventions to increase adherence to safe practices when handling chemotherapy is warranted.

Conclusion

The Revised HBDS-ON shows additional evidence of reliability and validity. This scale can be used to measure factors at workplace and personal levels that affect nurses' adherence to chemotherapy handling guidelines. Among these factors, cues to action at work environment are particularly important in influencing the adherence to the guidelines.

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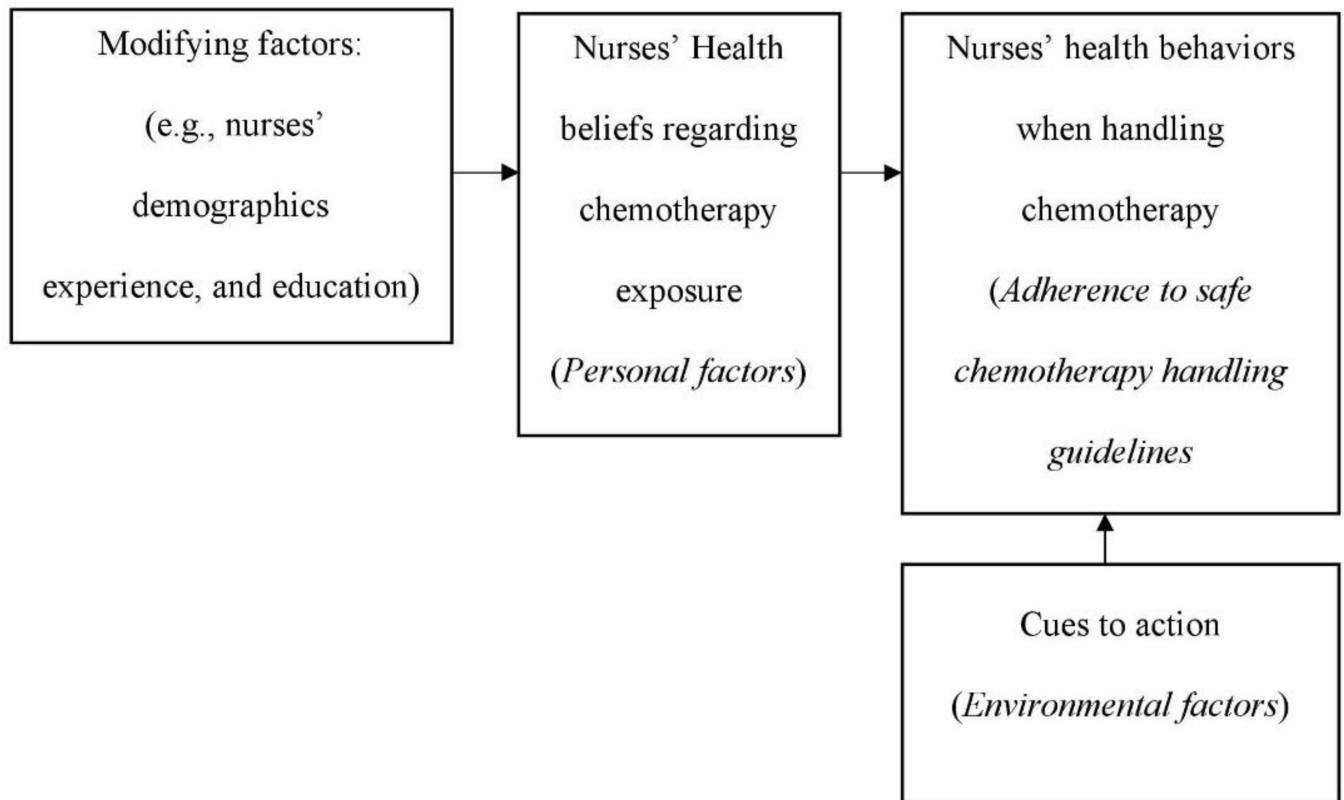


Figure 1.
Conceptual Model Based on the Health Belief Model

Table 1.

Participant Demographics (n=123)

Demographic	N (%)	M (SD)
Age		36.86 (11.17)
Years of nursing experience		12.17 (11.26)
Years of oncology experience		8.51 (8.83)
Gender		
Female	118 (95.9%)	
Male	5 (4.1%)	
Race		
African American	1 (0.8%)	
Asian	5 (4.1%)	
White	113 (91.9%)	
Other	4 (3.3%)	
Education		
Diploma	5 (4.1%)	
Associate degree	21 (17.4%)	
Bachelor's degree	79 (65.3%)	
Master's degree	15 (12.4%)	
Post Master's degree or certification	1 (.8%)	

Table 2.
Rotated Factor Matrix (n=123)

	Factor						
	1	2	3	4	5	6	7
Cues to Adhere to Chemotherapy Handling Guidelines							
Cues to Action 1	0.818	-0.022	0.046	0.064	0.188	0.106	-0.067
Cues to Action 2	0.738	-0.209	0.119	-0.007	0.059	0.254	-0.112
Cues to Action 3	0.725	-0.171	0.274	-0.020	-0.043	0.121	-0.148
Cues to Action 4	0.678	0.041	0.036	-0.024	0.002	-0.085	0.015
Cues to Action 5	0.570	-0.001	0.126	0.054	0.095	0.200	0.173
Cues to Action 6	0.558	-0.142	0.183	0.035	0.286	-0.208	0.002
Cues to Action 7	0.513	-0.401	0.290	-0.089	-0.001	0.246	0.071
Cues to Action 8	0.472	-0.286	0.339	0.069	0.056	0.185	-0.084
Cues to Action 9	0.466	-0.173	0.003	0.090	0.267	0.076	0.316
Cues to Action 10	0.436	-0.129	0.344	0.027	0.283	-0.111	-0.196
Cues to Action 11	0.409	-0.045	0.217	0.009	0.022	0.040	0.364
Perceived Barriers to Adhere to Chemotherapy Handling Guidelines							
Perceived Barrier 1	-0.187	0.779	-0.208	-0.077	-0.146	-0.133	-0.048
Perceived Barrier 2	-0.190	0.779	-0.162	0.099	-0.053	-0.048	0.084
Perceived Barrier 3	-0.183	0.662	-0.281	0.007	0.001	-0.025	0.163
Perceived Barrier 4	-0.068	0.508	-0.014	0.215	0.017	0.025	0.109
Perceived Barrier 5	-0.020	0.506	-0.101	0.052	-0.048	-0.051	-0.197
Perceived Barrier 6	0.051	0.491	0.190	-0.171	0.056	0.154	0.019
Perceived Barrier 7	-0.028	0.432	-0.243	0.124	-0.035	-0.008	-0.029
Perceived Efficacy to Adhere to Chemotherapy Handling Guidelines							
Perceived Efficacy 1	0.123	-0.156	0.741	0.108	0.059	-0.024	-0.017
Perceived Efficacy 2	0.035	-0.236	0.729	0.127	0.221	0.058	-0.022
Perceived Efficacy 3	0.431	-0.043	0.569	0.007	-0.220	-0.424	0.164
Perceived Efficacy 4	0.250	-0.014	0.518	0.130	0.067	0.092	-0.100
Perceived Efficacy 5	0.129	-0.216	0.500	0.219	0.085	0.087	0.002
Perceived Efficacy 6	0.350	-0.122	0.485	0.053	-0.106	0.096	-0.109
Perceived Efficacy 7	0.075	-0.397	0.444	0.138	0.250	0.187	0.074
Perceived Threat of Chemotherapy Exposure Complications							
Perceived Treat 1	-0.003	0.132	0.079	0.728	-0.076	-0.036	-0.307
Perceived Treat 2	0.110	0.040	0.021	0.721	-0.076	-0.072	0.103
Perceived Treat 3	-0.013	0.151	0.082	0.713	0.050	0.173	-0.027
Perceived Treat 4	-0.082	-0.121	0.131	0.679	0.201	0.102	-0.032
Perceived Treat 5	0.081	-0.004	0.143	0.674	0.009	-0.098	0.053
Perceived Treat 6	0.001	0.097	0.087	0.437	0.038	0.004	-0.390
Institutional Response to Chemotherapy Exposure Incidents							

	Factor						
	1	2	3	4	5	6	7
Institutional Response 1	0.208	-0.102	0.113	0.057	0.764	-0.055	-0.008
Institutional Response 2	0.129	0.006	0.079	0.002	0.728	0.124	0.053
Personal Protective Equipment (PPE) Availability and Accessibility							
PPE 1	0.264	-0.156	0.013	0.055	0.121	0.551	0.155
PPE 2	0.211	0.058	0.366	-0.018	-0.081	0.530	0.039
Equipment-Related Problems							
Equipment-Related Problems 1	-0.063	0.086	-0.091	-0.064	0.016	0.063	0.481

Table 3.
Descriptive Statistics for the Revised HBDS-ON Subscales (n=123)

Revised HBDS-ON Subscales	Minimum	Maximum	Possible Range	Mean	Std. Deviation	Cronbach's Alpha
Cues to adhere to chemotherapy handling guidelines	17.00	55.00	0–55	42.18	8.89	0.88
Perceived Barriers	9.00	35.00	0–35	22.64	5.97	0.81
Perceived Efficacy	22.00	35.00	0–35	32.49	2.83	0.80
Perceived Threat	16.00	30.00	0–30	26.91	2.95	0.82
Institutional Response to Chemotherapy Exposure Incidents	2.00	10.00	0–10	7.69	2.01	0.70
Personal Protective Equipment Availability and Accessibility	2.00	10.00	0–10	8.12	2.06	0.59
Equipment-Related Problems	1	5	0–5	3.69	1.16	N/A

Table 4.

Regression model testing of the relationships between the adherence to chemotherapy handling guidelines and the seven subscales' scores (n=123).

	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta	Bivariate r		
(Constant)	-15.52	24.76			-0.63	0.53
Cues to adhere to chemotherapy handling guidelines	1.12	0.27	0.47	0.52 **	4.16	<.001
Perceived barriers to adhere to chemotherapy handling guidelines	0.45	0.36	0.13	0.27 *	1.27	0.21
Perceived Efficacy to adhere to chemotherapy handling guidelines	0.10	0.84	0.01	0.31 *	.11	0.91
Perceived threat of chemotherapy exposure complications	0.70	0.65	0.10	0.12	1.08	0.28
Institutional response to chemotherapy exposure incidents	-0.11	1.00	-0.01	0.20 *	-0.11	.091
PPE Availability and Accessibility	-0.18	0.97	-0.02	0.19 *	-0.19	0.85
Equipment-Related Problems	-1.97	1.65	-.11	-0.07	-1.19	0.24

** Correlation is significant at the 0.001 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).