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Original Article

Translation and validation: standard Chinese version of the skin tear knowledge assessment instrument (OASES)

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ABSTRACT

Objective: Skin tears (STs) are acute cutaneous trauma and have become an increasingly common global health problem. International studies have shown barriers to the prevention and management of ST and the relevance of the role of nurses in implementation. The purpose of this study was to adapt an existing tool to measure nurses' knowledge of the prevention, assessment, and management of STs.

Methods: Skin tear knowledge assessment instrument (OASES) is a knowledge survey tool for skin lacerations developed by Van Tiggelen et al. in 2020. The standard Chinese version of OASES was formed by translating and cross-cultural adaption of source tools following Brislin's translation model, and content validity and translation quality were determined by Delphi method. A psychometric assessment of 341 nurses was then performed to assess item difficulty, discrimination, and quality of response selection in the standard Chinese version of OASES. In addition, construct validity was established by test-retest procedures and known-group techniques.

Results: The standard Chinese version had good content validity and moderate difficulty. It was found that the discrimination was very good: all groups with higher professional level (theoretically expected) scored significantly higher than those with lower professional level (theoretically expected). The stability of the tool was sufficient.

Conclusions: The standard Chinese version of OASES exhibits good psychometric properties and can be used and disseminated to nurses in a Chinese cultural context to assess knowledge about STs. However, it should be noted that the tool was only validated with nurses in cancer hospitals.

Introduction

Skin tears (STs) are acute cutaneous trauma that have become an increasingly common global health problem.[1,2] As the population ages, more people are at risk of skin injury, with STs being one of the most serious skin injuries in the elderly.[3] Although STs do not cause severe problems in a short period of time, they can cause wounds or even systemic infections, poor wound healing, weakness or fragility, decreased mobility, prolonged hospitalization, and high medical costs if not treated quickly and adequately.[4]

A literature review found few reports on the global prevalence rate of STs. Carville et al[5] concluded that ST is more common and frequent than pressure sores and burns. A systematic review found the prevalence rate of STs to be 3.3%–22% in different healthcare settings.[1] In China, a recent multicenter survey showed a prevalence rate of 1.06% for STs.[6] The Pennsylvania Safety Reporting System (PA-PSRS) reported that more than half of STs are acquired in hospitals[7] and have become a problem affecting inpatient safety.

The International Skin Tear Advisory Panel (ISTAP) believes that most STs are preventable.[8] Despite the high prevalence and impact, STs are often under-recognized and misdiagnosed, leading to unsatisfactory prevention and delayed or inappropriate treatment.[9] The key to reducing ST occurrence and severity is integrating best practice evidence for prevention and management.[10] However, there is a gap between evidence and practice in preventing and managing STs due to a lack of knowledge and negative attitudes toward ST.[10,11] It was found that most

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clinical nurses have not received training and therefore have misconceptions about the recognition, prevention, and management of ST.[12] Therefore, clinical nurses can better prevent, recognize, and manage ST if they are proficient and apply their knowledge of ST.[13,14] A prerequisite to providing ST knowledge to clinical nurses is a comprehensive and adequate knowledge assessment.[10] However, in China, research on the knowledge of nurses' STs is still in its infancy, and reliable and well-developed assessment tools are lacking.

Van Tiggelen et al developed a 20-item skin tear knowledge assessment instrument (OASES) to evaluate the knowledge of nurses' STs in 2020. OASES was psychometrically tested on nurses from 16 institutions in 37 countries. The results showed that the instrument is reliable and can be widely used.[10] The questionnaire fills a gap in this field in China and can be used as a valid tool to measure the level of knowledge of STs among Chinese nurses. This study aimed to adapt an existing tool (OASES) to measure nurses' knowledge of the prevention, assessment, and management of STs.

Methods

Study design

This study is divided into three parts as follows: (1) translating the original English version of OASES into standard Chinese; (2) evaluating the quality of the translation and revising through expert consultation; and (3) testing the standard Chinese version of OASES (C-OASES) for internal consistency and structural validity.

Research instruments

OASES is a knowledge assessment tool used to evaluate nurses' knowledge of STs. Based on expert opinion and relevant best-practice recommendations, this instrument identifies six knowledge domains covering the most relevant aspects of ST management to construct the instrument. The OASES contains 20 items grouped into six dimensions: etiology, classification, observation, prevention, treatment, and specific patient groups. All instrument elements are multiple-choice elements and include five choices, with option E being “I don't know the answer” The total score ranges from 0 to 20, with higher scores indicating greater knowledge about STs. The OASES has been demonstrated to have acceptable validity and reliability properties.[10]

Translation and adaptation

The cross-cultural adaptation and translation of OASES were carried out according to Brislin's translation model.[15] Phase I consisted of three steps. First, preliminary translation: two translators (B-J L. and J-Y L.) with good bilingualism in Chinese and English translated the tool independently. The authors of this paper integrated the two standard Chinese versions of the tool, discussed them, and reached a consensus with translation experts to form the final version. Second, back translation: the final version was independently translated into English by two translators without a medical background. One had a master's degree in English translation, and the other had one year of study abroad experience in an English-speaking country. Researchers compared similarities and differences between the two back-translated versions and compared them with the original tool, which was retranslated and back-translated to achieve agreement in case of disagreement. Third, cultural adaptation: if the scale is to be used cross-culturally, the elements of the scale must be well translated into the language and be culturally adapted to maintain the validity of the scale at the conceptual level between cultures.[16] Cultural adaptation was performed using the Delphi procedure. We distributed a self-developed cross-cultural adaptation expert consultation questionnaire to experts in the field of STs to examine conceptual, semantic, and experiential equivalence. A panel of seven experts was invited to independently evaluate each element of the tool in terms of clarity, translation quality, conceptual equivalence, and content validity. Experts were selected based on the following criteria: (1) master's degree or higher; (2) working in a tertiary care hospital or institution of higher education; (3) working or researching in the field of stoma or wound care; (4) more than ten years of experience; and (5) following the principles of informed consent and voluntariness, actively participating in this study, and being able to provide guidance and suggestions from different approaches and perspectives for this study. Two rounds of expert consultation were conducted. In the second round of consultation, they were asked to assess the importance of the questions (such as not important at all, not important, important, and very important). All elements were evaluated individually.

Phase II is described as follows: ten oncology nurses (five ostomates, three surgical oncology nurses, and two medical oncology nurses) used the scale as a pilot to determine whether the elements of the tool were easy to understand. The items were further modified based on the nurses' recommendations to generate the final tool.

Data collection and participants

The study samples were recruited from a tertiary cancer hospital in Guangdong Province. Before the study, we obtained consent from participating hospitals and departments. The study tool was distributed as an electronic questionnaire to the participating departments. Participants were able to complete the questionnaire by scanning the code. Participants were recruited from a tertiary cancer hospital with nearly 2000 registered nurses. Participants were selected using a random sampling method. In this study, participation was entirely voluntary, anonymous, and randomized.

Data analysis

SPSS v22.0 (SPSS Inc., Chicago, IL, USA) was used for statistical analysis. Answers to the knowledge assessment were recorded using dichotomous variables (incorrect-correct). A correct answer was scored 1, and an incorrect answer was scored 0. The option “I don't know the answer” was considered “incorrect” The total score for the instrument was calculated as the sum of the correct answers (maximum score = 20). The significance level was set at 5%.

Descriptive analysis was used to analyze the demographic characteristics of experts and participants. Continuous data were expressed as mean ± standard deviation ($\bar{x} \pm s$), and categorical data were expressed as percentages (%).

An assessment of item difficulty, discrimination index, quality of response options, and content validity was performed to study the validity of multiple-choice test items. The difficulty of the assessment (*P*-value) refers to the proportion of respondents who answered the item correctly.[17] For items with five response options, items with a $P = 0.70$ were the best in terms of difficulty. Items with a *P*-value > 0.90 were considered too easy, while items with a *P*-value below 0.10 were considered too difficult.[18] The discrimination index (D-value) was achieved using the extreme grouping method. The participants were divided into two extreme groups using the extreme grouping method: 27% of the best-performing participants and 27% of the worst-performing participants.[19] The discrimination index, expressed as a D-value, was calculated by subtracting the percentage of correct answers of the best-performing group from the percentage of correct answers of the worst-performing group. Based on prior research, a D-value less than 0.10 was regarded as low, between 0.10 and 0.20 as acceptable, between 0.20 and 0.30 as moderate, and beyond 0.30 as excellent.[18,20] The quality of the response alternatives (a-value) was

assessed by the proportion of respondents who chose the alternatives.[17] The distribution of incorrect answers in the answer alternatives was defined to evaluate the quality of the answer alternatives. The ideal a-value for each item with five response alternatives is 0.10 and must be less than the *P*-value.[18] A consistent a-value for each item is ideal, which means that each answer alternative has the same interference effect.

Construct validity was performed using the known group technique. Known group techniques were used to assess the ability of the tool to differentiate between groups expected to have different levels of expertise.[21,22] Participants were divided into three groups: nurses with a junior college degree or below; nurses with a bachelor's degree or above; nurses with less than 15 years of experience; nurses with more than 15 years of experience; nurses who had participated in training in stress injuries and STs; and nurses who had received little or no training. The scores of the group with higher professional levels of expertise (theoretical expectations) were compared with those of the group with lower levels of professional expertise (theoretical expectations).

Test-retest reliability was used to measure the stability of the tool at different moments in time. After two weeks of data collection, 72 nurses volunteered to participate in a second survey to validate the test-retest reliability. Stability of reliability ≥ 0.7 was considered acceptable, and ≥ 0.8 was considered good.[23]

Ethical considerations

This study was approved by the Ethics Committee of the Sun Yat-sen University Cancer Center (IRB No. B2022-570-01). Participants received written informed consent about the objectives and procedures before starting the study. Informed consent was obtained from all participants.

Results

Characteristics of the participants

In this study, seven experts were selected to culturally adapt the translated version and select, modify, or delete items from the instrument according to the consultation results. All the experts who participated in the Delphi process for this study were female. One of them has a doctorate (14.29%), two have a master's degree (28.57%), and four have a bachelor's degree (57.14%). Their average age was (40.86 ± 12.07) years, and they had an average of 18.57 ± 15.77 years of work experience. In this study, 341 nurses from cancer hospitals were invited to complete the questionnaire. Of all participants, the majority were female (96.19%). The average age of the participants was (31.81 ± 6.20) years, and the average work experience was (9.86 ± 7.06) years. The characteristics of all participants are summarized in Table 1.

Table 1
Demographics of the participants ($n = 341$).

	N	%
Age (years, Mean ± SD)	31.81 ± 6.20	
Work experience (years, Mean ± SD)	9.86 ± 7.06	
Gender		
Male	13	3.81
Female	328	96.19
Final education		
Special school	0	0
Junior college	21	6.16
Undergraduate	304	89.14
Master	16	4.69
Receiving training		
Participated in training on stress injury and skin laceration	120	35.19
Only participated in the training of pressure injury	136	39.88
Only participated in the training of skin laceration	3	0.88
No training	82	24.04

Psychometric analysis

Content validity

The item-level content validity (I-CVI) was 0.86–1.0, and the scale-level content validity (S-CVI) was 0.99. Ten oncology nurses who participated in the pilot trial reported that the items and choices in the tool were well understood.

Validity of multiple-choice test items

Item difficulty

For the 19 items, the difficulty of the items (*P*-value) ranged between 0.14 and 0.89, with an average of 0.51. One item (item 20) was considered too easy (0.92). Table 2 provides an overview of the information.

Discrimination index

The discrimination index (D-value) for 20 items ranged between 0.16 and 0.55, with a median of 0.35. Four elements had reasonable D-values, two elements were moderate, and 13 items were good. None had a negative discrimination index. An overview is provided in Table 2.

Quality of the response alternatives

The quality of the response alternatives (a-value) ranged from 0.02 to 0.55, with an average of 0.38. For six items, the a-values were higher than the *P*-values. Table 2 provides a summary of the information presented.

Construct validity

The known-group techniques were used to evaluate the construct validity of the tool. Participants were divided into four groups based on their theoretical expectation scores. The group with higher levels of theoretical expected knowledge had a statistically significantly higher average total score than those with lower levels of theoretical expected knowledge in the subgroups of final educational background, work experience, and training experience (Table 3).

Test-retest reliability

We adopted a test-retest procedure to evaluate the stability of the C-OASES. A total of 72 nurses completed the retest 10 days after the first test. In the scores of the two tests, "etiology" ($r = 0.44$, $P < 0.01$), "classification and observation" ($r = 0.50$, $P < 0.01$), "risk assessment" ($r = 0.30$, $P < 0.01$), "prevention" ($r = 0.73$, $P < 0.01$), "treatment" ($r = 0.92$, $P < 0.01$), "specific patient groups" ($r = 0.52$, $P < 0.01$), and the overall C-OASES ($r = 0.65$, $P < 0.01$) were statistically significant (Table 4).

Discussion

This study aimed to translate the OASES into standard Chinese and culturally adapt it to the Chinese cultural context. We also conducted a psychometric evaluation on C-OASES, an assessment tool used to investigate the level of knowledge of STs in a group of nurses, published in 2020 and currently lacking in China. The original OASES has been developed and tested for psychometric properties in 37 countries and has been shown to have acceptable validity and reliability.[10] To our knowledge, this is the first study on the psychometric characteristics of a version of the OASES applicable to China. The C-OASES consists of 20 multiple-choice items grouped into six topics covering the most relevant aspects of STs. The results indicate that the C-OASES has credible validity and reliability properties.

The validity of the face and content of the C-OASES was confirmed by seven experts in the dual Delphi program and by ten nurses in the pilot study. The I-CVI for all items exceeded 0.8, meeting the criteria for content validity.[24] All participants in the pilot trial indicated that the elements were easy to understand, suggesting that the C-OASES is a feasible tool for clinical nurses. The C-OASES has satisfactory both face and content validity. In other words, it demonstrates that the content

Table 2
Validity of the multiple-choice test items.

Domains	Items	The proportion of respondents choosing each response option[a]				Don't know[c]	D-value[d]	Test-retest correlations
		Response options						
		A	B	C	D			
Etiology	1	0.89[b]	0.03	0.03	0.04	0.04	0.20	0.44 (−0.50–0.53, $P < 0.01$)
	2	0.03	0.03	0.03	0.78[b]	0.14	0.35	
	3	0.02	0.51[b]	0.05	0.38	0.05	0.36	
Classification and observation	4	0.12	0.09	0.02	0.80[b]	0.06	0.29	0.50 (0.13–0.43, $P < 0.01$)
	5	0.02	0.41	0.36[b]	0.03	0.18	0.33	
	6	0.04	0.30	0.55[b]	0.06	0.11	0.50	
	7	0.06	0.55[b]	0.12	0.09	0.18	0.48	
Risk assessment	8	0.07	0.44[b]	0.21	0.09	0.19	0.31	0.30 (0.11–0.28, $P < 0.01$)
	9	0.14[b]	0.14	0.06	0.55	0.11	0.17	
Prevention	10	0.82[b]	0.02	0.09	0.03	0.05	0.36	0.73 (0.56–0.90, $P < 0.01$)
	11	0.55	0.31[b]	0.08	0.02	0.04	0.17	
	12	0.02	0.28	0.42[b]	0.21	0.06	0.39	
	13	0.46	0.17[b]	0.08	0.15	0.15	0.20	
	14	0.72[b]	0.04	0.15	0.03	0.06	0.49	
	15	0.11	0.05	0.39	0.38[b]	0.07	0.51	
Treatment	16	0.23	0.60[b]	0.03	0.07	0.08	0.49	0.92 (0.76–0.87, $P < 0.01$)
	17	0.26	0.06	0.02	0.56[b]	0.11	0.55	
	18	0.04	0.04	0.21	0.65[b]	0.07	0.51	
	19	0.44	0.19[b]	0.08	0.06	0.23	0.16	
Specific patient groups	20	0.09	0.03	0.92[b]	0.03	0.03	0.21	0.52 ($P < 0.01$)

[a] Based on the proportion of respondents who did not choose the 'I do not know the answer' option (a-value for incorrect response alternatives).
[b] Correct answer (*P*-value).
[c] Proportion of respondents who choose the 'I do not know the answer' option.
[d] Discriminating index.

Table 3
Known-groups technique.

Groups	*N*	Mean score (SD) (max = 20)	*t*	df	*P*
Junior college degree or below (L)	190	10.43 (3.06)	−2.19	339	0.029*
Bachelor's degree or above (H)	151	11.16 (3.03)			
Less than 15 years of work (L)	273	10.00 (3.55)	2.28	339	0.023*
More than 15 years of working experience (H)	68	10.94 (2.90)			
Have received one or no training (L)	221	10.46 (3.23)			
Participated in training on stress injury and skin tears (H)	120	11.30 (2.65)	2.45	339	0.015*

(H), group with theoretically expected a higher level of expertise; (L), group with theoretically expected lower level of expertise; *: $P < 0.05$.

Table 4
Test-retest correlations of the C-OASES.

Variables	Test		Re-test		*R*
	Mean	SD	Mean	SD	
C-OASES[a]	7.97	1.44	7.67	1.49	0.44**
C-OASES[b]	11.99	2.70	11.29	1.92	0.50**
C-OASES[c]	5.94	1.65	5.64	1.61	0.30**
C-OASES[d]	12.42	2.21	12.51	2.37	0.73**
C-OASES[e]	11.36	2.72	11.56	2.60	0.92**
C-OASES[f]	3.01	0.27	3.01	0.21	0.52**
C-OASES	11.50	2.71	12.14	2.44	0.65**

**: $P < 0.01$.
[a] Etiology.
[b] Classification and observation.
[c] Risk assessment.
[d] Prevention.
[e] Treatment.
[f] Specific patient groups.

setting of the scale items reflects nurses' knowledge of the skin lacerations to be measured.

An integral part of preventing and managing STs is the continuous improvement of nurses' knowledge and competence to ensure accurate identification of risk factors and the provision of interventions.[25] In this study, 341 clinical nurses from a tertiary cancer hospital in Guangdong Province were selected as samples to provide a more appropriate tool for evaluating nurses' knowledge of STs. Overall, the difficulty values of the items were good, although only one item was considered too easy (item 20). However, item 20 was not adjusted because experts agreed that identifying specific patient populations is important to ST prevention. For six items (5, 9, 11, 13, 15, and 19), the proportion of correct answers was lower than that of incorrect answers. However, these items were retained because the experts in this study suggested that the above items are necessary to truly examine the classification and prevention abilities of nurses. In China, the focus of skin management is limited to stress injuries and incontinent dermatitis, and less attention is paid to knowledge of STs.[26] Therefore, it is reasonable to assume that the lack of knowledge training leads to a lack of nurses' knowledge and thinking ability, resulting in low *P*-values. In this study, the D-values for all items ranged from 0.16 to 0.55, which is between acceptable and high. This result means that these items were well discriminated against and could distinguish between participants with low and high scores.

In this study, the known group technique was utilized to compare the average scores of groups with different levels of theoretical knowledge. This technique indicates whether the instrument is effective in measuring the structure.[21] The results of this study showed that the scores of all pre-defined groups differed significantly in the expected direction, which further confirms that the C-OASES can provide a high level of discrimination.

The reliability of the test was evaluated to assess the stability of C-OASES over two weeks. Reliability refers to the consistency and dependability of test results, ie., the degree to which test results are not affected by time, place, or other variables.[23] The results of this study showed that the two measurements were correlated, indicating that the C-OASES has stable repeatability. The results also imply that the C-OASES can be used as a reliable tool to measure the level of knowledge of STs among Chinese nurses.

The original ST knowledge assessment tool was developed based on the latest evidence-based recommendations for ST prevention and management.[10,27] All items of this assessment tool are based on the latest ST theories and practices, so it is somewhat specialized and current. Therefore, it needs to be continuously updated to ensure its broad applicability. Most Chinese researchers and clinical nurses pay little attention to the knowledge and related theories in the field of STs injuries, and the corresponding education and management still lack standards.[26] This is one of the reasons why some of the multiple-choice questions in the item difficulty analysis had a higher percentage of alternative options than correct answers. Educational programs can play an important role in disseminating ST guidelines and research findings to medical professionals, bridging the gap between evidence and practice.

Limitations

The C-OASES was validated only by clinical nurses in cancer hospitals, which may be a limiting factor. This also resulted in only three predefined groups in the structural validity test, which may impact the structural validation of the C-OASES. In the next step, the use of the instrument should be expanded to include not only clinical nurses but also interns and nursing students to improve the C-OASES further.

Conclusions

The C-OASES was developed after tedious translation, cultural adaptation, and psychological evaluation, as well as has satisfactory psychometric properties. The reliability and effectiveness of the C-OASES were confirmed by validity analyses of multiple-choice items, including item difficulty, discrimination index, quality of response alternatives, content validity, and the analysis of construct validity and reliability. Thus, it can be used to investigate the level of knowledge of STs among Chinese cancer nurses. Further research is needed to replicate this study with a larger sample. Therefore, to improve ST knowledge among Chinese medical practitioners, we need to conduct relevant educational programs and use the C-OASES to assess factual knowledge and more complex cognitive skills regarding ST management.

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CRediT author statement

Baojia Luo, Jianying Liu, Lei huang, and Zhong ying Huang identified the topic, conducted the research and design, and wrote the first draft of the paper; Wei cong Chen, Yong lan Ge, and Lei huang were responsible for the implementation of the study, data collection, data analysis, and interpretation of the results; Baojia Luo was responsible for the revision of the final draft, quality control, and review of the article, as well as overall responsibility for the article. All authors had full access to all the data in the study, and the corresponding author had final responsibility for the decision to submit for publication. The corresponding author attest that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

Declaration of competing interest

The authors declare no conflict of interest.

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Ethics statement

This study was approved by the Ethics Committee of the Sun Yat-sen University Cancer Center (IRB No. B2022-570-01). All participants provided written informed consent.

Data availability statement

The authors confirm that the data supporting the findings of this study are available within the article.

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