研究ノート

Establishment and Validation of the Japanese Version of the Exposure to Disruptive Behavior Scale

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　西欧諸国では、認知症高齢者による攻撃的行動が、施設や病院で働くスタッフにストレスを与えることが問題になっている。我が国においては、看護師による認知症高齢者の攻撃的行動に関する研究は始まったばかりであり、その攻撃的行動によるスタッフのストレスを測る尺度として信頼性・妥当性が確立したものはまだない。

　今回、カナダで開発されたThe Exposure to Disruptive Behavior Scale（EDBスケール）を日本語訳し、信頼性・妥当性の検証を行った。α係数は0.94であり、Stressor Assessment Scaleを使った構成概念妥当性も立証された。

　今後、日本のあらゆる施設で、日本語版EDBスケールを使って、認知症高齢者による攻撃的行動の発生頻度や、その行動によるスタッフのストレスを測定することが可能となった。

Key words　aggressive behavior, dementia, disruptive behavior, formal caregiver, translation

INTRODUCTION

　Caring for elderly people with dementia can be burdensome for formal caregivers , especially when an elderly person exhibits aggressive behavior[1][2][3][4]. Formal caregivers in nursing homes are frequent targets of aggressive behaviors because they occur most often while caregivers are assisting residents with dementia in activities of daily living [3][5][6][7]. After incidents involving aggressive behaviors, many formal caregivers report experiencing stress and other negative feelings[8][9], fear[5][7], and distress[10]. Not surprisingly, aggressive behaviors by residents can increase staff turnover rates[9][11][12].

　Japanese researchers have begun to determine the prevalence, correlates, and consequences of aggressive behaviors. Although fewer studies on the association between aggressive behaviors and dementia have been conducted in Japan than in Western countries, some Japanese researchers have reported a positive association between aggressive behaviors by older adults with dementia and negative effects on formal caregivers, such as stress and burnout[13][14][15][16]. However, none of these studies were conducted using a valid measurement that identified the relationship between dementia-related aggression and caregiver stress in Japan[17].

　Because there was no measurement that measures both the frequency of aggressive behaviors and level of occupational stress in Japan, the Exposure to Disruptive Behavior (EDB) scale was translated from English into Japanese. Since quantitative measurements must be reliable and valid in the culture where the research is conducted[18], a Japanese version of the EDB scale would allow assessments of the relationship between dementia-related aggression and caregiver stress in Japan.

Purpose of the Study

The purpose of this research was to develop a Japanese version of the EDB scale. The study addressed a specific aim: To translate the EDB scale into Japanese and establish preliminary evidence for reliability and validity.

METHODS

Research Design

This research employed a cross-sectional design. Data were collected from care workers (CWs) who were working in 10 nursing homes in Japan. The present study was reviewed and approved by the Institutional Review Boards (IRBs) of the two institutions where the researcher belonged to.

Setting

This study was conducted in special care units (SCUs) for residents with dementia in 10 nursing homes in northern and western areas of Japan. Based on the standard promulgated by Japan's Ministry of Health, Labour and Welfare, the hiring ratio of residents to care workers should be three-to-one in nursing homes. Extrapolating from this standard, a care worker is in charge of 10 residents in a day shift. The dementia rank established by the ministry in 1993 assigns ranks from I through M. The rank M is defined as the most severe dementia, in which shows severe mental disturbance and problematic behaviors that require special treatment. A special care unit for residents with dementia is one in which all residents in the unit are suffering with mild or severe dementia that exceeds III in the ministry's dementia ranking.

Study population

Convenience sampling was used to recruit 137 CWs[19)20)] in 10 nursing homes. CWs were recruited as participants for this study because they provide the majority of direct care for residents in nursing homes in Japan. CWs who met the following inclusion criteria were eligible for this study:

(1)　They provided direct care to residents with dementia.

(2)　They had worked full-time as a CW in the SCU at the facility for at least three months.

(3)　They were able to read and write Japanese.

Instrument Translation

The Exposure to Disruptive Behavior (EDB) scale was translated into Japanese, using the guidelines for cross-cultural adaptation of self-report measures[21)]. The present study conducted the instrument translation in six stages.

Stage one. This stage was the initial translation. Two translators who were bicultural in U. S. and Japanese cultures and whose native language was Japanese independently translated the scale from English to Japanese[21)22)]. The first translator (T 1) was well-versed in health care terminology and gerontological nursing, and the second translator (T 2) was well-versed in medical terminology as well as the cultural and linguistic nuances of the target language (Japanese).

Stage two. In this stage, the translations were synthesized through discussions among the two translators and investigator. They compared the two translated versions of the EDB scale (T 1 and T 2) and discussed discrepancies or problematic wording between them. The translators and investigator then developed a single common translation of the EDB scale (T12).

Stage three. In this stage, a back translation was performed by additional two translators (the third and the forth translator). Both of them were completely blinded to the original version of the EDB scale. The third translator was well-versed in health care terminology and gerontological nursing, and translated the EDB scale from Japanese into English (BT 1). The fourth translator was not very knowledgeable about medical terminology, but was well-versed in the cultural and linguistic nuances of the target language (English). This translator also translated the scale from Japanese into English (BT 2).

Stage four. This stage involved an expert committee review. The translation committee was composed of the investigator and all four bilingual and bicultural translators. The translation committee reviewed all translations (T1, T2, T12, BT1, and BT 2) and achieved consensus on any discrepancies. The committee then developed a pre-final Japanese version of the EDB scale for field testing. The translation committee also produced a written report in Japanese in which the rationale for each decision was explained. Before pre-testing, the back-

translated English version of the pre-final EDB scale was reviewed by three dissertation committee members and a panel of Ph. D. students, all of whom were native English speakers and well-versed in gerontological nursing. This review used the Content Validity Index (CVI), a measurement that is commonly used as an early step to enhance the construct validity of a measurement[23]. The CVI is measured on a 4-point scale, with 4 being the highest relevance to the construct. Item CVI (I-CVI) is computed by dividing the number of raters who gave a 3 or 4 rating to an item by the total number of raters. I-CVI scores range from 0 to 1, whereby higher numbers indicate higher agreement regarding an item among the raters. Scale CVI (S-CVI) is computed by dividing the number of items for which the I-CVI is $\geqq 0.8$ by the total number of items. A CVI of 0.8 means that 80% of raters (i. e., four of the five raters) agreed that the translated items were equivalent to the original items. The investigator also asked the reviewers to provide comments and suggestions. The four items of the pre-final version of the EDB scale were revised according to CVI scores and rater feedback.

Stage five. This stage involved pre-testing of the pre-final Japanese version of the EDB (EDBJ) scale with 10 CWs who did work similar to that performed by the study participants. This pre-testing determined whether the Japanese version of the scale could be understood and completed by the pre-testers. Participants for pre-testing were informed of the pre-test's risk (minimal) and were asked to sign a waiver of informed consent. After completing the questionnaire, each participant was interviewed to clarify their understanding of each questionnaire item. While most pre-testers were able to understand all items, some were unsure of the meaning of one of the items. As a result, the investigator added a short explanation for that item.

Stage six. In this final stage, translation committee members reconvened to make a final decision on whether the translated version of the scale was ready to be used for data collection. They reviewed participant comments related to item meaning and recommended final revisions. The translation committee decided upon the final version of the Japanese translation by consensus.

Survey Administration

After receiving permission to conduct the study from the administrators of 10 nursing homes and obtaining approval from the IRBs at the two institutions where the researcher belonged to, the researcher delivered the questionnaires to each facility. Questionnaires were given to the head nurse or person in charge of the unit in order to ensure that only one questionnaire was distributed to each potential participant. The investigator also gave this individual a written explanation of the purposes, procedures, benefits, and possible risks of the study to CWs who were potential participants. Since the questionnaire was self-administered, a returned and completed questionnaire was considered consent to participate in the study. Roughly one week after questionnaires were delivered to each facility, the researcher collected completed questionnaires from the SCUs. In the end, a total of 134 questionnaires were returned by participants and collected by the researcher.

Measures

Frequency of aggressive behaviors and the resultant occupational stress. The EDB scale measures both the frequency of disruptive behaviors (including aggressive and aversive behaviors) and level of occupational stress due to disruptive behaviors. It has demonstrated strong internal consistency reliability with Cronbach's α coefficients of 0.93 to 0.95[7] and 0.92 to 0.94[2].

In this scale, respondents are asked "How many times in the last year have you been physically or verbally assaulted by a resident in your unit?" and "How have you felt about each of these 20 types of behaviors when the behavior was directed at you?" Exposure to the 20 behaviors is rated on a six-point scale, ranging from Never occurs (1) to *More than once per shift* (6). Scores range from 20-120, with higher scores indicating greater exposure to aggressive behaviors. The CW's occupational stress from the behaviors is rated on a four-point scale, ranging from *Not affected* (1) to *Extremely stressed* (4). These scores range from 20-80, with higher scores indicating higher stress from aggressive behaviors.

Construct validity testing of the EDBJ scale. The validity of the EDBJ scale was tested with the Stressor Assessment Scale (SAS) for direct CWs in

nursing homes[24]. The SAS has demonstrated high validity among CWs in long-term care facilities for older people[25]. The instrument consists of 29 items with four subscales: conflict with superiors, conflict with residents, conflict with colleagues, and work burden. Because the SAS was being used to establish the validity of the EDB scale, this study used only the subscale of conflict with residents (Cronbach's α = 0.78)[25]. This subscale has six items and uses a three-point scale, ranging from *Not at all* (stressful) (1) to *Very stressful* (3). The maximum score is 18 points, with a higher score indicating higher stress[25]. Much like the EDBJ scale, the subscale of conflict with residents measures the amount of stress felt by direct CWs when a resident was uncooperative or displayed problematic behavior. Therefore, it was expected that the correlation between the EDBJ scale and SAS would be fairly high. The SAS questions can be answered in just a few minutes.

Analysis

Data were analyzed using SPSS software (v21.0, IBM, Chicago, IL). P values <.05 were considered statistically significant. Internal consistency (Cronbach's α) was analyzed to measure the reliability of each scale and subscale.

Exploratory factor analysis is used to identify a set of latent constructs underlying a battery of measured variables. Although prior research studies of the EDB scale have not reported a factor analysis[2)7)], the instrument contains items related to both aggressive and aversive behaviors. Therefore, exploratory factor analysis was performed to determine whether two different constructs in the EDB scale are actually present. One way to evaluate construct validity is by determining if a theoretical relationship between two measures of the same construct is supported. Therefore, the construct validity for stress from disruptive behaviors in the Japanese version of the EDB (EDBJ-S) scale was examined with the SAS. In both the EDBJ-S scale and SAS, a higher score indicates higher stress. Thus, if variables of the EDBJ-S scale are positively associated with those of the SAS, the constructs of the EDBJ-S scale and SAS are considered the same. In this way, the expected positive correlation contributes evidence of construct validity[26].

RESULTS

The present study recruited 137 potential participants. Participants completed the questionnaires at their work sites, and 134 completed questionnaires were returned (97.8% response rate). Of these, 129 were considered valid and met the following inclusion criteria of, (1) the care worker (CW) provided direct care for residents with dementia; (2) the CW worked full time (about 40 hours per week) on the special care units (SCUs) in the facility for at least 3 months; and (3) the CW was able to read and write Japanese.

Demographic Characteristics

Demographic characteristics of the participants are presented in Table 1. Female participants comprised 68.2% of the whole and 41.1% were in their thirties. In addition, 41% had worked as a CW for over ten years.

Content Validity

After the original EDB scale was translated from English into Japanese and then back-translated from Japanese into English, the CVI was used to explore whether the content of the original EDB scale was appropriately translated in the pre-final form of the EDBJ scale. Results for the I-CVI ranged from 0.8 to 1.0 and the S-CVI was 1.0 (see Table 2). These results indicated high agreement between the content of the original EDB scale and pre-final version of the EDBJ scale.

Table 1
Participant Demographic Characteristics (N = 129)

Participant characteristic	N（%）
Gender	
Female	88 (68.2)
Male	41 (31.8)
Age	
Under 30	31 (24.0)
30-39	53 (41.1)
40-49	22 (17.1)
50-59	15 (11.6)
Over 60	8 (6.2)
Experience as CW	
Less than 1 yr, less than 5 yrs	36 (27.9)
5 yrs - less than10yrs	40 (31.0)
Over 10yrs	53 (41.1)

Table 2
Content Validity Index for the EDBJ

Item #	Original version	Back-translated version	I-CVI
1	Swearing at caregiver	Shout abusive languages to the caregiver.	0.8
2	Yelling or screaming at caregiver	Yell or shout at the caregiver.	1.0
3	Verbally threatening	Threaten caregiver	0.8
4	Complaining about care	Complaint about the care.	1.0
5	Repeatedly seeking attention	Try to get attention repeatedly	1.0
6	Throwing objects or food at caregiver	Throw or fling objects and/or food at care giver.	1.0
7	Interfering in staff work	Interfere caregiver's work.	1.0
8	No response to questions by caregiver	Do not respond to caregiver's questioning.	1.0
9	Pinching	Pinch caregiver.	1.0
10	Spitting on caregiver	Spit at caregiver.	1.0
11	Biting	Bite caregiver.	1.0
12	Scratching	Scratch the caregiver.	1.0
13	Threatening gesture	Threaten by gestures.	1.0
14	Punching	Punch caregiver.	1.0
15	Slapping	Slap caregiver.	1.0
16	Kicking	Kick caregiver.	1.0
17	Fecal smearing	Rub stool.	0.8
18	Sexual comments	Speak with obscene word.	0.8
19	Sexual behavior in front of caregiver	Make sexually unpleasant behavior in front of the caregiver.	1.0
20	Touching caregiver sexually	Touch the caregiver in a sexually unpleasant manner.	0.8

Scale-CVI = 1.00

Based on the reviewer feedback, and with the four translators' agreement, the investigator changed subtle Japanese expressions in four items (1, 18, 19, and 20) in order to clarify and convey the intended meanings.

These items included the following:

- Item 1: the expression "Shout abusive languages to caregiver (介護者をののしる)" was changed to "Swearing at caregiver (介護者を口汚くののし

る)."
- Item 18: "Speak with obscene word (性的に不快な言葉を言う)" was changed to "Sexual comments (卑猥なことを言う)."
- Item 19: "Make sexually unpleasant behavior in front of caregiver (介護者の前で性的に不快な行動をする)" was changed to "Sexual behavior in front of caregiver (介護者の前で卑猥な行動をする)."

- Item 20: "Touch caregiver in a sexually unpleasant manner (性的に不快な方法で介護者を触る)" was changed to "Touching caregiver sexually (卑猥な方法で介護者を触る)."

Following revision of these four items, the pre-final version of the EDBJ scale was pre-tested by 10 CWs who perform similar work to that done by the study participants. While pre-testers were able to understand all items, some were not confident about the meaning of item 8, "No response to questions by caregiver." Therefore, the investigator revised this to include the term "ignore." The investigator reported the pre-test results and final changes made to the EDBJ scale to the dissertation chair and translation committee members. The translation committee came to a consensus to decide on the final version of the EDBJ scale.

Exploratory Factor Analysis

Exploratory factor analysis was used to examine the EDBJ-F (frequency of disruptive behavior) scale and EDBJ-S (stress from disruptive behavior) scale to identify a set of latent constructs underlying a battery of measured variables. The analysis identified three factors from both scales. From the EDBJ-F scale, 10 items (items 6, 9, 10, 11, 12, 13, 14, 15, 16, and 17) loaded on Factor 1; three items (items 18, 19, and 20) on Factor 2; and seven items (items 1, 2, 3, 4, 5, 7, and 8) on Factor 3. The factor correlation was 0.34 between Factors 1 and 2 of the EDBJ-F scale, 0.52 between Factors 1 and 3, and 0.32 between Factors 2 and 3 (see Table 3).

Table 3
Factor Correlations on EDBJ-F

	Factor 1	Factor 2	Factor 3
Factor 1	--		
Factor 2	.34	--	
Factor 3	.52	.32	--

From the EDBJ-S scale, seven items (items 9, 10, 11, 12, 14, 15, and 16) loaded on Factor 1; four items (items 17, 18, 19, and 20) on Factor 2; and nine items (items 1, 2, 3, 4, 5, 6, 7, 8,

and 13) on Factor 3. The factor correlation was 0.46 between Factors 1 and 2 of the EDBJ-S scale, 0.67 between Factors 1 and 3, and 0.55 between Factors 2 and 3 (see Table 4).

Table 4
Factor Correlations on EDBJ-S

	Factor 1	Factor 2	Factor 3
Factor 1	--		
Factor 2	.46	--	
Factor 3	.67	.55	--

The factor correlations between Factors 1 and 3 of both the EDBJ-F and EDBJ-S scales and the correlation between Factors 2 and 3 of the EDBJ-S scale were 0.52 or more, indicating high correlations between these factors. Consequently, the results of exploratory factor analysis suggest the presence of one major factor in both scales. When used in English, the EDB scale was used as a single scale with one factor. Results of the factor analysis of the EDBJ scale suggest that it can also be used as a single scale with one factor.

Reliability and Validity

Cronbach's α values obtained for the study population were $\alpha = 0.92$ for the EDBJ-F scale, $\alpha = 0.94$ for the EDBJ-S scale, and $\alpha = 0.94$ for the entirety of the EDBJ scale. All of these values indicate good reliability[26].

Construct validity for the EDBJ-F and EDBJ-S scales was examined in terms of the subscale of conflict with residents using the SAS ($\alpha = 0.77$ with this sample). Variables of the EDBJ-F scale were positively associated with variables of the SAS ($r = 0.27$, $p = 0.002$), and variables of the EDBJ-S scale were positively associated with variables of the SAS ($r = 0.49$, $p < 0.0001$) (see Table 5). The expected pattern and significant correlation between the scales thereby contribute not only to evidence of construct validity[26], but also to evidence of reliability and validity for the EDBJ scale.

TTable 5
Hypothesized and Observed Relationships Among EDBJ and SAS Variables

	SAS	
Variable	Hypothesized	Observed
EDBJ-F	+	+ (r = 0.27, p = 0.002)
EDBJ-S	++	+ (r = 0.49, p < 0.001)

DISCUSSION

Prior to the present study, no valid measurement was available to assess the association between dementia-related disruptive behaviors and caregiver stress in Japan. As such, the EDB scale was translated from English into Japanese and its validity was confirmed in this study. When measures such as the EDB scale are translated and used across cultures, they must be adapted culturally in order to maintain content validity of the instrument[21]. Certain customs and values are unique to the Japanese culture; a good example of this is the concept of joge (hierarchy), in which a younger person respects an older person[27]. Given the context of the present study, it was unclear whether or not caregiver perception of disruptive behaviors by older adults with dementia would be affected by this unique cultural norm. As a result, careful scrutiny was required to confirm that the cultural adaptation of the translated version maintained the content validity of the original instrument. In this study, the original EDB scale was translated from English into Japanese by four Japanese translators. Since the English language contains words that do not exist in Japanese (e.g., "swearing"), the four translators chose Japanese words that conveyed the closest meaning to the English originals. After the EDB scale was back-translated into English, the CVI was used to examine whether the content of the original EDB scale was appropriately translated in the pre-final version of the EDBJ scale. The CVI results indicated a high agreement between the content of the original EDB scale and pre-final version of the EDBJ scale. Accordingly, it was concluded that the EDBJ scale was culturally adapted and maintained the content validity of the original EDB

scale.

According to Beaton et al. (2000), the final step of cross-cultural adaptation of self-report measurements is a full assessment of the score level of attributes: reliability and construct validity. The original EDB scale has demonstrated strong internal consistency reliability, with Cronbach's α coefficients of 0.93 to 0.95[7] and 0.92 to 0.94[2]. The EDBJ scale was also found to have strong internal consistency reliability, with Cronbach's α coefficients of 0.92 to 0.94. In addition, this study established preliminary evidence for construct validity of the EDBJ scale based on correlations with hypothesized relationships with another scale. Therefore, EDBJ scale can be considered a valid measurement tool for assessing the frequency of disruptive behaviors and occupational stress resulting from disruptive behaviors among formal caregivers in Japan.

The validity of the EDBJ scale was tested with the SAS[24]. Even though the SAS has four subscales (i.e., conflict with superiors, Cronbach's α = 0.87; conflict with residents, Cronbach's α = 0.78; conflict with colleagues, Cronbach's α = 0.82; and burden from job, Cronbach's α = 0.82)[25], only the conflict with residents subscale was used for this study. Because this particular subscale measures the amount of stress felt by formal caregivers when a resident is uncooperative or displayed problematic behavior, the correlation between the EDBJ scale and SAS was expected to be fairly high. However, the strength of the correlation between variables of the EDBJ-F (frequency of disruptive behavior) scale and SAS was low (r = 0.27, p = 0.002). In addition, the strength of the correlation between variables of the EDBJ-S (occupational stress from disruptive behavior) scale and SAS was moderate (r = 0.49, p < 0.0001)[28]. One reason for the low to moderate correlation may have been that only one of the four SAS subscales was used to establish the validity of the EDBJ scale. If all four SAS subscales were used, the strength of the correlation between variables of the EDBJ scale and SAS might have been higher.

The EDB scale consists of 20 items, each of which represents a different aggressive or aversive behavior. As a result of exploratory factor analysis, the EDBJ scale was used as a single scale with

one factor. However, the degree of stress exhibited among CWs depended upon whether the behavior was aggressive or aversive. Comparison of the mean degrees of stress associated with aggressive versus aversive behavior revealed that the most stressful behaviors were all aggressive rather than aversive. The behaviors found to be most stressful among CWs were "Scratching" (M = 2. 53), followed by "Pinching" (M =2. 44), "Biting" (M = 2. 43), "Yelling or screaming at caregiver" (M = 2. 43), and "Kicking" (M =2. 22), all of which were considered aggressive behaviors. This indicates that CWs consider aggressive behaviors to be more stressful than aversive behaviors. In addition, when the researcher interviewed CWs during pretesting, one stated that she experienced aggressive behaviors that were not included in the EDBJ scale, such as hair-pulling. The Ryden Aggression Inventory, developed in the United States, also does not include pulling hair. Additional aggressive behaviors experienced by Japanese CWs, but not included in measurements of aggressive behaviors developed in Western countries, may also exist. Focusing on the relationship between aggressive behaviors and stress from these may require researchers to revise and develop the EDBJ scale to apply to CWs in Japan.

Conclusion and Implications for Future Research

Until now, there were no scales available to identify the relationship between dementia-related disruptive behaviors and caregiver stress in Japan. In this study, the EDB scale was translated from English into Japanese, and preliminary evidence was obtained regarding instrument reliability and validity. This translated instrument measures the frequency of disruptive behaviors (including aggressive and aversive behaviors) and occupational stress experienced due to those behaviors. The EDBJ scale enables Japanese researchers to compare further the frequency of aggressive and aversive behaviors by residents, as well as CW stress due to those behaviors in various settings in Japan.

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