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Original Article

# Reliability and validity of the Mongolian version of the Zarit Caregiver Burden Interview

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**Abstract.** [Purpose] Our study aimed to verify the reliability and validity of the translated Mongolian version of the Zarit Caregiver Burden Interview (ZBI). [Participants and Methods] We obtained the basic information of patients and their caregivers when they were hospitalized (Study 1). Subsequently, after the hospital discharged the patients, the caregivers answered the ZBI by telephone during the 4th and 5th weeks (Studies 2 and 3, respectively). To evaluate reliability, we calculated the correlation coefficient, compared the total scores of the ZBI obtained in Studies 2 and 3, and calculated Cronbach's alpha coefficient. To evaluate validity, we calculated the correlation coefficient of the score of item 22 and the sum of the scores of items 1–21. [Results] The correlation coefficient for reliability was high, and the difference between the two studies was insignificant. Cronbach's alpha coefficient was 0.92. The correlation coefficient was high for validity as well. [Conclusion] The Mongolian version of the ZBI has high reliability and validity.
Key words: The Mongolian version of the Zarit Caregiver Burden Interview, Reliability, Validity

## INTRODUCTION

Mongolia, an inland country in North Asia, is located between China and Russia. It comprises, Ulaanbaatar, its capital city and 21 prefectures[1]. In 2007, a course in physiotherapy was launched in the Mongolian National University of Medical Sciences[2]. There were few physiotherapists; and with the figure of 147 physiotherapists in 2018, it worked out to less than 1 physiotherapist per 10,000 people in Mongolia[3]. Moreover, the period of hospitalization in Mongolia is short; with the average number of hospitalization days being 8.7 days in Ulaanbaatar and 7.6 in the countryside[4]. Therefore, many patients may stay at home and their abilities to carry on their daily life activities in may not improve because they are not treated with enough physical therapy.

In 2015, there were 108,071 disabled people (3.9% of Mongolia's total population)[5]. The Medical and Labor Examination Commission sets degrees of disability for disabled insured/citizens[6], and provides economical social security. But Ishikura[7] said that although social security system, law, etc., have been decided, many of these have not yet been implemented.

Patients are discharged before improving their abilities to carry on daily living activities because of insufficient rehabilitation and since their families cannot depend on social security and welfare system, we deduce that the burden for caring might be heavy for the families. There are few researches in Mongolia relating to the emotional, social, economic, physical, and mental functions of the patients' families.

Through caregiver burden assessment measurement, Zarit Burden Interview (ZBI), and the shorter version of ZBI that was

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translated into Japanese and other languages, their reliability and validity were examined[8–14]. The ZBI devised by Zarit et al., is based on the definition of caregiver burden, and sums up the physical and psychological burden, as well as economic difficulties that can be assessed by caregiver burden. It is composed of 22 items, of which items 1 to 21 comprise questions about different aspects of caregivers' burden, while item 22 is a question about the overall burden that caregivers feel[15].

In this way, some research[8–14] was conducted, but diseases of participants were varied and not unified. In Mongolia, no similar studies have been conducted so far.

Our purpose was to devise the Mongolian version of ZBI and examine its reliability and validity.

## PARTICIPANTS AND METHODS

The participants were patients needing care who were treated with physical therapy when they were hospitalized in three national hospitals in Ulaanbaatar city as well as their caregivers. For patients, the inclusion criteria was: those who needed care (score of less than 100 in the Barthel Index), whilst for caregivers it was: those most responsible for providing care them were 18 years old, were living with the patients, and who would provide care for five weeks after the patients' discharge. The exclusion criteria were: patients who did not need care (score of 100 in the Barthel Index) and their families, caregivers who could not give exact information, patients and their caregivers who were transferred to other hospitals or institutions, caregivers who did not have a phone and those who were unable to provide care for five weeks after patients' discharge.

This study was done on receiving the Mongolian National University of Medical Sciences' Ethics Committee's approval (number: 2018/3-07). We explained details of the research to each of the participants and obtained their signature as confirmation of their agreement.

In order to devise the Mongolian version of ZBI, we organized forward and backward translations, patient tests, and proofreading based on the Linguistic Validation Guidance of a Clinical Outcome Assessment[16] by Mapi Research Trust. In the first phase—forward translation, two translators translated the original ZBI into Mongolian and assisted by another Mongolian unified them into one. In the second phase of backward translation, the first phase Mongolian version of the ZBI was translated into English, after which it was compared with the original ZBI and revised. For the patient tests, four caregivers of inpatients completed the second phase of the Mongolian version of ZBI. Since they did not have difficulty in understanding, no amendments were made. Thereafter, in the final phase, the proofread version was certified as the Mongolian version of the ZBI by Mapi Research Trust (Fig. 1).
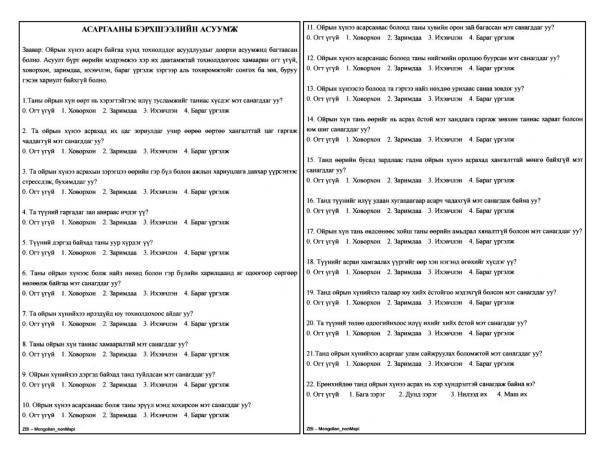


**Fig. 1.**   The Mongolian version of the ZBI.

J. Phys. Ther. Sci. Vol. 32, No. 7, 2020

450

To evaluate the reliability and validity, on hospitalization, we researched on the patients' age, gender, and medical conditions, caregivers' age, gender and relationship with the patients according to the medical records, self-reports and interviews (study 1). When they were in hospital, we explained about ZBI. After their discharge from hospital, in the fourth week, we called the caregivers and researched on the presence or absence of the necessity of caring, ZBI, period of care per day (study 2). The patients who did not need care were excluded. In the fifth week after discharge, we researched about the change in the care required as compared to the fourth week, again using telephonic ZBI (study 3). Those who care had changed from study 2, were excluded. Nine Mongolian physiotherapists (3 in each of the 3 hospital) carried out the research when patients were in hospital as well as after they were discharge and talked with their caregivers over phone.

We used the R2.8.1 Comprehensive R Archive Network (CRAN) for statistical analyses, and the significant level was 5%. To evaluate the reliability, we calculated Spearman's rank correlation coefficient of the total ZBI scores in studies 2 and 3 and compared them with the Wilcoxon signed rank test, and also calculated Cronbach's alfa coefficient of the ZBI score in study 2. To evaluate validity, we calculated Spearman's rank correlation coefficient of the score of item 22 and the sum of the scores of items 1 to 21. Thereafter we classified them into 3 groups according to the period of care per day (less than 7 hours, 7–13 hours, and more than 13 hours), and compared periods of care for different groups using one-way analysis of variance on sum of score of ZBI in study 2.

## RESULTS

The patients and their families who had agreed to answer the ZBI in study 1 comprised 30 pairs. At the study 2 stage, the 2 pairs who did not need care after discharge as well as the 2 who were unable to cooperate with the research, were excluded. At the study 3 stage, the 8 pairs whose level of caring had undergone a change, along with the 2 pairs who were not in a position to cooperate, were excluded. Finally, our research had 16 pairs of participating patients.

Their average age was $61.5 \pm 16.3$, males and females—8 each; 12 out of the 16 had cerebral nervous disease (Table 1). The average age of the caregivers was $48.6 \pm 12.9$, 12 females and 4 males; and 12 of the 16 were either daughters or wives (Table 2). The period from studies 2 to 3 was $9.5 \pm 5.5$ days (Minimum 4 days, maximum 23 days).

ZBI scores in studies 2 and 3 are shown in Table 3. The question with the highest average score was question 8, followed by questions 20, and 21 that were the second and third highest, respectively. The question with the lowest average score was question 6, while questions 13, and 10 that were the second and third lowest, respectively.

As regards reliability, the average of the total ZBI scores in studies 2 and 3 were $34.19 \pm 15.77$, and $35.31 \pm 18.84$, respectively. The correlation coefficient of the total scores of ZBI in studies 2 and 3 was 0.95 ($p<0.05$). There was little difference between the total score of ZBI in studies 2 and 3. Cronbach's alfa coefficient of the 22 items' ZBI scores in study 2 was 0.92.

In relation to validity, in study 2, the ZBI average score for question 22 was $1.81 \pm 1.17$ and the average of total score of questions 1–21 was $32.38 \pm 14.69$. Their correlation coefficient was 0.90 ($p<0.05$). However, the period of caring per day and the total score of ZBI in study 2, showed little difference among the three groups, based on one-way analysis of variance (Table 4).

## DISCUSSION

Relating to scores for each question of the Mongolian version of ZBI, question 8 "Do you feel your relative is dependent upon you?" scored the highest, followed by question 20 "Do you feel you should be doing more for your relative?" and question 21 "Do you feel you could do a better job in caring for your relative?" Question 6 "Do you feel that your relative currently affects your relationship with other family members or friends in a negative way?" had the lowest score, followed by question 13 "Do you feel uncomfortable about having friends over, because of your relative?" and question 10 "Do you feel your health has suffered because of your involvement with your relative?"

When the Japanese version of ZBI was devised, items for which the most burden was reported were: question 18 "Do you wish you could just leave the care of your relative to someone else?", question 14 "Do you feel that your relative seems to expect you to take care of him/her, as if you were the only one he/she could depend on?", and question 17 "Do you feel you have lost control of your life since your relative's illness?"[8] Compared with the Japanese, caregivers in Mongolia may have

**Table 1.** Characteristics of patients (n=16)

| Age (years) | | $61.5 \pm 16.3$ |
|---|---|---|
| Gender (Males/Females) | | 8/8 |
| Disease | Cerebral nervous disease | 12 |
| | Orthopedic surgery | 2 |
| | Bronchitis asthma | 1 |
| | Rheumatoid arthritis | 1 |

Age: Mean ± SD.

**Table 2.** Characteristics of caregivers (n=16)

| Age (years) | | $48.6 \pm 12.9$ |
|---|---|---|
| Gender (Males/Females) | | 4/12 |
| Relationship | Daughter | 7 |
| | Wife | 5 |
| | Husband | 2 |
| | Brother | 1 |
| | Son | 1 |

Age: Mean ± SD.

**Table 3.** ZBI score in studies 2 and 3

|  | Study 2 | Study 3 |
|---|---|---|
| Question 1 | 1.75 ± 1.34 | 1.69 ± 1.30 |
| Question 2 | 1.75 ± 1.00 | 1.94 ± 1.06 |
| Question 3 | 1.50 ± 1.10 | 1.50 ± 1.26 |
| Question 4 | 1.19 ± 1.17 | 1.25 ± 1.29 |
| Question 5 | 1.25 ± 1.00 | 1.19 ± 1.22 |
| Question 6 | 0.69 ± 0.95 | 0.56 ± 1.09 |
| Question 7 | 2.25 ± 1.29 | 2.06 ± 1.18 |
| Question 8 | 2.88 ± 0.72 | 2.94 ± 0.68 |
| Question 9 | 1.25 ± 1.44 | 1.19 ± 1.33 |
| Question 10 | 0.88 ± 1.41 | 0.88 ± 1.41 |
| Question 11 | 1.19 ± 1.11 | 1.25 ± 1.13 |
| Question 12 | 1.06 ± 1.06 | 1.50 ± 1.21 |
| Question 13 | 0.75 ± 1.24 | 1.00 ± 1.26 |
| Question 14 | 1.75 ± 1.34 | 1.88 ± 1.26 |
| Question 15 | 2.00 ± 1.15 | 2.25 ± 1.13 |
| Question 16 | 1.63 ± 1.36 | 1.81 ± 1.28 |
| Question 17 | 1.13 ± 1.20 | 1.06 ± 1.18 |
| Question 18 | 1.00 ± 1.21 | 1.25 ± 1.29 |
| Question 19 | 1.75 ± 1.24 | 1.88 ± 0.81 |
| Question 20 | 2.38 ± 0.96 | 2.38 ± 1.09 |
| Question 21 | 2.38 ± 1.09 | 2.06 ± 1.12 |
| Question 22 | 1.81 ± 1.17 | 1.81 ± 1.05 |
| Sum of questions 1 to 21 | 32.38 ± 14.69 | 33.50 ± 17.90 |
| Sum of questions 1 to 22 | 34.19 ± 15.77 | 35.31 ± 18.84 |

Mean ± SD.

**Table 4.** Correlation of period for caring and total score of ZBI

| Period for caring (n) | Less than 7 hours (6) | 7–13 hours (6) | More than 13 hours (4) | p-value |
|---|---|---|---|---|
| Total score of ZBI | 30.83 ± 12.16 | 34.33 ± 22.44 | 39.0 ± 10.23 | 0.75 |

Mean ± SD.

felt: self-confident about patients depending on them, anxious about their patients' future, and responsible for their care, but they may have not felt that caring creates many problems in their physical and daily living.

ZBI Zarit Burden Interview Version 1.0: Scaling and Scoring Version 5.0[17] by Mapi Research Trust states that differences in culture influence the answers. Sakamoto[18] said that since in Mongolian people, awareness of the "cooperative" and "solidary" in ideology socialism prevails, when we think about welfare in Mongolia, we need to clear up how people recognize and change the concept of "life" and "cooperative" in relation with nature. In this research, some caregivers did not become participants because their family and relatives took turns in providing care. We presume that people in Mongolia being conscious of cooperation, they consider it quite common for family and relatives to provide care to patients. Hence, the caregiver burden differs according to the culture and the political economy.

As for the reliability of the Mongolian version of ZBI, to evaluate its reproducibility, we calculated the correlation coefficient of studies 2 and 3, and compared both using the test-retest method. The correlation coefficient was 0.95 (p<0.05), which confirmed that it had significantly high correlation and that there were insignificant differences between both the groups. When the Japanese version of ZBI was devised, test-retest correlation coefficient was 0.76[8]. Therefore, the reproducibility of the Mongolian version of ZBI was proved to be high. Thereafter, we evaluated its internal consistency. Its Cronbach's alpha coefficient was 0.92, as against 0.93 being that of the Japanese version of ZBI[8]. The ZBI versions of each country and language (Persian, Turkish, Chinese, Brazilian, and Canadian version) had Cronbach's alpha coefficients ranging from 0.77 to 0.92[9–13]. In comparison, Cronbach's alpha coefficient of the Mongolian version of ZBI remained at the same level, suggesting high internal consistency is. Therefore, it indicates that reliability of the Mongolian version of ZBI is high.

Next, we evaluated validity, Spearman's rank correlation coefficient of the score of item 22, relating to "How much overall burden the caregiver feels" and the sum of the scores of items 1 to 21 relating to different aspects of caregivers' burden was 0.90 (p<0.05). In the Japanese version of ZBI, the correlation coefficient of the score of item 22 and the sum of the scores of items 1 to 21 was 0.71[8]. Hence, validity of the Mongolian version of ZBI was high. But there was little difference in the total scores of ZBI among the 3 groups relating to the length of period for caring. In previous researches, there had been many reports that hours spent for caregiving were significantly related to the burden of caregiving[15]. In this research, it appears that the sum of the ZBI score increased with the increase in the hours spent for caregiving each day, but there were few

J. Phys. Ther. Sci. Vol. 32, No. 7, 2020

452

participants and there was a dispersion of the sum of the scores. Since it is difficult to say that the length for caring is related to the sum of ZBI scores, we need to increase the number of participants and continue examining this.

As regards the limitation of this research, some of the previous researches had compared ZBI scores with behavioral disturbances, cognitive functions, depression of caregivers, and so on. However, in Mongolia, only a few of these had proved reliability and validity of measurement. Therefore, in our research, it was difficult to compare and examine ZBI scores with the results of other measurements.

In previous researches, many factors, such as cognitive functions, patients' abilities for activities of daily living, and period of caregiving of caregivers, were examined according to the burden of caregiving, but concurrent views were not expressed[15]. Hence, there is a possibility that it is typical of Mongolia, where home environment differs, at the center or the outskirts of Ulaanbaatar city, countryside, and so on. Therefore, caregiver burden is also expected to be diversified. In the future, by increasing the number of participants, examining the factor that increases caregivers' burden such as the characteristic of patients and caregivers, home environment, and so on; and finding which items of burden show high scores, the real situation of caring in Mongolia may be come to light.

In this research, the Mongolian version of ZBI was devised and it suggests that reliability and validity is high. In future, by using this measurement, the present situation of caring in Mongolia can be sorted out and it will also help to improve recognition of the importance of rehabilitation and develop social welfare.

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