



Brief Communication

Development of the Japanese version of the Cornell Assessment of Pediatric Delirium

Haruhiko Hoshino,^{1,2}  Yujiro Matsuishi,^{1,2}  Nobutake Shimojo,¹ Yuki Enomoto,¹ Takahiro Kido,³ and Yoshiaki Inoue¹

¹Department of Emergency and Critical Care Medicine, Faculty of Medicine, University of Tsukuba, ²Pediatric Intensive Care Unit, and ³Department of Pediatrics, University of Tsukuba Hospital, Tsukuba, Ibaraki, Japan

Aim: Delirium is a form of acute cerebral dysfunction and is associated with increased length of hospital stay, mortality, and health-care costs for adult patients in intensive care. However, in Japan, there are currently no reliable criteria or tools for diagnosing delirium in critically ill pediatric patients. The purpose of this study was to translate the Cornell Assessment of Pediatric Delirium (CAPD)—a screening tool for pediatric delirium—from English to Japanese for use in the diagnosis of delirium for pediatric patients in pediatric intensive care units.

Methods: The back-translation method was used to ensure equivalence in the Japanese version of the CAPD and its accompanying developmental anchor points. The translation process was repeated by a multidisciplinary committee of medical researchers and clinicians.

Results: The final back-translated version of the CAPD was submitted to the original author, who gave her approval.

Conclusion: The Japanese CAPD was developed and its effectiveness tested using a standardized procedure. Further study is required to test the validity and reliability of the Japanese version of the CAPD.

Key words: Cornell Assessment of Pediatric Delirium, delirium, pediatric delirium

INTRODUCTION

DELIRIUM IS A form of acute cerebral dysfunction and is associated with systemic illness or the effects of treatment in an intensive care unit (ICU). Delirium involves acute and intermittent changes in mental status with disordered attention and cognition.¹ Delirium has been shown to have negative clinical outcomes for in adult intensive care,² such as increased length of hospital stay,³ mortality, and health-care costs.⁴ However, the implications of pediatric delirium in the Japanese context are not well clarified because of the lack of an adequate screening tool. Currently, there are a number of validated and reliable screening tools for delirium used in pediatric ICUs, including the Pediatric Anesthesia Emergence Delirium (PAED) scale,⁵ the

Pediatric Confusion Assessment Method for the Intensive Care Unit (pCAM-ICU),⁶ and the Cornell Assessment of Pediatric Delirium (CAPD).⁷ The pCAM-ICU can be used only in children over 5 years old, and the PAED scale does not evaluate hypoactive delirium. In contrast, the CAPD is designed for children of all ages and can be used to assess hypoactive delirium. The CAPD is designed to give nurses a quick and easy way to screen for pediatric patients at risk of delirium.⁸ It consists of eight question items that correlate with the diagnostic domains of awareness and cognition. The nurse administering the CAPD answers each item on a 5-point Likert scale, the total score of which gives an indication of risk for delirium. However, the CAPD was not available in Japanese. The purpose of this study, therefore, was to create an accurate Japanese translation of the CAPD for use in clinical settings.

METHOD

BEFORE BEGINNING THE translation of the CAPD, permission was obtained from its original author, Dr. Gabrielle Silver, who directed us to also translate the CAPD's accompanying developmental anchor points. The

Corresponding: Yoshiaki Inoue, PhD, Department of Emergency and Critical Care Medicine, Faculty of Medicine, University of Tsukuba, Tsukuba, Ibaraki, 305-8575, Japan. E-mail: yinoue@md.tsukuba.ac.jp.

Received 11 May, 2017; accepted 18 Jul, 2017; online publication 3 Oct, 2017

Funding Information

No funding information provided.

developmental anchor points were delineated for children under the age of 2 years, because orientation, arousal, and appropriate cognition (which are all affected in delirium) are difficult to assess in young children and even harder to measure in infants. In addition, the author advised us that the implication of item 8 (Does it take the child a long time to respond to interactions?) is that delayed or slow motion movement may be a sign of hypoactive delirium, and not only the lack of response.

To ensure linguistic and cultural equivalence in the Japanese translation of the CAPD and its accompanying developmental anchor points, the back-translation method was used. Back-translation, originally established by Brislin,⁹ is a well-known translation method used to ensure the preservation of the overall content and meaning between the original and translated versions. Specifically, the adaption of Brislin's translation model by Jones *et al.*¹⁰ was selected for this project as this method involves multiple people in the translation process.

	Newborn	4 weeks	6 weeks	8 weeks	28 weeks	1 year	2 years
1. Is the child able to make eye contact with the person caring for him/her?	Looks at faces.	Maintains gaze for short periods of time. Eyes follow for 90 degrees.	Maintains gaze.	Eyes follow caregiver or objects crossing his/her center line. Pays attention to object held by tester.	Maintains gaze. Prefers parent. Looks at person talking.	Maintains gaze. Prefers parent. Looks at person talking.	Maintains gaze. Prefers parent. Looks at person talking.
2. Does the child engage in purposeful actions?	Moves head side to side in accordance with neonatal reflex.	Stretches hand out. (OK if this action is somewhat uncoordinated).	Stretches out hand.	Tries to grasp object offered using contrasting side to side movements without resistance.	Stretches out hand smoothly.	Stretches out hand and tries to grasp object. Tries to change position. If able to move, tries to stand.	Stretches out hand and tries to grasp object. Tries to change position. If able to move, tries to stand.
3. Is the child interested in his/her surroundings?	The child is calm and alert.	The child is clearly alert. The child turns in the direction of the caregiver's voice. The child may turn in the direction of the smell of the caregiver.	The amount of time the child is clearly alert increases The child turns in the direction of the caregiver's voice The child may turn in the direction of the smell of the caregiver	Nods head up and down, frowns at the sound of a bell, spoken to gently, expression becomes bright and smiles.	Prefers his/her mother over other family members. Becomes used to new objects and can distinguish between objects.	Prefers parents over other family members. Becomes agitated if separated from the preferred caregiver. Is used to a favorite blanket or stuffed animal and is calmed by it.	Prefers parents over other family members. Becomes agitated if separated from the preferred caregiver. Is used to a favorite blanket or stuffed animal and is calmed by it.
4. Does the child communicate his/her needs and wants?	Cries when hungry or uncomfortable.	Cries when hungry or uncomfortable.	Cries when hungry or uncomfortable.	Cries when hungry or uncomfortable.	Vocalizes or uses gestures when needs something (e.g., hungry, uncomfortable, interested in an object or his/her surroundings).	Uses single words and gestures.	Uses 3–4 words and gestures. Indicates when needs to use the toilet.
5. Is the child restless?	Does not maintain a clearly alert state.	Does not maintain a calm state.	Does not maintain a calm state.	Does not maintain a calm state.	Does not maintain a calm state.	Does not maintain a calm state.	Does not maintain a calm state.
6. Is it impossible to console the child?	Cannot be soothed by rocking, singing, feeding, or making comfortable.	Cannot be soothed by rocking, singing, feeding, or making comfortable.	Cannot be soothed by rocking, singing, feeding, or making comfortable.	Cannot be soothed by rocking, singing, feeding, or making comfortable.	Cannot be soothed using normally used methods (e.g., singing, holding, or talking).	Cannot be soothed using normally used methods (e.g., singing, holding, talking, or reading a book).	Cannot be soothed using normally used methods (e.g., singing, holding, talking, or reading a book), but can be calmed down when throwing a temper tantrum.
7. Has the child's level of activity decreased? Has the amount of movement while he/she is awake decreased?	Almost never bends arms and legs, has no strength other than during neonatal reflex. (Most of the time the child is sleeping comfortably).	Almost never stretches hands out, kicks, or grasps objects (OK even if actions are somewhat uncoordinated).	Almost never stretches hands out, kicks, or grasps objects (OK even if actions are somewhat uncoordinated).	Almost never grasps objects or moves head and arms purposefully. For example, does not try to push away unpleasant things.	Almost never stretches hands out, grasps objects, moves around on the bed, or pushes away objects.	Almost never plays, gets up, or pulls. Even if he/she moves, almost never crawls or walks around.	Almost never engages in more complex play, gets up, or moves around. Almost never stands, walks, or jumps, even though capable of these actions.
8. Does it take time for the child to react to others?	Does not make sounds. Does not react as expected (e.g., grasping reflex, sucking reflex, or the Moro reflex).	Does not make sound. Does not react as expected (e.g., grasping reflex, sucking reflex, or the Moro reflex).	Does not kick or cry in response to an unpleasant stimulus.	Does not babble, laugh, or gaze in reaction to contact with others.	Does not babble, smile, or laugh during contact with others (may even refuse contact).	Does not obey simple instructions. Even if able to understand, does not obey simple instructions provided in the language that can be understood by the child.	Does not obey simple commands with one to two steps. Even if able to speak, does not obey more complex instructions.

Fig. 1. Final English version of the developmental anchor points accompanying the Cornell Assessment of Pediatric Delirium, following back-translation from English to Japanese. The document was checked and approved by the original author.

The translation process followed a series of steps. First, the main researcher forward-translated the assessment tool from English to Japanese to create the provisional Japanese version. Next, the provisional Japanese version was given to a professional translator, a native Japanese speaker, who had also been a nurse in America, but was not familiar with the CAPD. The translator back-translated the provisional Japanese version into English to create the provisional English version. In the third step, a committee of eight medical professionals (two clinical researchers, two intensive care medical doctors, two pediatric doctors, and two pediatric intensive care nurses) discussed the differences of the original English version and the provisional English version to reduce variability through the expertise of a multidisciplinary medical team. Next, based on the findings of this discussion, the Japanese version was revised to create the final Japanese version. The final Japanese version of CAPD was once again back-translated to English by a professional translator. The final back translation was then checked by the original author. Every effort was made to carefully execute all the steps in the translation processes to avoid the loss of the original meaning due to cultural or linguistic differences.

This study was approved by the ethics board of University of Tsukuba Hospital (Tsukuba, Japan).

RESULTS

THE COMPLETED JAPANESE version of the CAPD and its accompanying developmental anchor points are presented in the supporting information (Data S1 and S2). There were a number of linguistic and semantic issues that arose through the translation process. The first was the item “Moves head to side, dominated by primitive reflexes” from the developmental anchor points. It is not common in Japan to assess the reflexes of newborns. We confirmed with the original author that this item was not referring to rooting reflexes and asymmetrical tonic neck reflex. As it was not, we translated the item word-for-word. In the provisional Japanese version, in the sentence “Does the child communicate need and want?” the words “need and want” were translated using a single word in Japanese that includes both concepts. However, after careful discussion of this sentence in our committee, we decided to express them separately as in the original version.

The final English version of the CAPD and accompanying developmental anchor points were submitted to the author (Fig. 1 shows the final English version of the developmental anchor points). The original author approved the back-translated final English versions of the CAPD and developmental anchor points.

DISCUSSION

WE CREATED THE Japanese version of the CAPD and developmental anchor points using the back-translation method to avoid loss of its original meaning and author's intentions. We selected the back-translation method suggested by Jones *et al.*¹⁰ as it involves multiple people in the translation. We included a committee of eight medical professionals in the process of translation whose collective expertise allowed us to develop the final Japanese version of the CAPD, ensuring its accuracy, cultural appropriateness, and also faithfulness to the original intention of the author. Further study is required to evaluate the validity and reliability of the Japanese version of the CAPD and developmental anchor points.

CONCLUSION

USING THE BACK -translation method, we successfully developed the Japanese version of the CAPD and its developmental anchor points, and the translated instruments were approved by the original author of the CAPD. It is hoped that, in the near future, the Japanese version of the CAPD will be an effective tool for identifying risk of delirium in Japanese pediatric patients.

ACKNOWLEDGMENTS

THE AUTHORS ARE grateful to Dr. Gabrielle Silver for granting us permission to translate the CAPD and providing invaluable guidance. We also thank Dr. Sumitani Masahiko for lending his expertise on delirium. Finally, we give heartfelt thanks to Mr. Thomas D. Mayers who provided language support.

DISCLOSURE

This study was approved by the ethics board of University of Tsukuba Hospital (approval no. H28-085).

Conflict of Interest: The authors have no conflict of interest to declare.

REFERENCES

- 1 American Psychiatric Association. Diagnostic and statistical manual of mental disorders (DSM-5®): American Psychiatric Pub, 2013.
- 2 Ely EW, Gautam S, Margolin R *et al.* The impact of delirium in the intensive care unit on hospital length of stay. *Intensive Care Med.* 2001; 27: 1892–900.
- 3 Ely E, Shintani A, Truman B *et al.* Delirium as a predictor of mortality in mechanically ventilated patients in the intensive care unit. *JAMA* 2004; 291: 1753–62.

- 4 Milbrandt EB, Deppen S, Harrison PL *et al.* Costs associated with delirium in mechanically ventilated patients. *Crit. Care Med.* 2004; 32: 955–62.
- 5 Sikich N, Lerman J. Development and psychometric evaluation of the pediatric anesthesia emergence delirium scale. *Anesthesiology* 2004; 100: 1138–45.
- 6 Smith HAB, Boyd J, Fuchs DC *et al.* Diagnosing delirium in critically ill children: validity and reliability of the Pediatric Confusion Assessment Method for the Intensive Care Unit. *Crit. Care Med.* 2011; 39: 150–7.
- 7 Traube C, Silver G, Kearney J *et al.* Cornell Assessment of Pediatric Delirium: a valid, rapid, observational tool for screening delirium in the PICU. *Crit. Care Med.* 2014; 42: 656–63.
- 8 Silver G, Kearney J, Traube C, Hertzog M. Delirium screening anchored in child development: the Cornell Assessment for Pediatric Delirium. *Palliat. Support. Care* 2015; 13: 1005–11.
- 9 Brislin RW. Back-translation for cross-cultural research. *J. Cross Cult. Psychol.* 1970; 1: 185–216.
- 10 Jones PS, Lee JW, Phillips LR *et al.* An adaptation of Brislin's translation model for cross-cultural research. *Nurs. Res.* 2001; 50: 300–4.

SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Data S1. Japanese version of the Cornell Assessment of Pediatric Delirium.

Data S2. Japanese version the developmental anchor points accompanying the Cornell Assessment of Pediatric Delirium.