

Japanese version of the Munich Parasomnia Screening: translation and linguistic validation of a screening instrument for parasomnias and nocturnal behaviors

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Objective: There is no broad screening instrument that can comprehensively assess parasomnias and sleep-related movement disorders listed in the *International Classification of Sleep Disorders*. The aim of this study was to develop the Japanese version of the Munich Parasomnia Screening (MUPS), a screening instrument for parasomnias and nocturnal behaviors, which was developed and validated at the Max Planck Institute of Psychiatry.

Methods: A multi-step translation methodology consisting of forward translation, back translation, expert review, and cognitive debriefing interviews was performed between June and November 2011.

Results: The English version of the MUPS was translated into Japanese, and the original author performed an expert review on the basis of a detailed report on the forward and back translation steps. The cognitive debriefing was carried out in five patients with parasomnia. The mean time to fill out the questionnaire was 8 minutes (ranging from 2 to 17 minutes). The authors reviewed and discussed the results of the cognitive debriefing interviews and modified the Japanese version. The final Japanese version was confirmed to be conceptually equivalent to the original English version.

Conclusion: The Japanese version of the MUPS is an easy-to-use self-rating instrument for parasomnia and nocturnal behavior screening, consistent with the original version. The usage of this instrument would enable clinicians to quickly screen the past history and current frequency of nocturnal behaviors.

Keywords: translation, linguistic validation, questionnaire, sleep-related eating disorder, sleep walking

Introduction

Parasomnias are defined as unpleasant or undesirable behavioral or experiential phenomena that occur predominantly or exclusively during the sleep period.¹ According to the *International Classification of Sleep Disorders*, Second Edition (ICSD-2), parasomnias are divided into three groups: disorders of arousal (from non-rapid eye movement sleep), parasomnias usually associated with rapid eye movement sleep, and other parasomnias.¹ Since the mechanism and symptoms of parasomnias vary widely; the ICSD-2 lists 15 disorders of parasomnias. Although confusional arousals, sleepwalking, sleep terrors, nightmare disorder, and sleep enuresis occur frequently in children,¹ and the concept of these conditions is well known among the public, differential diagnosis and judgment regarding the indication of treatment are difficult. On the other hand, sleep-related eating disorder, exploding head syndrome, and nocturnal groaning are less recognized than the above common sleeping disorders, and their disease concept is

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not fully understood. As the symptoms of parasomnias vary widely, time constraints in the clinical setting often prevent explicit inquiry about sleep-related behaviors, except when they are the chief complaint, which results in parasomnias being easily overlooked. A screening questionnaire would be helpful in detecting unusual nocturnal motor phenomena.

The Munich Parasomnia Screening (MUPS) is a self-rating instrument for screening of parasomnias and sleep-related movement disorders developed and validated by Fulda et al in 2008.² The instrument consists of 21 items that assess the past history and current frequency of parasomnias as well as normal variants or behaviors such as hypnic jerks and sleep talking that can be experienced throughout the night. The sensitivity and specificity of the individual items are high (above 80% for all items).² In addition, positive and negative predictive values are high for the use of the MUPS in clinical practice. The MUPS, which has English and German versions (German Sleep Society [DGSM] http://www.dgsm.de/fachinformationen_fragebogen_mups.php?language=german), is the most useful screening questionnaire in clinical and research settings at this time. While there exist questionnaires assessing a single parasomnia type such as the Japanese version of the REM Sleep Behavior Disorder Screening Questionnaire (RBDSQ-J), currently, no instrument covers all parasomnias and sleep-related movement disorders.

In this study, a Japanese version of the MUPS for screening for parasomnias and nocturnal behaviors was developed through translation and linguistic validation using a multi-step methodology comprising forward translation, back translation, expert review, and cognitive debriefing interviews.

Materials and methods

Original MUPS questionnaire

The original English version of the MUPS consists of a total of 21 questionnaire items regarding a large range of sleep-related behaviors ([Supplementary material 1](#)). In this study, the original English version of the MUPS was translated into Japanese and linguistic validation was performed on the Japanese version.

Methodology

All procedures of the study were conducted in accordance with the guidelines outlined in the Declaration of Helsinki. This study was reviewed and approved by the ethics committee of the Neuropsychiatric Research Institute, and all subjects provided written informed consent to participate in the study. Translation and linguistic validation were carried out between June and November 2011. The coordinator (RB) directly managed the overall process of the research. The following

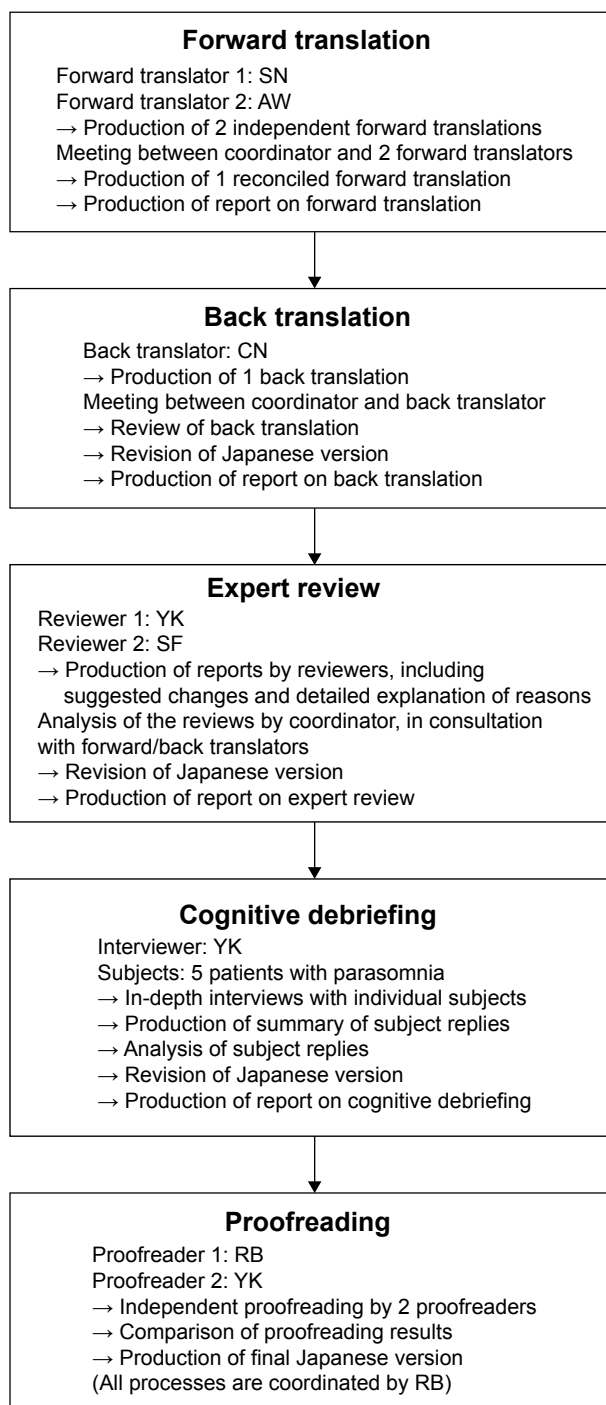


Figure 1 The process of linguistic validation of the Munich Parasomnia Screening.

methodology was followed for the development and linguistic validation of the Japanese version (Figure 1).

Permission for the translation and acquisition of the English version of the MUPS

The corresponding author (YK) obtained written permission from the author of the original MUPS (SF) to develop the Japanese version of the MUPS.

Forward translation and reconciliation

Two translators (SN and AW) separately and independently translated the English version of the MUPS into Japanese version (ver 1.0a and ver 1.0b). Both forward translators are native speakers of Japanese and proficient in English, with several years of experience living in the United States of America. Ver 1.0a and ver 1.0b were reconciled into a single forward translation (ver 1.1) through in-depth discussion among the coordinator and the translators.

Back translation

A bilingual translator who had not seen the original English version of the MUPS produced a back translation of ver 1.1 into English. The back-translated version was then compared with the original English version. Any discrepancies between the original and the back-translated versions were reviewed and discussed by the coordinator and the back translator to determine whether the discrepancy warranted a revision of the Japanese wording. Where modifications were deemed necessary, ver 1.1 was revised in consultation with the forward translators, and the second interim Japanese version (ver 1.2) was subsequently created.

Expert review

Expert reviews were conducted separately by the original author (SF) and the principal researcher (YK). The original author performed an expert review on the basis of a detailed report on the forward and back translation steps. The principal researcher reviewed ver 1.2 and made recommendations for revisions. The results of the two expert reviews were reviewed by the coordinator in consultation with the forward translators, and modifications deemed necessary were incorporated, resulting in the creation of the third interim Japanese version (ver 1.3).

Cognitive debriefing

Cognitive debriefing interviews were carried out to check the appropriateness of the Japanese wording, ease of understanding of the terms and expressions, lack of difficulty in responding to the questions, and the time required to complete the questionnaire. Ver 1.3 was tested on five patients with parasomnia who had been already diagnosed by a sleep disorder specialist and were receiving treatment: two women in their 20s, one woman in her 30s, and two men in their 30s and 40s, respectively. They had been given diagnoses of a combination of the following: sleep-related eating disorder (n=5), nightmare disorder (n=3), sleepwalking (n=2), sleep-related hallucinations (n=2), sleep terrors (n=1), and recurrent isolated sleep paralysis (n=1).

The mean age of the subjects was 32.0 ± 8.1 years. In terms of occupation, the subjects included two office workers, one part-timer and two unemployed. In terms of academic level, there was one high school dropout, two high school graduates, one vocational school graduate, and one university graduate. During each individual cognitive debriefing session, the subject was first instructed to fill out the Japanese questionnaire without any assistance, and the time needed to complete the instrument was recorded. An in-depth interview was then conducted to check whether the subject fully understood the meaning of each expression and each item as intended. At the end of each interview, the subject was encouraged to freely express any overall comments or suggestions for improving the Japanese version.

The authors reviewed and discussed the results of the cognitive debriefing interviews and modified the Japanese version accordingly, resulting in the creation of the fourth interim Japanese version (ver 1.4).

Proofreading

Ver 1.4 was proofread separately by YK and RB to check for spelling, grammar, and formatting errors, resulting in the final Japanese version of the MUPS (ver 1.5).

Results

Development of interim versions

Some expressions related to nocturnal behaviors were found to be problematic during the translation process. Therefore, the expressions were reviewed and modified in the course of the forward translation, reconciliation, and expert review steps, and the modifications were incorporated to produce an interim Japanese version of the MUPS.

The term “twitches” in item 1 (“Leg or body twitches that occur suddenly and unintentionally when falling asleep, often with the sensation of falling”) and item 6 (“Repeated involuntary twitching of the legs or kicking during sleep [can only be observed by another person]”) was translated by the forward translators as *pikupiku-ugoku* (twitch) and *keiren-suru* (have spasms/cramps), respectively. During reconciliation, the concept was deemed to require clarification by the original author and sleep medicine specialist. It was determined that spasms/cramps are longer, while the duration of twitches is very short, but both of these are potentially intense movements that are not voluntary or conscious. The Japanese translation for this expression was finally agreed on by reference to the Japanese translation of the ICSD-2.

In the course of the forward translation, it was found that the concept of “rhythmic” in item 2 (“rhythmic and rapid leg

movements”) was difficult to understand. Therefore, discussion was necessary to determine which would be more appropriate; *kokizamini* (wiggle/jiggle) or *kisokutekini* (regularly). The latter wording was adopted after expert reviews.

Both forward translators decided not to translate “rocking” and “swaying” in item 3 (“Rhythmic and repeated movements of the head or body when falling asleep or during night-time wake periods, eg, nodding, rocking, or swaying yourself to sleep”) differently but to interpret them as a single movement *karada-wo yusuru* (rock/swing back and forth), which refers to a general body movement in Japan. The original author confirmed that it was acceptable to combine the two movements into a single expression. The two movements were thus combined, as this was considered most appropriate in Japan.

The concept of “waking” in item 4 (“When falling asleep or waking, perceiving a loud bang, a sound similar to a bang [eg, door bang], or having the sensation of an “explosion in the head””) and item 5 (“Auditory or visual illusions that accompany falling asleep or waking in a distressing or threatening manner [eg, hearing sounds or voices, or seeing people or things that are not in the room]”) required confirmation with the original author whether it referred to waking up, in other words the act of transitioning from a sleeping state to a waking one, or the state of being awake. As the original author indicated waking to refer to waking up from sleep, the former interpretation was reflected in the Japanese translation.

In item 10 (“Choking or suffocating during sleep, or waking with the feeling of choking or suffocating”), it was unclear whether “waking with the feeling of choking and suffocating” referred to feeling choked or suffocated after waking up, or waking up because of feeling choked or suffocated. The original author clarified that the patient had to wake up to be able to report this item, and that in either case, the patient would experience this as waking up because of choking. For this reason, the original author agreed with the latter interpretation.

In item 15 (“Waking again after falling asleep in order to eat something”), it was unclear whether the concept of “waking again” referred to waking up, regardless of whether the patient actually gets up, or actually getting up and out of bed to go eat something, and confirmation was therefore required. The original author emphasized that for this item it was important that the patient had to be asleep first and then awoke from sleep (in contrast to going to bed, not being able to sleep and then getting up) to eat something. The author also indicated that the patient would not necessarily get out of bed to eat, if food existed nearby, eg, on a bedside table.

In item 20 (“Have you ever lashed about, hitting or kicking?”) and item 21 (“Have you ever actually done what you dreamt, eg, gesticulating or lashing about?”), it was necessary to clarify whether “lashed about” referred to constantly and intensely moving around, or moving around violently, raging, and running wild. After discussion, it was determined that “lashing out” referred to violently hitting or kicking. The author commented that a patient does not actually have to hit someone or something but intends to do so (in his/her dreams) as opposed to moving and accidentally hitting someone or something.

Results of the cognitive debriefing

The interim Japanese version of the MUPS was tested on five outpatients with parasomnia. The mean time to fill out the questionnaire was 8 minutes (ranging from 2 to 17 minutes). Basically, there was no single item that was reported to be unclear. However, one respondent stated that the questionnaire was difficult to answer because it was too detailed, although all others replied that it was easy to fill out. The cognitive debriefing interviews revealed that the respondents found some items unrelated to themselves or difficult to understand due to the fact that there were as many as 21 items assessing a wide variety of symptoms of nocturnal behaviors and parasomnias. All respondents selected “never observed by me or others” for any items considered unrelated to themselves.

Most of the patients stated that the expression *suimin ji zuihan shou* for “parasomnia” in the title was too technical to be understandable. It was therefore decided not to use the Japanese equivalent of “parasomnia”, but instead phonetically transliterate the English term using Japanese katakana characters.

Two patients said that it was not easy to distinguish between item 2 (rhythmic leg movements) and item 6 (repeated leg movements). However, it was considered that the statements “while falling asleep or while half asleep” in item 2 and “during sleep (can only be observed by another person)” in item 6 sufficiently distinguished between the items, and the linguistic validation team therefore decided that no changes were required for these items. In addition, the interviewer carefully checked and confirmed that the respondents correctly understood the instruction in parentheses in item 6.

During cognitive debriefing, we carefully checked whether the patients correctly understood the Japanese translation for “moaning” in item 11, which was back translated as “groan”.

The patients were also asked to indicate whether they considered *nyo-wo morasu* (leak urine) or *shikkin-suru*

(have incontinence) more appropriate to render “wetting oneself” in item 12. The former wording was selected by all patients and was therefore adopted.

In item 14, the expression “waking with severe anxiety and, possibly, screaming” was somewhat problematic, as the back translator interpreted only “screaming” to modify “waking” in the Japanese translation. This is indeed a possible interpretation of the Japanese construction, but it is also possible to interpret both “screaming” and “with severe anxiety” to modify “waking”, as intended by the forward translators. We carefully checked how patients interpreted this during cognitive debriefing, and confirmed that it was interpreted as intended by the forward translators and in line with the meaning of the original English version. The Japanese translation of this item was therefore adopted without any modifications.

Some patients suggested that it might be better to replace “cheese” in the first example “ice-cream and cheese” in item 16 with “mayonnaise”, as the combination of ice-cream and cheese is not uncommon in Japan. This suggestion was adopted in the Japanese translation.

For item 18, all patients interpreted kanashibari as intended as waking with the whole body paralyzed.

No problems were encountered with any of the response choices.

Development of the final version

The final Japanese version (ver 1.5) of the MUPS was completed after a group discussion among the linguistic validation team, followed by proofreading for spelling, grammar, and formatting ([Supplementary material 2](#)).

Discussion

Parasomnias, undesirable phenomena occurring during sleep and involving skeletal muscle activity, could result in high risk of sleep-related injuries to both individuals and their bed partners.³ Parasomnias are also associated with other adverse health consequences including depression and comorbid sleep disturbances.^{3,4} However, these disorders are frequently overlooked and underdiagnosed. It is important to detect and diagnose parasomnias correctly. Several questionnaires for a particular symptom have been developed so far.^{5–10} The SLEEP-50 is a validated questionnaire for nightmares and sleep walking.⁵ The Global Sleep Assessment Questionnaire is used to assess periodic leg movements and unspecified parasomnias,⁶ the Sleep Disorder Questionnaire for periodic leg movement disorder⁷ and the Sleep-EVAL System, a computerized tool for REM sleep behavior disorder.⁸

Recently, the RBDSQ was developed and validated in some large populations.^{9,10} However, except for the RBDSQ, none of these have been translated into Japanese, and there is no broad screening instrument that can comprehensively assess parasomnias and sleep-related movement disorders listed in the *International Classification of Sleep Disorders*.¹

The MUPS was developed as a screening instrument for assessing the occurrence and frequency of parasomnias and nocturnal behaviors.² Usage of this instrument enables clinicians to quickly screen the past history and current frequency of nocturnal behaviors. In this study, translation from English to Japanese and linguistic validation were performed to produce the Japanese version of the MUPS. The translation project was conducted by a team consisting of one near-native English speaking coordinator, two native Japanese speaking translators proficient in English, one native English speaking translator proficient in Japanese and three sleep medicine experts (including the corresponding author). Expressions were modified throughout the process of translation and linguistic validation with the aim of producing an easy-to-understand questionnaire consisting of grammatically correct and naturally sounding Japanese, while remaining conceptually equivalent to the original English version.

During the cognitive debriefing step, expressions such as “twitches”, “nodding, rocking, or swaying”, “teeth grinding”, “groan”, “wetting oneself”, and “nightmares” were explored to check whether they were understandable as intended. “Ice-cream and cheese” in item 16 was changed to “ice-cream and mayonnaise” as some patients pointed out that the combination of ice-cream and cheese were not rare in Japan.

The questionnaire is made up to 21 items for assessing nocturnal behaviors and motor phenomena, and one open format question which allows patients to report any other nocturnal behaviors. The questionnaire is completed by selecting one of seven response choices indicating lifetime history or current frequency for each item. The cognitive debriefing in the present study was conducted using a small sample of patients with parasomnia symptoms without healthy controls, which is in accordance with accepted procedures of linguistic validation, but which precludes explicit conclusions about the psychometric validity of the translated version. Further study is warranted to verify its psychometric properties.

In general, translating questionnaires into other languages is not a simple process, but requires careful consideration of the culture and practices of the target population. In this study, the English version of the MUPS was translated into Japanese, and cognitive debriefing was carried out on five patients with parasomnia. The final Japanese version was

confirmed to be conceptually equivalent to the original English version. Further research required includes an international comparative study comprising native speakers of both the original and translated versions to further confirm the strict conceptual equivalence of both versions. The assessment of the questionnaire's reliability, validity, and sensitivity to treatment effects in a clinical setting, as well as the standardization for use in the general population will be explored in future studies.

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Disclosure

The authors report no conflicts of interest in this work.

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