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TRANSLATION AND STANDARDIZATION OF NORDIC MUSCULOSKELETAL QUESTIONNAIRE IN MARATHI LANGUAGE

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Abstract Background: Evaluating the work environment through screening for musculoskeletal disorders can be highly beneficial. The Nordic Musculoskeletal Questionnaire (NMQ), a standardized tool, is specifically designed to assess musculoskeletal symptoms in ergonomic or occupational health settings. In rural part of Maharashtra state in India most of the people understand and speak Marathi language. So, this study was aimed to translate and standardize a version of the Nordic Musculoskeletal questionnaire into Marathi language and evaluate its reliability.
Methods: The questionnaire was independently translated into Marathi by translator with a background of health care profession. Thereafter, two other translators performed a back-translation in English language independently from each other. This version was then submitted to a committee, consisting of specialists in the area of knowledge of the instrument, to evaluate equivalence to the original instrument. The final version was pretested on 20 subjects randomly selected from the study setting. Reliability was assessed by a test–retest procedure at 1-day interval using the Kappa coefficient in a group of 160 subjects.
Results: The expert committee found both face validity and content validity to be good. For test-retest reliability, the Kappa measure ranged from 0.813 to 1. Internal consistency, assessed using Cronbach's Alpha, showed a result of 0.716.
Conclusion: The cross-cultural adaptation and assessment of the NMQ Marathi version were satisfactory. The NMQ Marathi version can be effectively used by the physiotherapy community for assessing and managing musculoskeletal symptoms in Marathi speaking populations.

Keywords: Occupational health; ergonomics; musculoskeletal disorders; translation; reliability; validity.

1. INTRODUCTION

Over the past two decades, job-related musculoskeletal disorders have garnered significant global attention. Work-related Musculoskeletal Disorders (WMSDs) are health issues affecting the structure and function of the locomotor system. These disorders involve muscles, tendons, bones, ligaments, cartilage, nerves, and surrounding tissues. WMSDs can range from mild to severely disabling conditions, with varying characteristics and progression. Researchers worldwide have employed diverse techniques for the assessment and management of WMSDs [1, 2].

Among the various assessment techniques, the Nordic Musculoskeletal Questionnaire (NMQ) is widely utilized measure to determine musculoskeletal issues. Developed by researchers from Nordic countries with support from the Nordic Council of Ministers, the NMQ evaluates health symptoms related to job settings. Since its inception in 1987, it has been commonly used by researchers in epidemiological studies and by clinicians in general health examinations[1, 3].

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The NMQ is a simple, structured questionnaire featuring a body map that highlights nine anatomical sites: the neck, upper back, lower back, shoulders, elbows, wrists/hands, hips/thighs, knees, and ankles/feet on both sides. It includes questions about symptoms experienced over the past 12 months and the past 7 days, as well as any activity limitations and visit to physician for the symptoms in the past 12 months. Responses are recorded in a binary format. The NMQ can either be self-administered or recorded through an interview method within less than 10 minutes.

The original English version of the NMQ has been translated and validated into various languages, including Brazilian Portuguese, Portuguese, Greek, Turkish, Chinese, Hindi, Persian, Arabic and Gujarati [4-11], [1]. This enhances its usability across different cultural and national contexts. Cross-cultural adaptation involves translating and adapting a questionnaire for use in a different setting. This process is necessary when a questionnaire is used in a context that differs from its original population, such as a different country, culture, or language.

The NMQ is frequently used to address musculoskeletal disorders in India. However, to the best of our knowledge, it has not yet been translated into Marathi language. In Rural Maharashtra most of the people use Marathi language in their day-to-day life. So, obtainment of a reliable translated tool that can be implemented among the rural populations and workers understanding Marathi language for assessment of musculoskeletal disorders becomes a necessity. Therefore, this study aims to translate and standardize the Nordic Musculoskeletal Questionnaire in its Marathi version.

2. METHODOLOGY

The study was conducted at a health science university located in a rural area of Maharashtra state in India. The study was initiated after receiving approval from the Institutional Ethical Committee. All individuals who agreed to participate in each phase of this study signed an informed consent form.

To ensure the quality of adapted instruments, it is essential to adhere to international norms during the adaptation process. Utilizing a methodology recognized by the scientific community allows for the comparison of data across different services [4]. The study followed all essential steps for instrument adaptation as outline in specialized literature. These steps included translating the English version into Marathi using the WHO guidelines for translation and adaptation of instruments, followed by back-translation into English, analysis by a panel of experts, and assessing the Marathi version of the NMQ for face validity, content validity, test-retest reliability, and internal consistency [12, 13].

2.1. Initial Translation Into the Marathi Language

In this step, the forward translation of NMQ into Marathi was done by an independent translator with a background in the healthcare profession. The translator was explained the guidelines and the purpose of translations. Emphasis was placed on conceptual translation rather than literal linguistic translation. The translated version was then reviewed by an expert committee, which consisted of a bilingual expert, a healthcare professional, translators, a layman and authors of this paper. The changes suggested by the committee were implemented, and the Marathi version was then approved.

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2.2. Backward Translation to English

Backward translation was conducted by an independent translator who was unaware of the purpose of the study. Again, emphasis was placed on conceptual translation rather than linguistic translation. This phase aimed to check for discrepancies between the content and meaning of the original version and the translated instrument. All the versions were analysed and compared by the author, and a final version was obtained. It was further reviewed by the expert committee for any discrepancies in both the original and backward translated versions.

2.3. Pretest

After agreement on both translations by the expert committee, the questionnaire was pre-tested on 14 individuals, 6 male and 8 female. This group included employees, students and professors of the institution. They were interviewed for any difficulty in understanding the questions, response system, layout and linguistic translation. Subsequently, the final version of the Nordic Musculoskeletal Questionnaire Marathi version was prepared and sanctioned by all committee members.

2.4. Evaluation of the Reliability of the Questionnaire

The reliability was assessed using the test-retest method. This test consisted of the application of the questionnaire to the same subjects, under similar conditions, in two or more situations. The questionnaire was applied to 160 individuals from the university, chosen randomly based on inclusion and exclusion criteria. In order to be part of the sample, certain criteria had to be met, such as age should be more than18 years, having knowledge of both Marathi and English languages, and being able to understand verbal expressions and answers by marking the chosen answers. Participants who were not willing to participate and those undergoing any mental illness were excluded. The selected subjects were informed of the purpose of the research. Each received two copies of the instrument, and they were oriented to answer the first copy on the day when the questionnaire was handed in and the second copy on the next day, at the same time and under similar conditions, without referring to the previous questionnaire. General data on the interviewees, such as age, gender, and educational status, were also collected. The data were entered and analysed using a Microsoft Excel sheet. The participants were characterized by descriptive analysis. The Kappa coefficient (k) was utilized for evaluation of test-retest reliability. This coefficient has values ranging from -1 to +1. Values close to +1 indicate total agreement between the two moments, while values close to -1 indicate total discrepancy. Values higher than 0.75 represent strong agreement and those below 0.40 indicate poor agreement. Kappa coefficient values of 0.40–0.75 represent moderate agreement [14]. Initially, the agreement of all the answers of participants was evaluated according to the nine body areas affected. Kappa coefficients concerning the answers to the four questions were also evaluated, without considering pain location.

3. RESULTS AND STATISTICAL ANALYSIS

Analysis of the experts' evaluations regarding the equivalency of the instrument demonstrated that there was no need to modify its form and content. Therefore, the instrument was kept in the same form which was presented to the committee.

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3.1. Analysis of Instrument Reliability

As regards the demographic characteristics of the general group participating in this phase of the study, it was verified that 49% (n = 79) were female and 51% (n = 81) were male (mean age 23.9 ± 9.61 years; range 20–59 years). As for educational status, 28.1 % (n = 45) completed education till high school (SSC), 33.1 % (n =53) were done high secondary school (HSC) or technical school level education and 38.7 % (n = 62) were graduates and/or postgraduates. It was also observed that the most common region where pain occurred was the lower back, as reported by 72.5% (n = 116) of the participants. The second most frequent complaint of pain was in the knee region, reported by 41% (n = 66) of the individuals. 70% (n = 112) of the participants reported experiencing pain in the previous 7 days. Agreement among all the answers of participants calculated by the Kappa coefficient, according to the region of the body involved, is shown in Table 1.

Table 1. Kappa agreement coefficient for each answer in the questionnaire.

Region of pain	Questions			
	Have you at any time during the last 12 months had trouble (such as ache, pain, discomfort, numbness)?	During the last 12 months have you been prevented from carrying out normal activities (e.g. job, housework, hobbies) because of this trouble?	During the last 12 months have you seen a physician for this condition?	Have you had trouble during the last 7 days?
Neck	9.84	923	9.836	0.942
Shoulder	0.967	0.89	1	0.911
Elbows	0.888	0.882	0.813	0.876
Wrist/Hands	1	0.854	0.891	0.957
Upper back	0.95	0.929	0.95	0.964
Lower back	0.93	0.952	0.987	0.957
Hips/Thighs	0.922	0.932	0.891	0.922
Knees	0.961	0.973	0.983	0.945
Ankles/Feet	0.86	0.922	0.863	0.909

According to Kappa values, all 36 items that comprise the instrument obtained a value of at least 0.813, with two items obtaining a score equal to 1. This result demonstrates a good reliability of the instrument being studied.

Cronbach's Alpha value of 0.716 indicates that this scale has acceptable internal consistency. The value falls into the "good reliability" range, suggesting that the items on this scale are measuring the same underlying construct consistently. This indicates that the translation has maintained the integrity of the original scale.

4. DISCUSSION

The demographic characteristics of the study participants provide a balanced representation of gender, with a nearly equal distribution of males (51%) and females (49%). The mean age of the participants was 23.9 years, with a wide age range from 20 to 59 years, ensuring a diverse sample in terms of age. This diversity is crucial for the generalizability of the findings across different age groups.

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Educational status varied among participants, with a significant proportion having completed education up to high school (28.1%), high secondary school or technical school (33.1%), and graduates or postgraduates (38.7%). This variation in educational background is important as it may influence the understanding and reporting of musculoskeletal symptoms.

The prevalence of musculoskeletal pain in the study population was notably high, with 72.5% of participants reporting lower back pain and 41% reporting knee pain. These findings are consistent with existing literature, which identifies the lower back and knees as common sites of musculoskeletal discomfort. The high prevalence of pain reported in the previous seven days (70%) underscores the relevance and urgency of addressing musculoskeletal health in this population.

The Cronbach's Alpha value of 0.716 indicates that the Marathi version of the Nordic Musculoskeletal Questionnaire (NMQ) has acceptable internal consistency. This value falls within the "good reliability" range, suggesting that the items on the scale are consistently measuring the same underlying construct. The reliability of the translated questionnaire is crucial as it ensures that the instrument maintains the integrity of the original scale, providing valid and reliable data for assessing musculoskeletal disorders.

The successful adaptation of the NMQ into Marathi, as evidenced by the acceptable Cronbach's Alpha value, highlights the effectiveness of the translation and adaptation process. This process included translation, back-translation, expert committee review, and pre-testing, which collectively contributed to maintaining the content validity and reliability of the instrument. The findings suggest that the Marathi version of the NMQ can be reliably used in epidemiological studies and general health examinations to assess musculoskeletal disorders in Marathi-speaking populations.

The study demonstrates that the Marathi version of the NMQ is a reliable tool for assessing musculoskeletal disorders. The high prevalence of reported pain highlights the need for targeted interventions to address musculoskeletal health in this population. Future studies could focus on longitudinal assessments to monitor changes in musculoskeletal health over time and evaluate the effectiveness of intervention strategies.

5. CONCLUSION

The Marathi version of the Standardized Nordic Questionnaire demonstrates acceptable internal consistency. This suggests that the questionnaire is a reliable tool for assessing musculoskeletal disorders in Marathi-speaking populations. Its ease of understanding and quick application further enhances its utility in both clinical and research settings.

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