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Cross-Cultural Adaptation and Expert Opinion of Revised Trauma Quality of Life Questionnaire (RT-QoL): Malay Language Version

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Abstract

Background: This study examines the cross-cultural adaptation and expert validation of the Revised Trauma Quality of Life (RT-QOL) questionnaire, translating it from English to Malay.

Methods: The study employed Beaton's adaptation guidelines and Takasaki's framework for expert opinions, involving 51 road traffic injury patients recruited from the Emergency and Trauma Department (ED) of a public hospital in Kedah, Malaysia, from March to June 2022. Participants were contacted via telephone 30 days after their hospital visit regarding their involvement in the study. Three independent experts, comprising academicians in healthcare and emergency department clinicians, reviewed and reconciled the RT-QOL Malay translation to ensure content validity and practical usability.

Results: The Malay version exhibited satisfactory internal consistency, with reliability scores between 0.68 and 0.90, similar to those of the English version. The findings indicate that the questionnaire is appropriate for larger-scale studies, providing a useful instrument for assessing trauma-specific conditions in Malaysian contexts.

Conclusion: This study represents the inaugural local examination of quality of life in road traffic injury patients utilizing the RT-QOL in Malay. This study establishes a basis for future research utilizing the RT-QOL Malay version to improve the comprehension and management of trauma-related quality of life concerns in the region.

Keywords: cross-cultural adaptation, Malaysia, quality of life, trauma

INTRODUCTION

Unintentional injuries are non-deliberate conditions with identifiable and preventable causes, aimed at avoiding recurrence and minimizing severity. Among unintentional injuries, those resulting from road traffic injuries (RTI) are alarming, warranting proactive public health concern to intensify preventive measures.[1,2] Globally, road traffic injuries cause about 1.19 million deaths and between 20–50 million non-fatal injuries each year.[3] In Malaysia, road traffic accidents are the leading cause of injury-related cases,[3] with motorcyclists accounting for a significant proportion of the casualties. According to the Royal Malaysia Police report, a total of 6,370 motorcycle-related accidents were recorded in 2019, of which 3,959 were fatal. This reflects an average of approximately 11 motorcyclist fatalities per day. In addition to that, since 2018, road traffic accidents have consistently been listed among the top five leading causes of death in Malaysia, according to the Department of Statistics Malaysia.[4–8] This persistent trend may be linked to the nation's increasing population and the corresponding growth in vehicle ownership.[9,10] Consequently, trauma-related injuries from these accidents contribute significantly to mortality rates and often result in long-term consequences for survivors, including extended impairments in their quality of life (QoL). Previously, due to the paucity of instruments development in trauma-specific cases,[11] the QoL of those affected by trauma cases, such as road accidents, were measured commonly by the eminent Medical Outcomes Study 36-items Short Form Health Survey (SF-36) and 12 items (SF-12), European Quality of Life–5 Dimensions (EQ-5D-3L Scales) and The Quality of Well-Being Index (QWB).[12] While these instruments have provided valuable information regarding the population in general, they do not clearly address the knowledge that can be gained from specific groups, such as people involved in trauma cases, like accidents. Thus, the Trauma Specific Quality of Life (T-QoL) was developed by Wanner *et al*. to close these gaps.[11] The T-QOL, due to its lengthy questions (43 questions), was further revised by Herrera-Escobar *et al*., decreasing the number to 18 questions.[13] The Revised-

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Trauma Quality of Life (RT-QoL) developed by Herrera-Escobar *et al*. was tested among different injury and patient characteristics, offering the specificity and validity which can be used by other trauma-specific condition populations, such as road traffic accidents, and hence, the usage of RT-QoL in this current study. The utilization of RT-QoL in the current study aims to reduce respondents' cognitive burden[13] without compromising the study's objectives, while also encouraging greater participation.

Prior to this study, the outcomes of RTIs in local settings were more commonly observed in costing[14,15] and evaluation studies[16–20] compared to any investigation of patients' well-being due to the injury suffered. Measuring the quality of life among affected individuals is essential, as the burden of road traffic injuries has shifted from mortality to long-term disability and reduced QoL among survivors.[12] This shift highlights the need to prioritize improving the quality of life for RTI survivors, not only to prevent fatalities but also to tailor interventions and enhance health outcomes for those most impacted.[21]

To date, there is no Malay-language version of the RT-QoL, nor has the English version been widely used in the local context. The RT-QoL was chosen for this study because it specifically addresses the well-being of trauma patients, unlike other general QoL instruments used to assess health outcomes. The RT-QoL was selected for its rigorous development and validation, demonstrating strong internal consistency with Cronbach's alpha values ranging from 0.80 to 0.87. Its concise format of 18 items also reduces cognitive burden on patients, making it a more practical and user-friendly tool for data collection. Moreover, by reducing the original 25-item T-QoL to a shorter version, the revised tool is designed to enhance practicality for both patients and healthcare providers. This streamlined format helps minimize respondent fatigue, facilitates data collection, and improves its applicability in both clinical and research settings.[13] The rationale for adapting this questionnaire was to ensure that the core content of each survey item is clearly understood by all respondents, promoting a standardized level of comprehension and minimizing interpretation bias.[22] In relation to that, the development of a Malay version of the RT-QoL aims to increase its accessibility and encourage more local research on trauma-related quality of life in the future. This adaptation helps address the current gap in trauma-specific QoL instruments that are culturally and linguistically appropriate for use in Malaysia. Hence, the objective of this study was to translate and culturally adapt the RT-QoL questionnaire into Malay and evaluate its practicality by incorporating expert opinions from both academics and clinicians (emergency physicians). This study is significant as it may serve as a reference for other trauma cases, such as falls, violent injuries, or physical assaults, that intend to use the Malay version of the RT-QoL instrument in future research. The use of this instrument is particularly relevant due to its items, which were specifically developed to address trauma-related aspects of quality of life. To the best of our knowledge, this is the first local study to explore the QoL of RTI patients using trauma-specific tools, as well as translating and adapting the questionnaire for use in the local context.

METHODS

The authors obtained permission from the original developer of the RT-QoL questionnaire[13] to use it in this study and proceeded with the cross-cultural adaptation process. Following this, the authors then informed the developer of their intention and objectives in translating the English version of the RT-QoL into Malay. This study was part of the major research registered and approved under the National Malaysia Research Registry (NMRR) Ethics Committee [NMRR 20-3246-53718] and Universiti Kebangsaan Malaysia Ethics Committee (UKM) [FF-2020-418]. This cross-cultural adaptation study was done with the pilot data, which was collected from March to June 2022 at one of the public hospitals in the state of Kedah, Malaysia. Of the 79 patients conveniently recruited for the study, only 51 were included in the final analysis due to missing data that affected the overall results. The suggested minimum sample sizes for Cronbach's alpha test, based on optimal effect sizes, are 15, 22, and 24 individuals, respectively. Considering a 20% non-response rate, a minimum of 30 respondents is deemed adequate to evaluate the reliability of the questionnaire.[23,24] Therefore, the final sample size remains adequate to ensure sufficient statistical power and confidence in the study's findings.

Both expert content validity and construct consistency analysis were done to determine the suitability of the questionnaire translation and adaptation. The integration of expert validity and Cronbach's alpha can be considered sufficient in certain cases, particularly during initial adaptations of a well-established instrument for a new language or cultural context, especially when the original version has demonstrated strong psychometric properties,[25] as is the case with the RT-QoL questionnaire.

The study was conducted at a public hospital with a high daily volume of emergency and trauma (ED) patient admissions. Participants were recruited through convenience sampling at the hospital's Emergency and Trauma Department, as this setting offers immediate access to trauma patients involved in accidents. Unlike other clinical departments, the ED serves as the primary point of care for individuals who have recently sustained accident-related injuries, making it an appropriate setting for identifying participants relevant to the study's focus on trauma and post-accident quality of life. To be eligible for the study, the patients must satisfy the following criteria: motorcyclists or pillions (a) injured due to road traffic accidents who crashed on other road vehicles and road dividers, road skidded, or due to weathers change; (b)

sustained a road injury 30 days from road accident and sought treatment at the hospital; (c) aged from 18 to 64 years old; (d) suffered either mild, moderate or severe injury based on the Abbreviated Injury Scales (AIS) assessment; (e) must be mentally capable of understanding the objectives of the study; (f) provided informed consent to the study; and (g) must be a Malaysian. The patients were excluded from the study if they (a) were pronounced dead upon hospital arrival; and (b) rejected the study invitation.

Due to the unique and dynamic nature of road accident injuries, the researchers did not interfere with the hospital's standard treatment procedures to ensure that data collection did not delay emergency care provided by the doctors. To minimize disruption to patient care during data collection, the research team conducted discussions with key Emergency Department (ED) personnel, including emergency physicians, medical assistants, patient registrars, nurses, and housemen. These discussions aimed to identify the most appropriate and feasible strategies for participant recruitment without compromising the study's objectives. Based on the consensus reached, eligible patients were approached at their final point of contact, usually during discharge after completing treatment. A modified patient flow pathway was then created together with the ED team. According to this modified flowchart, first, the respective patient was identified during triage as a motorcyclist or pillion, and accident forms were given for patient registration. A yellow sticker containing patient information was noted on the patient's accident form. Second, after treatment and diagnosis were delivered to the patient by emergency physicians, the patient was briefly informed about the study, and a colored study slip was given to the patient to seek their confirmation to join the study. Third, once agreed, a copy of the colored study slip was given to the patient. The patient who agreed to join was later contacted by phone to respond to the RT-QoL questions after 30 days of their hospital treatment.

Several trained enumerators sent a REDCap (Research Electronic Data Capture) link consisting of RT-QoL questions via WhatsApp to the patient. The patient was followed up within one week to ensure a timely response. The study data were gathered and managed through REDCap, a secure, web-based electronic data capture platform hosted by Universiti Sains Malaysia.[26,27] This platform is tailored for research data management and provides: (a) an intuitive interface for accurate data entry; (b) audit trails to track changes and export activities; (c) automated processes for efficient data export to widely used statistical software; and (d) features that enable seamless integration and interoperability with external data systems. The data and cross-cultural analyses were done using SPSS version 28, while the content of RT-QoL was done by independent academicians in the healthcare field and ED physicians.

A Cross-cultural adaptation refers to the process of addressing both linguistic and cultural factors to tailor a questionnaire for application in a different context.[28] This process is crucial to ensure equivalence between the original and adapted versions when implementing a self-administered health status questionnaire in a new cultural, linguistic, or national setting.[28,29] In this study, the translation and adaptation of the RT-QOL were guided by Beaton's widely recognized framework.[28] The approach was informed by prior studies, including Adhikari *et al*.,[30] which adopted the Exercise Adherence Rating Scale (EARS) into Nepali; Takasaki *et al*.,[24] which modified the 12-item Orebro Musculoskeletal Screening Questionnaire (OMSQ-12-J) for Japanese; and Reis *et al*.,[31] which translated and adapted the Quality of Life Index Spinal Cord Injury–Version III into Portuguese.

The translation and adaptation process included four important phases. Phase 1 involved the forward translation of the RT-QoL by two bilingual academicians with expertise in health studies. Their background helped ensure accurate translation of medical terms and reduced the likelihood of errors. Having two translators also allowed for cross-checking, which helped minimize personal bias. This method follows the World Health Organization[32] guidelines, which recommend expert-led and collaborative translations to ensure both reliability and cultural relevance. By combining subject-matter expertise, cross-verification, and adherence to international standards, the translated tool is made more accurate and dependable for use in both research and healthcare settings. Phase 2 involved synthesizing the two translated versions produced in Phase 1 into a single, unified draft. In Phase 3, a back translation was carried out by two independent bilingual professional translators. The translated items were then reviewed and refined by a bilingual academic expert involved in the study and a bilingual medical expert, specifically, an Emergency Specialist. These independent experts were invited to evaluate the study instrument and were not involved in the study's design, data collection, or analysis, ensuring an objective and unbiased assessment. Their input helped confirm the content validity and relevance of the instrument within the study context.

The final version of the revised RT-QoL was drafted after the experts completed their tasks. This session was to include experts' impressions on questions practicality,[24] which were suitable for addressing the topic of road traffic injury. The final phase of the study involved a pilot test with patients who had sustained injuries from road traffic accidents. The step-by-step cross-cultural adaptation process was modified and adapted from Beaton's guidelines.[28]

Following a similar approach by Takasaki *et al*.,[24] who used clinician impressions to assess the practicality of the OMSQ-12-J instrument, this study adopted a comparable strategy to evaluate the Malay version of the RT-QoL. In

addition to assessing internal consistency, expert reviewers were consulted to evaluate the content validity of the instrument. They specifically examined the relevance, clarity, and appropriateness of each item to ensure it was suitable for the target population of road traffic injury patients. To enhance the credibility and content validity of the study instrument, three independent expert reviewers were invited to evaluate its content: two external academicians with healthcare backgrounds (Expert Reviewers 1 and 2) and one emergency department specialist with expertise in trauma care (Expert Reviewer 3). As these reviewers were not involved in the study's design, data collection, or analysis, their evaluations provided an independent and unbiased assessment. Table 4 summarizes the experts' agreement, and the reconciliation process conducted on the RT-QoL content. In regard to that, to determine the reliability of the Malay version of the RT-QoL, internal consistency was assessed using Cronbach's alpha. A total of 51 participants were successfully recruited to support both the reliability testing and the refinement of questionnaire items based on expert feedback.

RESULTS

Descriptive analysis was applied to characterize the patients' demographic information. Mean, standard deviation (SD), and percentage (%) were used to present this data. Reliability analysis examines the degree to which a scale yields consistent results. One common method for assessing reliability is internal consistency, which is measured using Cronbach's Alpha. The internal consistency values for the Malay version of the RT-QoL, as measured by Cronbach's alpha coefficients, ranged from 0.68 to 0.90. These values are generally consistent with those reported by Herrera-Escobar *et al*.,[13] whose study yielded alpha values between 0.80 and 0.87. Although the physical well-being subscale showed a slightly lower alpha of 0.68, this level is still considered acceptable and indicates sufficient internal consistency for application in health-related quality of life research.[33]

Table 1 shows the demographic characteristics of the patient involved. Initially, 79 patients with road traffic injuries were enrolled between March and June 2022. However, only 51 responses were eligible for the analysis, as the remaining were excluded due to missing or incomplete data. The patients' mean age was 36 years old with a standard deviation (SD) of 18.7. Most of the patients were motorcyclists (90%), while the remaining 10% were pillion riders. Among the patients, 16% were 20 years old. Out of 51 patients, about 3/4 were males (N = 38, 74%), which was expected due to motorcyclists being dominated by males. In terms of ethnicity, half of the patients were Malay, and the rest were Chinese. Of 51 patients, 65% experienced motor vehicle accidents at least once a year ago and had hospital visits, where 42% self-reported their injury condition as mild injury and 36% reported moderate injury.

Table 2 shows the expert agreement on 6-item emotional well-being, 6-item functional engagement, and 6-item physical well-being and recovery, while Table 5 shows the reliability measures of the internal consistency of the RT-QoL constructs within the study by utilizing the Cronbach's Alpha (α) value. Cronbach's alpha results revealed that the emotional well-being scale with six items (α = 0.721) and the functional engagement scale with six items (α = 0.936) were reliable. Similarly, the physical well-being scale with six items was also acceptable (α = 0.686). While the emotional well-being and functional engagement remained consistent in reliability, the physical construct turned out to be demonstrated otherwise, but still acceptable. Although a Cronbach's alpha (α) value above 0.70 is commonly used as the benchmark for reliability, values between 0.60 and 0.70 are still regarded as acceptable according to reliability testing guidelines.[33] In common practice, omitting the item can be done to increase the value. However, due to the question being vital for this study, it was decided to be kept. In this research, RT-QoL was assessed and refined based on expert insights to ensure cultural and contextual appropriateness for the Malaysian community. The performance of items may exhibit variations influenced by linguistic adaptation or the diverse experiences of patients.

TABLE 1. Demographic characteristics of patients (N = 51)

Variable	N	%
Gender		
Female	13	26.0
Male	38	74.0
Riding position		
Motorcyclists	46	90.0
Pillions	5	10.0
Race		
Malay	48	94.0
Chinese	3	6.0
Hospital visits due to MVA at least once a year		
Yes	33	65.0
No	18	35.0
Self-reported injury severity		
No injury at all	0	0.0
Mild injury	14	42.4
Moderate injury	12	36.4
Severe injury	7	21.2
No hospitalization history	0	0.0

MVA = motor vehicle accident

TABLE 2. Expert agreement and reconciliation on RT-QoL content

Items	Expert reviewer 1	Expert reviewer 2	Expert reviewer 3	Modification
Emotional Well-being				
Kesejahteraan Emosi				
Q1: I have felt more ''on edge'' or ''jumpy'' lately. *Sejak kebelakangan ini, saya berasa lebih gelisah dan tidak tenteram*	√	√	√	-
Q2: My appetite has changed since the injury. *Selera makan saya telah berubah sejak kecederaan itu.*	√	√	√	-
Q3: My mood has become worse since the injury. *Suasana hati saya semakin merosot sejak kecederaan itu.*	√	√	√	-
Q4: I am angry that I got injured. *Saya berasa marah kerana saya mengalami kecederaan.*	√	√	√	-
Q5: I have to rely on others, such as my family, friends, social security, or community support programs because of my current financial limitations. *Saya harus bergantung kepada orang lain seperti keluarga, rakan, jaringan keselamatan sosial (contoh SOCSO), atau program sokongan komuniti disebabkan oleh masalah kewangan saya.*	√	x	x	The social security utilization when translated to Malay is considered vague and might arouse query for those who are not familiar with the term, hence, the example should be given for social security.
Q6: My injuries have negatively changed my relationships with my family, friends, or intimate partner *Kecederaan saya telah mempengaruhi hubungan saya dengan keluarga, rakan atau pasangan secara negatif.*	√	√	√	-
Functional Engagement				
Penglibatan Fungsi				
Q7: I need help: walking upstairs. *Saya memerlukan bantuan untuk menaiki tangga.*	√	√	√	-
Q8: I need help: walking on flat surfaces. *Saya memerlukan bantuan untuk berjalan di permukaan yang rata.*	√	√	√	-
Q9: I need help: bathing/showering. *Saya memerlukan bantuan ketika mandi.*	√	√	√	-
Q10: I need help: eating. *Saya memerlukan bantuan ketika makan.*	√	√	√	-
Q11: I need help: going to the bathroom. *Saya memerlukan bantuan untuk pergi ke bilik air.*	√	√	√	-
Q12: I need help: cooking/preparing meals. *Saya memerlukan bantuan untuk memasak atau menyediakan makanan.*	√	√	√	-
Physical and Well-being Recovery				
Pemulihan dan Kesejahteraan Fizikal				
Q13: Even though I was injured, my life is better now than it was before the injury. *Walaupun saya mengalami kecederaan, kehidupan saya kini adalah lebih baik berbanding sebelumnya.*	√	√	√	-
Q14: My recovery was shorter than I expected. *Tempoh pemulihan saya adalah lebih singkat daripada yang saya dijangkakan.*	√	√	√	-
Q15: I currently have physical limitations. *Keadaan fizikal saya terbatas pada ketika ini.*	√	√	√	-
Q16: I am able to exercise like I used to. *Saya boleh melakukan senaman seperti dahulu.*	√	√	√	-
Q17: I am able to continue my normal leisure activities. *Saya boleh meneruskan aktiviti riadah saya seperti biasa.*	√	√	√	-
Q18: I have pain on a daily basis. *Saya mengalami kesakitan pada setiap hari.*	√	√	√	-

DISCUSSION

The RT-QoL was translated into Malay and underwent cross-cultural adaptation, with successful validation achieved. The Malay version of the RT-QoL demonstrated excellent reliability and received positive expert feedback regarding its practical use with RTI patients. Even though the analysis suggested deleting one of the questions in the physical construct, due to the importance of the question to the study, it was kept in the original questionnaire without compromising the internal consistency. The range of internal consistency (*α*) of RT-QoL English version[13] was high in emotional well-being (*α* = 0.80) and physical well-being and recovery (α = 0.83) constructs compared to the current RT-QoL Malay version. However, RT-QoL Malay version proposed a high internal consistency (*α*) in the functional engagement, *α* = 0.93, compared to the English version. Variations in item performance may be affected by linguistic adaptation or diverse patient experiences. Since this was the first attempt at RT-QoL, both English and Malay versions were used in the local RTI setting.[22,34] As compared to the original version, no major modifications to the questions were necessary, except for a suggestion by the expert to revise the items related to the emotional construct. The original question in English was, "I have to rely on others, such as my family, friends, social security, or community support programs because of my current financial limitations" and the Malay translation was, "*Saya harus bergantung kepada orang lain seperti keluarga, rakan, jaringan keselamatan sosial (contoh SOCSO), atau program sokongan komuniti disebabkan oleh masalah kewangan saya"*. The reasoning behind this modification was that layman respondents might not understand the "social security" definition. Hence, an example of a locally implemented social security system was included in the Malay version of the RT-QoL to enhance respondent understanding.

The strengths of this study are: (a) the RT-QoL translation and cross-cultural adaptation process adhered to well-established guidelines; (b) expert reviews were conducted in line with previous study recommendations, with the added benefit of involving a diverse group of experts from both academic and clinical backgrounds to assess the RT-QoL; and (c) the feasibility of the RT-QoL was evaluated and successfully compared with the original English version. To the best of our knowledge, this is the first attempt to collect quality of life (QoL) data from RTI patients using the Malay version of the RT-QoL. However, this study was not without limitations. The COVID-19 pandemic significantly hindered participant recruitment efforts, which contributed to the limited sample size in this study. To address this limitation, future research should aim to include a larger and more diverse sample encompassing various types of trauma cases, thereby offering broader insights and improving the generalizability of the findings, as well as employ factor analysis to further investigate the construct validity of the RT-QoL Malay version.

The usage of RedCap link as an online survey distribution could be seen as another option to encourage response amidst the pandemic. Nevertheless, many patients were reluctant to participate during the pilot phase, which coincided with the COVID-19 pandemic and a surge in reported phone scam cases.[35] This situation created fear and mistrust among potential respondents, affecting their willingness to support the study. This issue could have been reduced if the survey had been conducted face-to-face. Additionally, recall bias may have occurred, as patients were required to reflect on their condition and well-being 30 days after their hospital visit, when the survey was administered. Furthermore, Rissanen *et al*.[12] discussed several instruments that are widely used internationally to measure quality of life after road traffic injuries, including the SF-36, EQ-5D, and WHOQOL-BREF. Nonetheless, the application of the RT-QoL instrument in analogous studies is constrained, underscoring a significant deficiency, especially within the Malaysian context, thereby complicating a comprehensive discussion on the reliability comparison among questionnaires, particularly those centered on trauma-related research. Thus far, no local studies are known to have adapted or validated the RT-QoL for use in Malay or for populations specifically affected by trauma or accidents, therefore, this study takes an important first step in addressing that gap by introducing a Malay version of the RT-QoL. It aims to expand the range of quality of life assessment tools that are relevant to the Malaysian context, particularly for post-injury cases, and to encourage more trauma-focused QoL research using validated and population-appropriate instruments.

CONCLUSIONS

The RT-QoL was translated and cross-culturally adapted into the Malay Language. Both academics and medical experts were consulted to review the content of RT-QoL so that it was practical to be used for the study related to road traffic injury patients and their quality of life. The RT-QoL Malay version provided evidence that it could be used in road traffic injury and that it could be further used in other trauma cases.

CONFLICT OF INTEREST

None declared.

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