Translation, Cross-Cultural Adaptation, Validity and Reliability of the Malay Version of the Rosenbaum Concussion Knowledge and Attitude Survey-Student Version (Rockas-St-M)

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Abstract

Objective: To translate and culturally adapt the Rosenbaum Concussion Knowledge and Attitude Survey-Student Version (RoCKAS-ST) into Malay and evaluate the reliability of the Malay version of the survey (RoCKAS-ST-M) in high school-age athletes age under 18 year old.

Study Design and Setting: The RoCKAS-ST was forward and backward translated, and culturally adapted into Malay language on 32 high-school athletes (contact and non-contact sports) under age 18 years old and participated at various level of sports competitions. All participants completed the translated RoCKAS-ST-M (Malay) that was administered twice at 14 days interval after first attempt. The internal consistency, face validity and test-retest reliability were calculated using Cronbach's alpha value, discussion and intraclass correlation coefficient (ICC), accordingly for RoCKAS-ST-M.

Results: The RoCKAS-ST-M showconsiderable acceptable moderate internal consistency with CKI and CAI score range between 0.40 and 0.66 of Cronbach's alpha. The reliability of CKI and CAI shows a good reliability value exceed 0.60 of ICC. The RoCKAS-ST-M scale was valid, and reliable among high school athletes that involved in various sports participation.

Conclusion: This study showed that the cross-cultural adaptation of the English version of RoCKAS-ST was successful and this score could be useful to evaluate the level of knowledge and attitude of high school athlete toward sports concussion.

Keywords: *Concussion, concussion knowledge, concussion attitude, high-school athletes, reliability*

Introduction

High school-age athlete that involve in sports especially in contact sports are at greater risk exposed to sports related concussion and more vulnerable to experience second impact syndrome (SIS) that may lead to catastrophic condition if not treated early[1,2]. It estimated that the incidence of sports related concussion among youth is between 1.3 to 3.8 million per year in United State of America and not representing any specific age group[3].To date, the overall estimate of the incidence of sports concussion at young athletes is not available due to several reasons. This include variation of definition use, inability to identify the sign and symptom of this condition, and underreporting behaviour among athletes in high school setting which lead to assumption of the occurrence of sports related concussion may be under estimate in this population[2,3].

Nowadays, more information is available about sports related concussion regarding it aetiology, signs and symptoms, early management and return to sports criteria that has been made available and distributed to the sports personnel, coach and parents[4-6]. There is alsomore action taken by authorities to distribute, create an awareness program and preventive measure regarding sports related concussion management among high-school athletes. However, it is unclear whether the program is effective to increase the knowledge, awareness and to modify the unsafe behaviour about concussion among high school athletes[7-8].

In addition, little has been done to examine the knowledge and attitude toward sports related concussion among high school athletes population[9] particularly in Malaysian context.A systematic review warranted the need of further study to examine the sports related concussion knowledge and safe reporting behaviour among sports administrative team and high school athletes[2].Rosenbaum and it colleagues[7]developed and validated a Rosenbaum Concussion Knowledge and Attitude Survey-Student Version (RoCKAS-ST) which evaluate the Concussion Knowledge Index (CKI) and Concussion Attitude Index (CAI) of the high school athletes. The result of the survey aims to provide information for potential education intervention program specific for this athlete's population. As consequence, a Malay version of (RoCKAS-ST-M) would be very useful for evaluating the concussion knowledge and attitude the high school athletes in the Malay-speaking population. Therefore, the primary aim of this study was to translate, cross-culturally adapt and establish the face validity and reliability of the RoCKAS-ST-M within Malaysian context.

Materials and Method

Study Design: This study was conducted in two stages. At the first stage, the translation and cross-cultural adaptation of the RoCKAS-ST into Malay version was performed according to the five stages proposed in the Guidelines for the Cross-Cultural Adaptation Process[10]. In the second stage, the measurement of RoCKAS-ST-M properties was performed following a purposive sampling model. This study was conducted at selected high school, which consists of 32 high-school athletes (contact and non-contact sports) under 18 year old and participated at various level of sports competition. The sample size was determined following minimal requirement to pre-testing the complete questionnaire that may provide some quality improvement in content validity[10].Each participant was informed about the study procedure and all participants are recruited based on volunteer basis. Informed consent form from each participant was obtained prior the conduction of the study.

Translation and Cross-Cultural Adaptation: The translation and cross-cultural adaptation procedure of RoCKAS-ST followed an international guidelinesthat consist of five stages[10].At the first stage, forward translation of original RoCKAS-ST into Malay language by two independent translators with a command of English. The informed translator (T1) was a physiotherapist and the non-informed translator (T2) was a language teacher. Both translator have a good English command and spoke fluent Malay language as their mother tongue. In the second stage, both the original RoCKAS-ST and Malay version (T1 & T2) were compared and reviewed by both translators with the third independent observer. Any issues or inconsistencies in translation were resolved through consensus in order to establish the first version of RoCKAS-ST-M (T-12). In the third stage, the backward translation of T-12 were establish by two independent translators that were asked separately to translate back the RoCKAS-ST-M (T-12) into English version (BT-1 & BT-2) as a process of validity check in recognizing any inconsistencies of conceptual error in the first version translation of RoCKAS-ST-M. In the fourth stage, a group of discussion were made between the expert in the methodological, physiotherapist and all four translators including language expert. These group experts compared and reviewed all four versions of the survey and establish the new RoCKAS-ST-M for field-testing. In the final stage, the test of pre-final version of the RoCKAS-ST-M survey was performed in n =32 high-school athletes that involved in contact or non-contact sports.The COSMIN checklistwereused for further assessment on the measurement properties of the RoCKAS-ST-M[11].

Participants: Participants of this study are all high school athletes. The eligibility criteria were as follows: (i) age must be under 18 year, (ii) involved in contact or non-contact sports, and (iii) each individual were recruited under volunteer basis. The final version of the RoCKAS-ST-M were administered twice by appoint researcher at 14 days interval after the first attempt. Before collection of the survey, each participant were reminded to complete the survey at their best effort.

Statistical Analysis: Descriptive analyses were presented as mean, standard deviations and percentages. The internal consistency was measured using Cronbach's alpha with value ranging from 0.70 to 0.90 that considered as good to greater indicator. The value exceeding 0.90 was considered as high correlation[12]. The face validity were established through discussion, judgement and agreement between expert group and participant's feedback session. The test-retest reliability of RoCKAS-ST-M were calculated using the intraclass correlation coefficient (ICC) with corresponding of 95% of confidence interval usingtwo-way random effects model in order to determine the intersession repeatability between measurements[12,13]. The value of reliability were rated as poor (r = 0.00 – 0.20), fair (0.21 -0.41), good (0.41 -0.60), very good (0.61 – 0.80) and excellent reliability (0.81-1.0)[14].Feasibility of the RoCKAS-ST-M were estimated using the time to fill up the questionnaire. Statistical significant p value were pre-set at 0.05. Data were analysed using IBM SPSS Statistics 21.0 software.

Results

Cross-Cultural Adaptation And Face Validity: The expert group and five high school athletes that involved in contact and non-contact sports were interviewed in separate group discussion. Feedback from each group discussion reached a similar consensus that the questionnaire was easy to understandand there is no specific cultural adaptation required. Furthermore, based on discussion in expert group, it concluded that the construct of the RoCKAS-ST-M questionnaire were pertinent for the purpose of questionnaire and intended population.

Study Participants: Total of 38 participants were included in this study, but 6 participants provided invalid answers on the RoCKAS-ST-M questionnaire. Therefore, only 32 questionnaires were evaluated in this study. From 32 participants (19 males and 13 females) were aged between 16 and 17 year old. In total, twenty-four participants were involved in contact sports and eightwere from non-contact sports.

Internal Consistency: Analysis of internal consistency for the translated CKI score compromising of 37 items presented with the Cronbach's alpha, $\alpha = 0.40$. Analysis of the internal consistency of the translated CAI score compromising of 18 items considered as having a good reliability with Cronbach's alpha, $\alpha = 0.66$. Most items needed to be preserve, except for item in section 4, question number 2, where the deletion of this item would increase the alpha value to $\alpha = 0.71$. Therefore, the elimination of this item should be considered.

Test-retest Reliability: Mean score of CKI is 16.09 (±2.25) and 14.41(±2.15) for first and second attempt, respectively. The test retest reliability indicated good reliability of CKI score with ICC of 0.64 (95% CI 0.26 – 0.83), $p < 0.05$. Mean score of CAI is 59.4 (±5.21) and 58.4 (±6.02) for first and second occasion, respectively. The result of test-retest reliability revealed a similar result with a good reliability of CAI score presented with ICC of 0.69 (95% CI 0.37 – 0.85), $p < 0.05$.

Discussion

The purpose of this study was to establish the face validity and reliability of the RoCKAS-ST-M within Malaysian context in a sample of high school athlete that involve in contact and non-contact sports. The qualitative analyses of measure of RoCKAS-ST-M resulted in acceptable and good reliability and suggest this questionnaire is a stable and acceptable measure of concussion knowledge and attitude among high school athletes involved in contact and non-contact sports.The mean score of CKI is slightly differ from first measurement and this could reflects the facts that some athletes providing a different responses from first measurement and second measurement. The reason probably the athlete does not know the correct answers to the given questions and start guessing on both measurements[7]. In addition, the analysis of internal consistency using Cronbach's alpha showed a good consistency between both measurements.

Therefore, this study has successfully translated and validates the Malay version of RoCKAS-ST-M. This is an important procedure in order to improve understanding on the question and increase the relevancy of the provided answers. Moreover, the level of English proficiency among Malaysians was still considered low[15]. In fact, this is a global problematic in various fields include higher institutions and industrials especially for non-English native[15-17].Therefore, by translating to own native language, lower misunderstanding and higher accuracy of the answer could be achieved. In addition to that, the relevant answers enhance the quality of intervention framework in future.

The intervention of sports concussion education program requires an accurate assessment of current population knowledge gaps before development of

specific educational strategies[1]. The goals of educational program are two-fold; to improve the individual concussion knowledge and to change the unsafe attitude by encouraging self-reporting behaviour among athletes with self - suspected concussion during training or competition. Athlete that receive a formal education program related to sports concussion were more likely to report concussion-related symptoms[7]. Previous studies also suggested the important of the role of the coach, teammates and parents were encouraging the reporting behaviour[18]. Therefore, the intervention of education program should not focus entirely to high school athlete but also consider including both coach and parents altogether. The sports concussion risk factor were graded as high among athlete with history of previous concussion and increased risk high impact collision in matched play compared to training, with age, gender, playing position and player level are indicated as low risk of sports concussion[19]. The future education program should consider these factors for targeted intervention to the athlete with high risk of sports concussion. According to Consensus statement on Sports Related Concussion that was held in Berlin[4], schools are encouraged to imply the SRC policy which include the education, prevention and management for sports concussion for coach, teachers, staff and parents in providing appropriate supports to athletes recovering from SRC.

Conclusion

The RoCKAS-ST-M was found to be reliable and valid tools to measure concussion knowledge and attitude level among high school athletes in Malaysia setting. Most importantly, it allows the evaluation of knowledge and attitude on sports concussion which essential in examination of the effectiveness of concussion education program, reporting behaviour and sports concussion management. Future researcher will be able to use this questionnaire to assess the athletes understanding on sports concussion on a large scale and identify athlete with high-risk behaviour. It is important for early detection of unsafe attitude toward sports concussion in this young athlete particularly those who involved in contact sports.

Ethical Clearance: This study was approved by the university research committee (Code Project: 2017-0241-107-01) and Educational Planning and Research Division Ministry of Education Malaysia (Ref. No.: KPM.600-3/2/3-eras (130)).

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Declarations of Interest: Nul.

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