



SPORTS-RELATED DENTAL TRAUMA AND MOUTHGUARD USE (SDTM) QUESTIONNAIRE IN KANNADA: A CROSS-CULTURAL VALIDATION STUDY

Dr. DJ Veeresh

Professor, Department of Public Health Dentistry, Bapuji Dental College and Hospital, Davangere, Karnataka, India

Dr. Varghese Suresh*

Senior lecturer Department of Public Health Dentistry, Educare Institute of Dental Sciences, Malappuram, Kerala, India. *Corresponding Author

ABSTRACT **Background:** There was no validated instrument to measure the knowledge attitude and practice towards traumatic dental injuries among sports personals. It is a great challenge to come up with a questionnaire that is psychometrically sound and is efficient and effective for use in research.

Aim: To content validate the Sports related Dental Trauma and Mouthguard use (SDTM) Questionnaire for sports personal.

Materials and Methods: A questionnaire for assessing the SDTM Questionnaire for sports personal consisting of 19 close-ended questions was prepared and translated to the Kannada language. Content validity ratio was checked after distributing to a panel of five subject matter experts (SME's). SME had scored the items of the questionnaire according to relevance, clarity, simplicity, and ambiguity. The questionnaire was modified according to the inputs of experts and reevaluated.

Results: The content validity values based on the relevance, clarity, simplicity, and ambiguity were **0.89, 0.96, 0.96 and 0.98** respectively for the translated and modified Sports related Dental Trauma and Mouthguard use (SDTM) Questionnaire in Kannada. Overall, CVI score was **0.947** which is a good agreement.

Conclusion: SDTM questionnaire can be utilized in future by the researchers for assessing the Sports related Dental Trauma and Mouthguard use.

KEYWORDS : traumatic dental injury, sports medicine, questionnaire validity, sports injury, mouthguards, content validity index.

INTRODUCTION

Dental trauma is considered a major public oral health problem because of the high prevalence and the impact caused in daily life. This is not a simple problem and has a great psychological impact especially when it leads to the loss or fracture of anterior teeth.¹ The most common teeth affected by trauma Anterior teeth are not only important for aesthetics but also are essential for phonetics, mastication, supporting tissues integrity, psychosocial well-being. 60% of traumatic dental injuries (TDIs), are Sports related. So, the prevention and management of TDI are important.² One of the most effective ways of prevention is the use of mouthguards as they are known to reduce TDI.³ For prevention to be effective Assessment of the current knowledge, attitude and practice of the target population is necessary so as to customize the preventive strategy according to the needs of public or to a target population.

There was no validated instrument (questionnaire) to measure the knowledge attitude and practice towards traumatic dental injuries among sports personals. It is a great challenge to come up with a questionnaire that is psychometrically sound and is efficient and effective for use in research. The quality of measuring tools is usually checked using reliability and validity scores. Reliable and valid questionnaires are required for the researchers to study complex constructs.⁴

The process of developing an instrument is focused on reducing error while measuring. So, it is an important goal for any developer to develop a valid instrument. Aim of this study is the development of a questionnaire that tries to measure the knowledge and attitude towards traumatic dental injury during the practice of sports and the use of mouthguards was to be made.

MATERIALS AND METHODS

Content validity is one of the fundamental steps in the development of new tools of measurements. As content validity links abstract concepts with observable and measurable indicators.⁵ This is a two-step process starting with the Development stage and ending with the Judgment quantification process.⁶ The first stage, the Development stage requires a good and extensive review of the literature to identify relevant domains and contents. For this study, the literature review identified approximately 30 to 40 articles on the subject of TDI's and after which the items were constructed. Articles by Kec, eci AD et al and Tiwari V et al were taken as key articles for reference and construct.^{7,8} The instrument was developed with instructions and scoring guidelines for each item. The second stage was the Judgment-quantification stage which required a Subject Panel of experts (SPE). The SPE's worked independently, to evaluate the instrument and rate items of relevance

according to the Content domain.⁹ In addition to item content and clarity, they also checked for instrument comprehensiveness. The SPE suggested modifications for items that are inconsistent with the concept of the questionnaire. Content validity index (CVI) was used to utilize a quantitative measure.

Calculation of the CVI score is by tallying the results of the experts based on the degree to which the experts agree on the relevance and clarity of the items. The panel of Experts was used to validate the TDI's modified questionnaire. The questionnaire consisted of 19 close ended questions. The questionnaire tested the athletes regarding their knowledge, attitude towards TDI's and the use of mouth guards. It was translated to local (Kannada) language. The questionnaire was divided into two sections. Section I dealt with demographic details and Section II contained questions about their knowledge, attitude towards TDI's and the use of mouthguard.

Questionnaire validity is measured using content validity ratio using the formula (CVR)¹⁰: $CVR = (N_e - N/2) / (N/2)$, CVR = CVR value for the ⁱth measurement item; n_e = number of subject matter experts (SMEs) indicating a measurement item is "essential"; N = total number of SMEs in the panel; CVR equation takes on values between -1.00 (strong disagreement) and +1.00 (strong agreement). The CVI is the mean of the CVR values of all the retained items.

The questionnaire was distributed to a panel of five SME's to indicate whether or not a measurement item is "essential" for operationalization of the questionnaire. One faculty from public health dentistry, two from conservative and endodontics, and one from oral medicine and radiology were invited as SMEs. The questionnaire scrutinized thoroughly and scored for relevance, clarity, simplicity, and ambiguity individually, and the overall score was calculated. The inputs of SME's were taken into consideration and some of them were eliminated and a few questions were added.

The eliminated questions are

1. What kind of mouthguard do you use?
2. Knowledge about managing these soft-tissue tears?
3. Do you think tetanus toxoid (TT) injection is necessary in dental trauma cases?
4. How frequently do you come across TDI's?

Questions added according to the inputs by SME's are:

1. What kind of tooth injury did you have?
2. If you sought treatment for the tooth injury, when was it?

RESULTS

Content validity of the questionnaire was measured by CVR. It was calculated individually based on the SME's opinion on relevance, clarity, simplicity, and ambiguity of the questions. Three questions

having a CVR score of -0.2 were eliminated, three new questions were added. Final CVI scores were 0.89, 0.96, 0.96 and 0.98 for relevance, clarity, simplicity, and ambiguity, respectively [Table 1]. Overall, CVI score for the modified Kannada questionnaire was 0.947.

Table 1 Content validity ratio and content validity index scores based on relevance, clarity, simplicity, and ambiguity.

Sl no.	Questions	Relevance (CVR)	Clarity (CVR)	Simplicity (CVR)	Ambiguity (CVR)
1.	What sport/sports do you practice?	1	1	1	1
2.	How long have you been practicing sports?	1	0.6	1	1
3.	In the sports that you practice is it mandatory to wear protective equipment to protect the mouth or face?	0.6	1	1	1
4.	If yes, what kind of injury to the mouth or face have you observed?	1	1	1	0.6
5.	What is the most common reason for injuries to the mouth or face?	1	1	1	1
6.	Have you suffered any kind of injury to teeth while playing sports?	1	1	1	1
7.	What kind of tooth injury did you have?	0.6	1	1	1
8.	How did you proceed?	1	1	1	1
9.	When did you seek treatment for dental injury?	0.6	1	1	1
10.	Do you know when a tooth comes out as a whole it can be replanted into the socket?	0.6	1	1	1
11.	In your opinion, within which period of time a tooth must be replanted?	1	0.6	1	1
12.	Are you aware that immediate action is essential for a successful outcome for tooth replantation into the socket?	1	1	1	1
13.	How can you carry a tooth which come out in-toto to the dentist?	1	1	1	1
14.	Are you aware of mouthguards for use during sports practice?	1	1	1	1
15.	Do you think mouth guards are effective in protecting teeth and mouth from injury?	1	1	1	1
16.	Do you use or have you used mouthguards?	1	1	1	1
17.	What is the reason for not using mouthguards?	1	1	0.6	1
18.	Do you recommend the use of mouthguards to other athletes?	0.6	1	1	1
19.	Have you ever interacted with medical or dental experts regarding safety measures for facial and dental injury?	1	1	0.6	1
	CVI	0.89	0.96	0.96	0.98
	Overall CVI=0.947				
	CVI – Content validity index, CVR – Content validity ratio				

DISCUSSION

The fundamental step in developing an instrument to be used in research is validation. In case of questionnaire it represents the mechanism were in which we will convert abstract concepts to observable and measurable indicators.⁶ The Content validation is a two-step process which includes the development stage and judgment quantification process. The development of the instrument requires an extensive review of the literature to learn identify and quantify all the relevant items and domain in the instrument.⁷

When a new instrument is being developed it should be adapted to the location, scenarios culture and language. These adaptations may change content, format, response options, or visual presentation of an instrument.¹² Although there are many versions of the SDTM questionnaire has been successfully used, studies representing the cross-cultural validity of the revised instrument was not found in literature representing local language.

It cannot be simply implied that translation as the answer that helps the person understand questionnaire better. As even a small change can distort validity of a questionnaire. So, whenever a small change is made the need arises for cross cultural validation.

This study was conducted in line with the previous study conducted by Yaghmale as well as Akhil et al in which used a similar rating technique by experts based on relevance, clarity, simplicity, and ambiguity on 4-point scale.^{13,12} The results so obtained were analyzed and compared which represents CVI of 0.70 as average agreement; 0.80 as adequate agreement; 0.9 is categorized as good agreement, and CVI of 1.00 indicates 100% agreement between raters. Content validity of the current questionnaire was 0.947. This is similar to the results from the panel of experts in a study by Akhil et al. where the experts' agreement which was 0.96.¹²

Errors are innate in research. This is truer when the research protocol is subjective in nature and this might affect validity. It is not possible to generate feedback from experts in a consensus building meeting, and there are errors of speculation. So, content validity becomes an important factor which identifies the concept of measuring; however, it is not a sufficient indication that the instrument actually measures what is intended to measure. Researchers should have a more comprehensive of content validity. A single approach is insufficient, and a variety of approaches should be tested.

Acknowledgement

Various contributors had helped in developing this study and its protocol. We would like show our gratitude to all the SME's for their participation in the study. We would also like to acknowledge Dr. Nagesh L., Dr. Sapna B., Dr. Puja Yavagal, Dr. Usha GV, Dr. Savithra Prakash and Dr. Akhil Pallepatti.

Financial support and sponsorship

Self-funded research

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Juneja P, Kulkarni S, Raje S. Prevalence of traumatic dental injuries and their relation with predisposing factors among 8-15 years old school children of Indore city, India. *Ciujul Med.* 2018 Jul;91(3):328-335.
2. Gupta G, Gupta N, Chopra R, Sachdev V. Awareness towards management and prevention of dental injuries among sports instructors in Delhi, India. *J Dent Specialities.* 2016;4(2):135-138
3. Knapik JJ, Marshall SW, Lee RB, Darakjy SS, Jones SB, Mitchener TA, dela Cruz GG, Jones BH. Mouthguards in sport activities history, physical properties and injury prevention effectiveness. *Sports medicine.* 2007 Feb 1;37(2):117-44.
4. Tsang S, Royse CF, Terkawi AS. Guidelines for developing, translating, and validating a questionnaire in perioperative and pain medicine. *Saudi J Anaesth* 2017;11:80-9
5. Wynd CA, Schmidt B, Schaefer MA. Two Quantitative Approaches for Estimating Content Validity. *Western Journal of Nursing Research.* 2003;25(5): 508-518. 12.
6. Lynn M. Determination and Quantification of Content Validity. *Nursing Research.* 1986;35: 382-85.
7. Kee, eci AD, Erog lu E, Baydar ML. Dental trauma incidence and mouthguard use in elite athletes in Turkey. *Dent Traumatology* 2005; 21: 76-79.
8. Tiwari V, Saxena V, Tiwari U, Singh A, Jain M, Goud S. Dental trauma and mouthguard awareness and use among contact and noncontact athletes in central India. *J Oral Sci.* 2014 Dec;56(4):239-43.
9. Sirajudeen MS, Pillai PS, Shah UN, Mohan N. Content validity and inter-rater reliability of a checklist to assess the ergonomic practice of computer professionals. *International Journal of Therapies and Rehabilitation Research.* 2012 May 1;1(2):11.
10. Zamanzadeh V, Ghahramanian A, Rassouli M, Abbaszadeh A, Alavi-Majd H, Nikanfar AR. Design and implementation content validity study: development of an instrument for measuring patient-centered communication. *Journal of caring sciences.* 2015 Jun;4(2):165.
11. Prakash S, Pallepatti A. Cross-cultural content validation of a modified service quality questionnaire in Kannada. *Journal of Indian Association of Public Health Dentistry.* 2016 Apr 1;14(2):171.
12. Yaghmale F. Content validity and its estimation. *J Med Educ* 2009;3:25-7