Validity And Realibility Of The Knowledge, Attitude And Practice (Kap) Questionnaire On Hexagonal And Olympic Barbell Deadlift Among Young University Students

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KEYWORDS

Deadlift, Hexagonal barbell, Olympic barbell, Resistance training

ABSTRACT

An instrument for assessing the Knowledge, Attitude, and Practice (KAP) regarding hexagonal and Olympic barbell deadlift among young university students is crucial for identifying any gaps in KAP. This assessment can assist in developing specific educational interventions, enhancing training programs, improving overall strength and conditioning outcomes, and mitigating health risks. The objective of this study was to create and verify a questionnaire, specifically designed for young university students, that assesses knowledge, attitudes, and practices (KAP) related to hexagonal and Olympic barbell deadlift exercises. A study employing purposive sampling was undertaken among a cohort of 242 young university students in Malaysia. This questionnaire was derived from a previous study and enhanced with additional components related to hexagonal and Olympic barbell deadlift. The verification of content validity, construct validity, and reliability was conducted utilising several tests. All the items in the questionnaire contribute to a minimal factor structure, as indicated by the results of a rotational component matrix. The Kuder-Richardson 20 (KR-20) coefficient for the knowledge domain was 0.73, which is regarded satisfactory. The Cronbach's Alpha values above 0.70, indicating strong reliability. However, they were lower than the overall Cronbach's Alpha value of 0.965 for the practice domain. Therefore, no item needed to be removed. This questionnaire demonstrates robust validity and reliability, making it suitable for assessing knowledge, attitudes, and practices related to hexagonal and Olympic barbell deadlift.

1. Introduction

Exercise, which is a subset of physical activity, can be described as any intentional movement of the body produced by the contraction of skeletal muscles that results in a measurable increase in energy expenditure, thereby contributing to overall physical fitness and well-being. This results in an increase in the amount of calories that are burned by the body as well as an increase in the heart rate, which keeps the body in a state of regular physical fitness [7]. Exercise is commonly described as a deliberate, organized, and cyclical kind of physical activity [27]. Various health-oriented groups advise youngsters to participate in moderate to vigorous physical activity on a daily basis for a duration of 60 minutes [11]. Recent estimates indicate that 78% of adolescents fail to engage in 60 minutes or more of physical activity, which is recommended to include on a daily basis of exercise [28]. The theory of planned behavior suggests that the significance of exercise knowledge for engaging in physical activity depends on its connection to attitude [13]. The knowledge component has a direct impact on an individual's attitudes, which in turn shapes their intention to engage in exercise, highlighting the critical role that understanding and awareness play in motivating people to incorporate physical activity into their daily routines [2]. Understanding the health advantages associated with physical exercise serves as the foundation for engaging in consistent exercise routines. Therefore, acquiring knowledge about exercise and its correlation with health and fitness could serve as the initial step towards establishing a favorable attitude towards exercise [14].

Resistance training has been found to yield several health advantages, including the augmentation of muscle strength, the reversal of muscle atrophy, the reduction of body fat, the enhancement of cardiovascular well-being, the improvement of mental health, and the elevation of bone mineral density [10], [25]. Hence, it is imperative to acknowledge the indispensability of resistance training for the general populace. However, its significance is heightened when the objective is to facilitate the transition into a particular activity or everyday life chores [22], injury prevention [5], or optimization of athletic performance [4]. The deadlift stands as a foundational resistance exercise that is commonly

incorporated into various training regimens with the objective of improving the physical fitness of athletes. Deadlift exercise is commonly utilized, specifically to enhance the muscular strength of the thigh and posterior chain, encompassing the gluteus, hamstrings, erector spinae, and quadriceps within their variants such as hexagonal and Olympic barbell deadlift [9], [15], [17], [26]. Therefore, it is well recognized as a prevalent form of resistance training aimed at improving strength in the lower extremities, encompassing a range of diverse adaptations [21].

There are a number of different iterations of the KAP on exercise survey that have been developed [1], [3], [20], [29] The inclusion of KAP in an exercise survey can contribute to a comprehensive analysis of the situation by facilitating the identification of exercise priorities. This is achieved by assessing the existing knowledge, attitudes, and behaviors pertaining to exercise. Majority of surveys mostly target adult, elderly, or clinical groups, with limited research conducted among university students and individuals engaged in deadlift and resistance exercises. Rozi et al. [20] evaluated the KAP regarding exercise among a group of staff from a university. The survey contains basic items that may be viable for adoption. The development and validation of a new Knowledge, Attitudes, and Practices (KAP) questionnaire, based on a prior study of hexagonal and Olympic barbell deadlifts, has the potential to generate more empirical evidence regarding KAP among university students, thereby enhancing our understanding of physical activity and exercise within this age group. Additionally, assessing university students' experience with deadlifts or resistance training may provide preliminary insights into the viability of resistance training as a tool to improve athletic performance. Consequently, this study aims to create a KAP questionnaire focused on hexagonal and Olympic barbell deadlifts for young university students. The validated KAP questionnaire developed in this study could offer valuable information for future research related to physical activity.

2. Methodology

Study design

A purposive sampling study was conducted among 242 university students who met our inclusion criteria, which required participants to be over 18 years old and physically healthy enough to exercise. The questionnaire was divided into four sections, covering socio-demographic data, knowledge, attitudes, and practices related to hexagonal and Olympic barbell deadlifts. To ensure the questionnaire's face validity, a pilot study was conducted with five individuals to assess its understandability. The pilot study achieved a 100% response rate, with participants taking approximately 15 minutes to complete the questionnaire. Additionally, the content validity of the questionnaire was evaluated by six experts in the field. This study received ethical approval from the UPSI Research Ethics Committee. The collected data were analyzed using IBM SPSS software version 27.0 (SPSS Inc, Chicago, IL, USA), ensuring a robust analysis of the gathered information.

Literature search

The development of the questionnaire began with an extensive literature search conducted through online journal databases, including Scopus and PubMed. Keywords used were “deadlift”, “hexagonal barbell”, “Olympic barbell”, “convectional barbell”, “resistance training”, “strength training”, “KAP towards exercise” and “KAP towards resistance training”.

Questionnaire development

The development of the questionnaire for this research was adapted from the work of Abdulkadeer et al. [1] and subsequently modified to incorporate specific measurements related to hexagonal and Olympic barbell deadlifts. The comprehensive questionnaire comprised a total of 26 questions, divided into four distinct sections to cover various aspects relevant to the study. Section A included a set of five questions designed to gather sociodemographic data from the respondents. This section aimed to collect essential background information to contextualize the findings of the study. Section B focused on assessing the participants' knowledge of deadlifts and consisted of eight questions. A three-point Likert scale was employed to represent the responses, with options being "Yes," "No," and "Not sure." For

each question, a correct response was assigned 1 point, while "No" and "Not sure" responses were given 0 points. Consequently, the possible scores for the knowledge domain ranged from 0 to 8, allowing for a clear assessment of the respondents' understanding of deadlifts. Section C delved into the attitudes of the participants towards deadlifts, comprising ten questions. This section utilized a five-point Likert scale to gauge responses, with categories including "Strongly Agree," "Agree," "Not Sure," "Disagree," and "Strongly Disagree." Numerical scores of 5, 4, 3, 2, and 1 were respectively assigned to these categories. The attitude domain's scores thus ranged from 10 to 50, providing a detailed insight into the participants' perceptions and attitudes towards deadlifting exercises. Section D addressed the practice domain, containing three questions regarding the participants' actual practice of deadlifts. This section utilized a scoring system where different categories were assigned scores of 4, 3, 2, and 1. Consequently, the practice domain exhibited a range of scores from 3 to 12, allowing for an evaluation of the frequency and extent of the participants' engagement in deadlift exercises. The initial questionnaire was developed in English and subsequently translated into Bahasa Malaysia. The translation process involved back-to-back translation by a bilingual translator fluent in both English and Bahasa Malaysia, ensuring linguistic accuracy and cultural relevance. To further ensure the precision of the questionnaire, it underwent a thorough proofreading evaluation, verifying the accuracy and clarity of the translated version. This comprehensive approach to questionnaire development aimed to provide a robust tool for assessing knowledge, attitudes, and practices related to hexagonal and Olympic barbell deadlifts among university students, thereby contributing valuable data to the field of physical activity and exercise research.

Content Validity of the Questionnaire

The evaluation of content validity is crucial for establishing the credibility of an instrument. This process involves engaging a panel of experts who provide constructive feedback on the representativeness and clarity of each item within the newly developed tool. According to [6], it is recommended to involve at least five experts in the relevant field to review the instrument, ensuring adequate control over chance agreement and enhancing the reliability of the evaluation process. Content validity entails evaluating the instrument based on its representativeness and relevance [18]. Validity, in general, refers to the degree to which an instrument effectively and accurately assesses the intended construct [23]. In this study, a panel of six experts specializing in physical conditioning assessed all the questions. The experts used a scale ranging from 1 to 4 to evaluate factors such as relevance, clarity, simplicity, and ambiguity. The six experts, all from sport coaching and conditioning backgrounds, provided comments on the first version of the questionnaire, leading to revisions in the wording and terminology used. The amended second version of the questionnaire was then re-sent to the same panel of experts for the final phase of content validation. Overall, the amended questionnaire was found to be clear, simple, and understandable.

Reliability (Internal consistency)

Internal consistency was assessed using the Kuder-Richardson Formula 20 (KR20) for the knowledge domain because its questions were scored dichotomously, with answers being either correct or incorrect (typically scored as 1 or 0). For the attitude and practice domains, Cronbach's Alpha coefficient was employed since these domains often involve Likert-scale responses or other non-dichotomous formats. The reliability assessment using KR20 for the knowledge domain revealed a robust correlation of 0.73, falling within the acceptable range of 0.70 to 0.89 as per [24]. Meanwhile, the overall Cronbach's Alpha coefficients for the attitude and practice domains were 0.95 and 0.96, respectively, indicating good internal consistency according to [12].

Construct Validation

In this phase, construct validity was examined through exploratory factor analysis (EFA) for all remaining items (Knowledge: 8 items, Attitude: 10 items, Practice: 3 items). The Kaiser-Meyer-Olkin (KMO) test was conducted to measure the adequacy of the sample size for factor analysis, while Bartlett's test of sphericity was performed to determine if the variables in the questionnaire were sufficiently correlated to justify the use of factor analysis.

Statistical Analysis

The data collected from the participants was analysed using the Statistical Package for the Social Sciences, version 27.0 (SPSS). The data for this study was analysed using factor analysis, Cronbach's Alpha, and the Kuder-Richardson 20 (KR20) reliability test. Means and standard deviations were computed for continuous variables. Furthermore, the frequencies and percentages for categorical variables were also acquired.

3. Results and discussion

In this study, a cohort of 242 university students, consisting of 149 males (61.6%) and 93 females (38.4%), participated. Most of the participants were footballer (n = 42, 17.4%), followed by 30 volleyball players (12.4%), 28 handball player (11.6%), 25 basketball players (10.3%), 22 futsal players (9.1%), 16 sepak takraw players (6.6%), 15 badminton players (6.2%), 14 hockey players (5.8%), 12 netballers (5.0%), 9 petanque and tennis players (3.7%, 3.7%), 8 softball and table tennis players (3.3%, 3.3%) and 4 lawnballers (1.7%).

Table 1. Demographic profiles of respondents

Details		N	Percentage
Gender			
	Male	149	61.6
	Female	93	38.4
Age			
	18-24 years old	242	100.0
Race			
	Malay	242	100.0
Sport			
	Football	42	17.4
	Volleyball	40	12.4
	Handball	28	11.6
	Basketball	25	10.3
	Futsal	22	9.1
	Sepak takraw	16	6.6
	Badminton	15	6.2
	Hockey	14	5.8
	Netball	12	4.0
	Petanque	9	3.7
	Tennis	9	3.7
	Softball	8	3.3
	Table tennis	8	3.3
	Lawnball	4	1.7

Principal factor analysis was performed to assess the construct validity. The study began with the Kaise-Meyer-Olkin test and Barlett's Test of Sphericity to ensure that the sample size was sufficient for the factor analysis. Table 2 presents the outcome of the Kaiser-Meyer-Olkin test and Barlett's Test of Sphericity. The Kaiser-Meyer-Olkkin test of sampling stability for factor analysis yielded a value of 0.888, while the Bartlett's test showed a significant result ($p < 0.001$), showing that the sample was sufficient for conducting factor analysis. The factor analysis was performed using the primary axis factoring analysis extraction method, and the rotation was carried out using the Varimax method with the suppression of small coefficients (absolute value < 0.30). The minimum threshold value for factor analysis in this study was 0.4 [22]. Table 3 presented the findings of exploratory factor analysis (EFA). All questions were retained in the instruments, as all of them contribute to a minimal factor structure,

as indicated by the results of a rotational component matrix.

Table 2. Result of Kaiser-Meyer-Olkin and Barlett's Test of the Sphericity

Test		**Result**
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.888
Bartlett's Test of Sphericity		5910.967
Degree of freedom		78
Significance		<0.001

Table 3. EFA results

Items	1	2	3
Knowledge			
K1	1.000		
K2	0.955		
K3	1.000		
K4	0.892		
K5	0.867		
K6	0.745		
K7	0.777		
K8	0.695		
Attitudes			
A1		1.000	
A2		0.893	
A3		0.923	
A4		0.859	
A5		0.876	
A6		0.867	
A7		0.417	
A8		0.900	
A9		0.907	
A10		0.421	
Practices			
P1			1.000
P2			0.883
P3			0.927

The Kuder-Richardson 20 (KR-20) coefficient for the knowledge domain was 0.73, falling within the acceptable range of 0.70 to 0.89 [24]. Table X presented the Cronbach's Alpha coefficient for the attitudes and practices category. The Cronbach's Alpha values for both domains exceeded the threshold of 0.70, indicating their acceptability. The Cronbach's Alpha value for the attitudes domain is 0.952, whereas the Cronbach's Alpha value if an item is deleted is 0.945, indicating a little decrease in reliability. Consequently, there was no deletion of any item. The Cronbach's Alpha scores for the practice domain exceeded the threshold of 0.70, indicating a good level of reliability. The Cronbach's Alpha for the practice domain is 0.965. If an item is deleted, the entire Cronbach's Alpha decreases to 0.948, which is still lower than the overall Cronbach's Alpha value. Therefore, no item was removed.

Table 4. Cronbach's Alpha for Attitudes and Practices domain

Subscale	**N**	**Result**
Attitudes	10	0.952
Practices	3	0.965

The KAP questionnaire is extensively utilised to assess the levels of knowledge, attitudes, and practices pertaining to different physical activities. As far as the author knows, there is currently no questionnaire available that evaluates the three areas related to hexagonal and Olympic barbell deadlift. Consequently, we made alterations to the preexisting questionnaire derived from a prior investigation by incorporating more components pertaining to hexagonal and Olympic barbell deadlift. The questionnaire comprises three distinct categories: knowledge, attitudes, and practices. The knowledge category aims to assess the general understanding of hexagonal and Olympic barbell exercises. The attitudes domain seeks to evaluate commonly held beliefs and opinions towards these exercises. Lastly, the practices domain investigates the actual performance of hexagonal and Olympic barbell deadlifts. Joseph et al. [16] suggested that the sample size should be a minimum of one hundred or greater. The determination of sample size for factor analysis is contingent upon the total number of components included in the apparatus. [19] has suggested maintaining a ratio of 5:1, meaning that there should be five respondents for each issue. Hence, the minimum sample size required for doing factor analysis in our study should be 105 participants (calculated as 21 questions multiplied by 5). The ideas provided the criteria for determining the suitable sample size for factor analysis, and based on those criteria, this study comprised a sample size of 242 young university students. The questionnaire comprises a total of 21 questions, with 8 questions in the knowledge domain, 10 questions in the attitudes area, and 3 questions in the practice domain. All the items in the questionnaire were retained, and all the questions contributed to a minimal factor structure, as indicated by the results of a rotational component matrix. The Kuder-Richardson 20 (KR-20) coefficient for the knowledge domain was 0.73, falling within the acceptable range of 0.70 to 0.89 [24]. Furthermore, the Cronbach's Alpha for the attitudes and behaviours category above the threshold of 0.70, indicating its acceptability [8]. The objective of this study was to create and verify the effectiveness of a KAP questionnaire specifically designed for assessing knowledge, attitudes, and practices related to hexagonal and Olympic barbell deadlift exercises. The chosen scales in the KAP demonstrated a satisfactory level of internal consistency. The Cronbach's Alpha coefficients in the questionnaire were deemed satisfactory, therefore proving the sufficiency of the internal consistencies of these scales. The results of the exploratory factor analysis indicated a strong association between all the components and the dimensions of knowledge, attitudes, and practice.

4. Conclusion and future scope

The objective of this study was to create and verify a questionnaire that evaluates knowledge, attitudes, and practices related to the hexagonal and Olympic barbell deadlift. After conducting several testing, our results provide evidence of the validity and reliability of a 21-item questionnaire that may be used to assess knowledge, attitudes, and practices (KAP) related to hexagonal and Olympic barbell deadlift. Nevertheless, further investigation involving diverse sample populations is necessary to ascertain whether the conclusions drawn from this study are particular to the sample or have broader applicability. Future research should prioritize enhancing items by using Likert-type questions to gather more comprehensive data from participants.

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