Med & Health Jul 2026; 21(2): 760-778 https://doi.org/10.17576/MH.2026.2102.12

ORIGINAL ARTICLE

Development and Validation of Questionnaire about Knowledge, Attitude and Practice of Primary School Teachers on Myopia Children in Malaysia

GOMATHI GUNASEGARAN[1,3], SHARANJEET KAUR[2,3], MOHD HARIMI ABD RAHMAN[2,3], SUMITHIRA NARAYANASAMY[1,3]*

[1]*Centre for Community Health Studies, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, 50300 Kuala Lumpur, Malaysia*

[2]*Centre for Rehabilitation and Special Needs Studies, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, 50300 Kuala Lumpur, Malaysia*

[3]*Optometry & Vision Science Program, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, 50300 Kuala Lumpur, Malaysia*

**Correspondence: sumithira@ukm.edu.my: Tel: +603-92897602*

Received: 01 July 2025 / Accepted: 13 November 2025

ABSTRAK

Kajian ini bertujuan untuk membangunkan dan mengesahkan soal selidik mengenai pengetahuan, sikap dan amalan (KAP) guru sekolah rendah mengenai rabun jauh dalam kalangan kanak-kanak di Malaysia. Kajian ini merangkumi empat fasa, iaitu: (i) penjanaan item soal selidik berdasarkan kajian lepas; (ii) kesahan kandungan oleh 10 panel pakar dan kesahan muka oleh 10 guru sekolah rendah; (iii) kajian kebolehlaksanaan terhadap 64 orang guru sekolah rendah; (iv) kesahan dan kebolehpercayaan konstruk yang ditentukan dengan mengedarkan soal selidik masing-masing kepada 396 dan 64 guru sekolah rendah. Versi terakhir MyT-KAPQ terdiri daripada empat bahagian: demografi, pengetahuan, sikap dan amalan dengan 47 item. Indeks kesahan kandungan (CVI) bagi domain pengetahuan adalah tinggi antara 0.78 hingga 1.0, dengan nilai kappa yang diubah suai melebihi 0.74. Kecukupan persampelan Kaiser-Meyer Olkin menunjukkan skor yang boleh diterima iaitu 0.844 dan 0.881 untuk kedua-dua domain sikap dan amalan, manakala Ujian sfera Bartlett adalah signifikan (χ^2=0.00, $p < 0.001$). Analisis faktor menunjukkan setiap domain sikap dan amalan mengandungi 3 faktor dengan 12 item. Semua item dalam domain KAP menunjukkan nilai Cronbach $\alpha > 0.74$ dan nilai kebolehpercayaan ujian semula yang baik. Versi akhir soal selidik terdiri daripada 47 item daripada tiga bahagian yang terdiri daripada KAP yang mempunyai sifat psikometrik yang memuaskan untuk mengukur KAP guru-guru sekolah rendah berkaitan rabun jauh dalam kalangan kanak-kanak di Malaysia.

Kata kunci: *Amalan; guru-guru sekolah rendah; miopia; pengetahuan; sikap*

ABSTRACT

This study aims to develop and validate a questionnaire on knowledge, attitude and practice (KAP) of primary school teachers on myopia among schoolchildren in Malaysia. Four phases were used to develop the questionnaire, namely: (i) questionnaire item generation via systemic literature review; (ii) content validity by 10 expert panels and face validity by 10 primary school teachers; (iii) feasibility study among 64 primary school teachers; and (iv) construct validity and reliability were determined by administrating the questionnaire to 396 and 64 primary school teachers, respectively. The final MyT-KAPQ consists of

four sections: demography, knowledge, attitude and practice with 47 items. Knowledge domain items showed high content validity index (0.78-1.0) with Kappa values higher than 0.74. Acceptable scores of 0.844 and 0.881 were obtained for Kaiser-Meyer Olkin sampling adequacy for both attitude and practice domains and Bartlett's Test of sphericity was significant ($\chi^2 = 0.00$, $p < 0.001$). Factor analysis resulted in each attitude and practice domain containing three factors with 12 items. All items in the KAP domains showed acceptable values >0.70 for Cronbach's α and good test-retest reliability values. The final version of the questionnaire comprised 47 items across three sections namely KAP and demonstrated satisfactory psychometric properties for assessing the KAP of primary school teachers concerning childhood myopia in Malaysia.

Keywords: Attitude; knowledge; myopia; practice; primary school teachers

INTRODUCTION

Myopia, the leading cause of visual impairment has gained huge attention worldwide due to its rapidly increasing prevalence (Han et al. 2022). Generally, myopia is categorised with a spherical equivalent equal to or less than -0.50 Dioptre, low myopia with spherical equivalent between equal to or less than -0.50 Diopters and less than -6.00 Diopters, and high myopia is categorised as equal to or more than -6.00 Dioptre (Sankaridurg et al. 2021). This eye disorder is defined as axial lengthening of the eyeball which is greater than 24 mm that causes the focus to fall in front of the retina (Benzir et al. 2022).

The global prevalence of myopia was 22.9% in the year 2000 and is estimated to rise to 50% in 2050 (Holden et al. 2016). Reported prevalence among young adults is 70 to 90% compared to 20 to 30% two or three generations ago. In Taiwan, the prevalence of myopia among schoolchildren increased significantly from the year 1983 to 2017 for the age group 7 years old (5.37-25.41%), 12 years old (1.39-4.26%) and 15 year old (4.37-15.36%) (Tsai et al. 2021). The rate of myopia in Singapore schoolchildren of age group 7-9 years old were 22.1%, 40.1% and 34.1% for race Malays, Chinese and Indians, respectively. Similarly, in Malaysia, the prevalence of same age schoolchildren was 9.2%, 30.9% and 12.5% for the race Malays, Chinese and Indians, respectively (Saw et al. 2006). Myopia is the most common refractive error found among Malaysian schoolchildren (Ismail & Sukumaran 2022).

Children acquire the most learning during primary schoolchildren education. Thus, good visual acuity in primary schoolchildren is precedence to ensure better learning and educational perspective (Wilhelmsen & Felder 2020). Early detection and management are vital as a delay in treatment negatively influences children's school learning and performance (Tariq et al. 2023). Since children spend most of their time in school, teachers must be able to recognise myopia in schoolchildren to achieve early detection. To create awareness among primary school teachers, gaps in primary school teachers' knowledge, attitude and practice (KAP) regarding myopia in primary schoolchildren is important. According to World Health Organisation (WHO), the KAP survey will help to gather information about general health and identify knowledge gaps (WHO 2008). As the prevalence of myopia continues to rise in Asia-Pacific countries, it is increasingly important for school teachers to play an active role in its prevention among schoolchildren. Although there are past studies that emphasise on teachers' role addressing children's vision problem, however there is an insufficiency of validated KAP tools focusing on primary school teachers related to myopia. Therefore, the study focused on the development of a questionnaire KAP on myopia among primary schoolchildren Questionnaire (MyT-KAPQ). The information obtained from this questionnaire help to identify primary school teachers' KAP level and design interventional programs to improve the KAP level for better awareness.

MATERIALS AND METHODS

Ethical approval was granted by the Ethics and Research Committee of The Univeristi Kebangsaan Malaysia (UKM PPI/111/8/ JEP-2020-669). The duration of the research was from March 2020 to June 2022 and conducted among primary school teachers around Perak, Pahang, Johor, Selangor and Wilayah Persekutuan Kuala Lumpur which was selected by simple random sampling. The development of MyT-KAPQ consisted of four phases which included the development of items, content validation by an expert panel using the Delphi method, along with assessments of face validity, feasibility, construct validity, internal consistency and test-retest reliability of the final questionnaire. Purposive sampling was used to assess content validity, while convenience sampling for face validity and random sampling was applied for construct validity and reliability (Abd Rahman et al. 2023; Andrade et al. 2020; Ghani et al. 2023). A digitally signed consent form was obtained from all participants in this study.

Item Development

To determine the content area that corresponds to the variables for this study, it was necessary to identify the content domain (Goni et al. 2020). A thorough study on former research was done through ScienceDirect, Scopus, Pubmed, Medline and Cochrane to gather strategic information on KAP related items and domains on myopia among schoolchildren and primary school teachers. For this research specific keywords such as 'development of the questionnaire, knowledge, attitude, practices, primary school teachers and myopia among schoolchildren' were used for a thorough analysis and literature search from former studies and related studies were derived and pertinent questions were composed and designed (Agarwal et al. 2021; Andrade et al. 2020; Goni et al. 2020).

Two sessions of focus group discussions (FGDs) involving the researchers in this study were conducted to construct the KAP questionnaire. Based on the discussions, items were deleted, modified or added to the questionnaire. A first draft was created of MyT-KAPQ that comprised 61 items under three domains, that was KAP. The items were generated in an easy and clear Malay and English language so that participants could understand and double negatives were excluded. In order to gather accurate response, knowledge domain was constructed using a binary scale of either yes or no as a unidimensional response option (Goni et al. 2020). Attitude and practice domains applied response a 4-point Likert scale to avoid a neutral response (Agarwal et al. 2021).

Content Validity

Content validity was performed to determine whether the items represented an adequate definition for the research objectives (Polit & Beck 2006). Two-round e-Delphi method was used to improve the critical appraisal and consensus on the limitations of the first draft of the MyT-KAPQ (Hong et al. 2019). A group of 10 panel experts were involved in the e-Delphi method to review the draft questionnaires (Tegegne & Wondimu 2023). The requirements for experts' inclusion were more than five years' experience and engaging in myopia examination and prevention. Panel experts consisted of two optometry academicians and eight practicing optometrists. Round one e-Delphi method was conducted by preparing a modified questionnaire with a content validation form to review the relevance, clarity, ambiguity and simplicity of the items to the respective domains. A 4-point Likert scale was used to score the individual items (1= not relevant, 2 = items that needed some minor revision, 3 = items that were relevant but needed some minor revision, 4 = very relevant). Clear instructions and content validation forms were given by researchers to participating experts by email. They were given two weeks to respond as well as comments and feedback were encouraged. The content validity Index (CVI) was determined by calculating each item-CVI (I-CVI) and overall scale-CVI (S-CVI). The questionnaire was amended and modified according to the feedback received from the experts and

presented in a FGD during the second round e-Delphi method. Six experts participated in the discussion by using an online platform (Google Meet) to discuss the suitability of the items on the second draft questionnaire. Three experts were unable to attend the discussion due to work and one expert did not respond to the inviting message. A total number of 47 items under three domains of KAP contained questionnaire were built in second draft of MyT-KAPQ.

Face Validity

The second draft of MyT-KAPQ was distributed to 10 primary school teachers for face validity to check on the comprehensibility, understanding and clarity of the questionnaire. Inclusion criteria for teachers were government registered teachers and not working in visually impaired school. Due to Covid-19 restrictions, the third party was prohibited from entering the schools. Therefore, the questionnaire was distributed by a non-face-to-face approach by using Google Forms. The primary school teachers completed the questionnaire and provided feedback. Changes were made in the questionnaire if there were any comments.

Feasibility Study

According to previous study, a minimum number of 25 to 75 respondents was recommended to conduct feasibility study. In this study, a total of 64 primary school teachers were approached online to participate in the feasibility study to determine the acceptance and response capabilities of the respondents towards intervention and data collection method (Yusoff et al. 2021). Following this technique, the final version of the MyT-KAPQ was created for validation and reliability testing. The MyT-KAPQ consisted of four sections (social demographic details, knowledge, attitude and practice). The sum of 11 questions were included in the social demographic section (name, age, gender, date of birth, working experience as a teacher, race, educational level, monthly household income, myopia, had been involved in training/courses of eye health and have undergone eye screening). Knowledge domain consisted of 23 items that reflect on the prevalence and causes, risk factors, symptoms and effects of myopia. Dichotomous answers such as 'yes/no' were provided to validate the knowledge where for 'Yes'-1 and 'No'-2 values were given. Attitude domain consisted of 12 items that validate preconceived ideas towards near work, outdoor activities, population, socioeconomic status and knowledge of eye screening. Practice domain consisted of 12 items that determine behaviour towards awareness, eye examination and eye health. A 4-point Likert scale '1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree' for attitude and '1 = not at all, 2 = sometimes 3 = often 4 = always' for practice was used. The option of 'neutral' was not used to avoid inaccurate validation due to respondents might choose the options: (i) did not have an opinion; (ii) not interested in expressing true opinion; (iii) did not understand the questions; and (iv) facing a "not applicable" question (Asún et al. 2016).

Construct Validity and Test-retest Reliability

The sample size calculation was based on Krejcie and Morgan's (1970) formula:

$$s = X^2 NP (1-P)/ d^2 (N-1) + X^2 P(1-P)$$

where s was required sample size, X^2 was the table value of chi-square for one degree of freedom at the desired confidence level (3.841), N was population size, P was the population proportion, assumed to be 0.50 as it can provide maximum sample size, d was the degree of accuracy expressed as a proportion which was 0.05. The population of primary school teachers registered under the Educational Ministry of Malaysia till July 2020 was 236,993. Hence, a total of 384 primary school teachers were required for the study. To calculate exploratory factor analyses (EFA), a sample size of 300 was good for factor analysis (Williams et al. 2010). An online-based calculation was done for reliability

with a 15% dropout rate, resulting in a sample size of 63 primary school teachers (Arifin 2018).

The MyT-KAPQ was constructed in 'Google form'. A well-explained description of the survey and consent form were included on the first page of the questionnaire, followed by social demographic details, KAP sections. Primary school teachers who fulfilled the inclusion criteria such as (i) being registered under the Ministry of Education Malaysia, and (ii) being on duty as teachers during the study period were included in the survey. Teachers working in blind special schools were excluded from this survey because it could cause bias in the study. The link for the online survey, approval from the ministry and ethical approval were distributed through email and 'WhatsApp' to the teachers. Social demographic details like name, age, gender, date of birth, working experience, race, educational level, household income, had myopia, involved in eye health training or courses and underwent eye screening were collected. The questionnaire was re-distributed to 64 primary school teachers for the test-retest reliability after two weeks. Two weeks was sufficient time to minimise the biased response to the recollection of data (Wu et al. 2022).

Statistical Analyses

Data were analysed through Statistical Package for the Social Science (SPSS) software, version 25.0 (IBM Corp., Armonk, NY, USA) Descriptive statistics were used to analyse the sociodemographic details of the primary school teachers. CVI was calculated based on each I-CVI and overall S-CVI. I-CVI and modified kappa (k) were used to validate the content of the items. I-CVI was determined by dividing the number of raters who scored the item by three or four divided by the number of experts. S-CVI/Ave was calculated by the total of I-CVI divided by the total items (Polit et al. 2007; Xu et al. 2024). The I-CVI above 0.78 was considered a highly relevant item for the domain. Hence, items with an I-CVI of ≥0.78 remained, I-CVI of 0.70-0.78 were revised, while those with ≤0.70 were eliminated (Xu et al. 2024).

Construct validity of items in attitude and practice domains was evaluated using EFA. However, EFA was not used for knowledge domain because a dichotomous scale (yes or no) was used. EFA was used to minimise the number of variables from a large number of variables in the questionnaire (Henson & Roberts 2006). Sampling adequacy for conducting factor analysis was determined using the Kaiser-Meyer-Olkin (KMO) and Bartlett's sphericity tests. Data with KMO value that was more significant than 0.50 and Bartlett's sphericity test value of $p < 0.05$ indicated suitability for factor analysis (Park 2021). The number of factors influencing the variables and to analyse variables that belong together was determined using principal component analysis (PCA) with varimax rotation (Eze et al. 2021). Satisfactory factor analysis can be proceeded if Bartlett's test of sphericity ($p < 0.001$) and the KMO measurement of sampling adequacy (>0.7) (Lloret et al. 2017). The eigenvalues (>1), scree plot and interpretability of the factor were used to determine the number of factors to be remained (Watkins 2021). A cut-off point of 0.4 was considered for factor loading with communalities of 0.7 or above (Hair et al. 2010). Items that cross loaded on more than 1 factor were placed with the factor that was most conceptually similar with (Costello & Osborne 2005; Park 2021). A *p*-value of <0.05 was regarded as significant.

Reliability refers to the extent to which measurements can be replicated while correlation and agreement between measurements is represented by intraclass correlation coefficient (ICC). To determine the internal consistency of the questionnaire, Kuder-Richardson-20 (KR-20) and Cronbach's α coefficient was used. KR-20 was used to evaluate the scale for knowledge domain and Cronbach's α coefficient for the four-point Likert scale for attitude and practice domains. The constructed questionnaire was considered to have satisfactory internal consistency when the KR-20 coefficient was 0.50 and Cronbach's α coefficient was 0.70 (Ghani et al. 2023).

ICC test-retest reliability method was used to assess the stability and consistency of the

questionnaire over time. For ICC, values less than 0.5 were indicative of poor, between 0.5 to 0.75 indicated moderate, between 0.75 to 0.90 good and more than 0.90 indicated excellent reliability (Koo & Li 2016). Items were sustained based on KR-20 internal consistency reliability for knowledge domain while both factor analysis and internal consistency reliability were used for attitude and practice domain. Statistical significance were considered if p-values were <0.05.

RESULTS

Item Development

A literature review was done on 300 studies based on keywords relevant to our research. A total of 71 research papers were used for this study. The relevant articles were reviewed and a total number of 61 items based on the three domains of KAP were generated and included in the first draft of MyT-KAPQ.

Content Validity

A total of 10 expert panels validated the content of each item under domains KAP. I-CVI, an average of the scale-level index (S-CVI/Ave), modified kappa (k), probability of chance agreement (Pc) and panel agreement were examined on relevance, clarity, ambiguity, simplicity (Tables 1, 2, 3 and 4) for KAP domains. At the end of the FGD with expert panels, 47 items were retained with some corrections and improvisation and 14 items were removed. The second draft of MyT-KAPQ consisted of 23 items for domain knowledge, 12 items for domain attitude and 12 items for domain practice.

Face Validity and Feasibility Study

The second draft of MyT-KAPQ was distributed through Google form to 10 primary school teachers. They were given a week to respond. The 47 items remained without any changes or amendments because no suggestions were stated by the respondents. The feasibility study showed that the second draft of MyT-KAPQ was good in acceptance and easy to collect data for the research team. The final version of MyT-KAPQ was developed.

Construct Validity

Based on the sample size calculation, 384 primary school teachers were required. However, a total number of 396 primary school teachers participated in this cross-sectional study. The number of participants exceeded the sample size as the questionnaire was distributed by online. Descriptive statistics showed that there were 330 (83.3%) female teachers and 66 (16.7%) male teachers that participated in this study, of which, 37 (9.3%), 55 (13.9%), 301 (76%) and 3 (0.8%) were Malay, Chinese, Indian and other race teachers, respectively. The distribution of teachers falls within various age ranges, from 21-30 years (15.9%), 31-40 years (30.8%), 41-50 years (29.5%) and 51-60 years (23.7%). The majority of teachers belonged to household incomes between RM 3,851-10,959 (76.3%), followed by those earning less than RM 3,850 (19.4%), and a smaller percentage earning more than RM 10,960 (4.3%). A total of 140 primary school teachers had experience in teaching for 11-20 years, 120 teachers had experience in teaching for 21 to 30 years, 116 teachers had worked for below than 10 years and 20 teachers had the most experience as teachers which is 31-40 years. A total of 189 teachers had a history of myopia and 207 teachers did not have a history of myopia. A total of 252 teachers had a history of eye examinations and 144 teachers had not had any eye examinations before. A total of 77 teachers had been involved in eye health training and 319 teachers did not have experience in participating in eye health training.

The EFA was used to confirm construct validation for attitude and practice domains. The KMO sample adequacy was 0.844 for attitude domain and 0.881 for domain practice respectively while Barlett's test of sphericity was less than 0.001 for both domains, indicating that

TABLE 1: The relevance rating of each item

Item	Panel in agreement	I-CVI	Pc	Kappa	Interpretation	S-CVI/Ave
K_1	9	0.90	0.010	0.90	Excellent	
K_2	10	1.00	0.001	1.00	Excellent	
K_3	8	0.80	0.176	0.76	Excellent	
K_4	10	1.00	0.001	1.00	Excellent	
K_5	10	1.00	0.001	1.00	Excellent	
K_6	10	1.00	0.001	1.00	Excellent	
K_7	9	0.90	0.010	0.90	Excellent	
K_8	10	1.00	0.001	1.00	Excellent	
K_9	10	1.00	0.001	1.00	Excellent	
K_10	8	0.80	0.176	0.76	Excellent	
K_11	9	0.90	0.010	0.90	Excellent	
K_12	8	0.80	0.176	0.76	Excellent	
K_13	10	1.00	0.001	1.00	Excellent	
K_14	10	1.00	0.001	1.00	Excellent	
K_15	10	1.00	0.001	1.00	Excellent	0.96
K_16	10	1.00	0.001	1.00	Excellent	
K_17	10	1.00	0.001	1.00	Excellent	
K_18	10	1.00	0.001	1.00	Excellent	
K_19	10	1.00	0.001	1.00	Excellent	
K_20	10	1.00	0.001	1.00	Excellent	
K_21	10	1.00	0.001	1.00	Excellent	
K_22	10	1.00	0.001	1.00	Excellent	
K_23	10	1.00	0.001	1.00	Excellent	
K_24	10	1.00	0.001	1.00	Excellent	
K_25	10	1.00	0.001	1.00	Excellent	
K_26	9	0.90	0.010	0.90	Excellent	
K_27	9	0.90	0.010	0.90	Excellent	
K_28	10	1.00	0.001	1.00	Excellent	
K_29	10	1.00	0.001	1.00	Excellent	
K_30	9	0.90	0.010	0.90	Excellent	
A_1	10	1.00	0.001	1.00	Excellent	
A_2	9	0.90	0.010	0.90	Excellent	
A_3	9	0.90	0.010	0.90	Excellent	
A_4	9	0.90	0.010	0.90	Excellent	
A_5	9	0.90	0.010	0.90	Excellent	
A_6	10	1.00	0.001	1.00	Excellent	
A_7	8	0.80	0.176	0.76	Excellent	
A_8	10	1.00	0.001	1.00	Excellent	0.94
A_9	10	1.00	0.001	1.00	Excellent	
A_10	9	0.90	0.010	0.90	Excellent	
A_11	10	1.00	0.001	1.00	Excellent	
A_12	9	0.90	0.010	0.90	Excellent	
A_13	9	0.90	0.010	0.90	Excellent	
A_14	10	1.00	0.001	1.00	Excellent	
A_15	10	1.00	0.001	1.00	Excellent	
A_16	10	1.00	0.001	1.00	Excellent	
P_1	10	1.00	0.001	1.00	Excellent	
P_2	10	1.00	0.001	1.00	Excellent	
P_3	7	0.70	0.117	0.66	Good	
P_4	10	1.00	0.001	1.00	Excellent	0.94
P_5	10	1.00	0.001	1.00	Excellent	
P_6	10	1.00	0.001	1.00	Excellent	
P_7	10	1.00	0.001	1.00	Excellent	

Continued...

...continuing

Item	Panel in agreement	I-CVI	Pc	Kappa	Interpretation	S-CVI/Ave
P_8	9	0.90	0.010	0.90	Excellent	
P_9	9	0.90	0.010	0.90	Excellent	
P_10	10	1.00	0.001	1.00	Excellent	
P_11	10	1.00	0.001	1.00	Excellent	
P_12	10	1.00	0.001	1.00	Excellent	
P_13	8	0.80	0.176	0.76	Excellent	
P_14	9	0.90	0.010	0.90	Excellent	
P_15	9	0.90	0.010	0.90	Excellent	

Modified kappa (κ) > 0.6 (acceptable), S-CVI/Ave > 0.90 (acceptable)
I-CVI: Item-content validity index; Pc: Probability of chance agreement

TABLE 2: The clarity rating of each item

Item	Panel in agreement	I-CVI	Pc	Kappa	Interpretation	S-CVI/Ave
K_1	10	1.00	0.001	1.00	Excellent	
K_2	10	1.00	0.001	1.00	Excellent	
K_3	8	0.80	0.176	0.76	Excellent	
K_4	9	0.90	0.010	0.90	Excellent	
K_5	10	1.00	0.001	1.00	Excellent	
K_6	10	1.00	0.001	1.00	Excellent	
K_7	9	0.90	0.010	0.90	Excellent	
K_8	10	1.00	0.001	1.00	Excellent	
K_9	8	0.80	0.176	0.76	Excellent	
K_10	9	0.90	0.010	0.90	Excellent	
K_11	9	0.90	0.010	0.90	Excellent	
K_12	10	1.00	0.001	1.00	Excellent	
K_13	10	1.00	0.001	1.00	Excellent	
K_14	10	1.00	0.001	1.00	Excellent	
K_15	10	1.00	0.001	1.00	Excellent	0.95
K_16	10	1.00	0.001	1.00	Excellent	
K_17	10	1.00	0.001	1.00	Excellent	
K_18	10	1.00	0.001	1.00	Excellent	
K_19	10	1.00	0.001	1.00	Excellent	
K_20	10	1.00	0.001	1.00	Excellent	
K_21	10	1.00	0.001	1.00	Excellent	
K_22	10	1.00	0.001	1.00	Excellent	
K_23	9	0.90	0.010	0.90	Excellent	
K_24	9	0.90	0.010	0.90	Excellent	
K_25	9	0.90	0.010	0.90	Excellent	
K_26	9	0.90	0.010	0.90	Excellent	
K_27	10	1.00	0.001	1.00	Excellent	
K_28	10	1.00	0.001	1.00	Excellent	
K_29	8	0.80	0.176	0.76	Excellent	
K_30	10	1.00	0.001	1.00	Excellent	
A_1	9	0.90	0.010	0.90	Excellent	
A_2	9	0.90	0.010	0.90	Excellent	
A_3	9	0.90	0.010	0.90	Excellent	0.94
A_4	9	0.90	0.010	0.90	Excellent	
A_5	10	1.00	0.001	1.00	Excellent	

Continued...

...continuing

Item	Panel in agreement	I-CVI	Pc	Kappa	Interpretation	S-CVI/Ave
A_6	9	0.90	0.010	0.90	Excellent	
A_7	10	1.00	0.001	1.00	Excellent	
A_8	10	1.00	0.001	1.00	Excellent	
A_9	9	0.90	0.010	0.90	Excellent	
A_10	10	1.00	0.001	1.00	Excellent	
A_11	9	0.90	0.010	0.90	Excellent	
A_12	9	0.90	0.010	0.90	Excellent	
A_13	10	1.00	0.001	1.00	Excellent	
A_14	9	0.90	0.010	0.90	Excellent	
A_15	10	1.00	0.001	1.00	Excellent	
A_16	10	1.00	0.001	1.00	Excellent	
P_1	10	1.00	0.001	1.00	Excellent	
P_2	8	0.80	0.176	0.76	Excellent	
P_3	10	1.00	0.001	1.00	Excellent	
P_4	10	1.00	0.001	1.00	Excellent	
P_5	10	1.00	0.001	1.00	Excellent	
P_6	10	1.00	0.001	1.00	Excellent	
P_7	9	0.90	0.010	0.90	Excellent	
P_8	9	0.90	0.010	0.90	Excellent	0.93
P_9	10	1.00	0.001	1.00	Excellent	
P_10	10	1.00	0.001	1.00	Excellent	
P_11	10	1.00	0.001	1.00	Excellent	
P_12	8	0.80	0.176	0.76	Excellent	
P_13	8	0.80	0.176	0.76	Excellent	
P_14	9	0.90	0.010	0.90	Excellent	
P_15	9	0.90	0.010	0.90	Excellent	

Modified kappa (κ) > 0.6 (acceptable); S-CVI/Ave > 0.90 (acceptable)
I-CVI: Item-content validity index; Pc: Probability of chance agreement; S-CVI/Ave: Scale-level content validity index

TABLE 3: The simplicity rating of each item

Item	Panel in agreement	I-CVI	Pc	Kappa	Interpretation	S-CVI/Ave
K_1	10	1.00	0.001	1.00	Excellent	
K_2	10	1.00	0.001	1.00	Excellent	
K_3	8	0.80	0.176	0.76	Excellent	
K_4	10	1.00	0.001	1.00	Excellent	
K_5	10	1.00	0.001	1.00	Excellent	
K_6	10	1.00	0.001	1.00	Excellent	
K_7	9	0.90	0.010	0.90	Excellent	
K_8	10	1.00	0.001	1.00	Excellent	
K_9	10	1.00	0.001	1.00	Excellent	0.96
K_10	8	0.80	0.176	0.76	Excellent	
K_11	9	0.90	0.010	0.90	Excellent	
K_12	9	0.90	0.010	0.90	Excellent	
K_13	10	1.00	0.001	1.00	Excellent	
K_14	10	1.00	0.001	1.00	Excellent	
K_15	10	1.00	0.001	1.00	Excellent	
K_16	10	1.00	0.001	1.00	Excellent	
K_17	10	1.00	0.001	1.00	Excellent	

Continued...

..continuing

Item	Panel in agreement	I-CVI	Pc	Kappa	Interpretation	S-CVI/Ave
K_1	10	1.00	0.001	1.00	Excellent	
K_2	10	1.00	0.001	1.00	Excellent	
K_3	8	0.80	0.176	0.76	Excellent	
K_4	10	1.00	0.001	1.00	Excellent	
K_5	10	1.00	0.001	1.00	Excellent	
K_6	10	1.00	0.001	1.00	Excellent	
K_7	9	0.90	0.010	0.90	Excellent	
K_8	10	1.00	0.001	1.00	Excellent	
K_9	10	1.00	0.001	1.00	Excellent	
K_10	8	0.80	0.176	0.76	Excellent	
K_11	9	0.90	0.010	0.90	Excellent	
K_12	9	0.90	0.010	0.90	Excellent	
K_13	10	1.00	0.001	1.00	Excellent	
K_14	10	1.00	0.001	1.00	Excellent	
K_15	10	1.00	0.001	1.00	Excellent	0.96
K_16	10	1.00	0.001	1.00	Excellent	
K_17	10	1.00	0.001	1.00	Excellent	
K_18	10	1.00	0.001	1.00	Excellent	
K_19	10	1.00	0.001	1.00	Excellent	
K_20	10	1.00	0.001	1.00	Excellent	
K_21	10	1.00	0.001	1.00	Excellent	
K_22	10	1.00	0.001	1.00	Excellent	
K_23	10	1.00	0.001	1.00	Excellent	
K_24	10	1.00	0.001	1.00	Excellent	
K_25	9	0.90	0.010	0.90	Excellent	
K_26	9	0.90	0.010	0.90	Excellent	
K_27	9	0.90	0.010	0.90	Excellent	
K_28	10	1.00	0.001	1.00	Excellent	
K_29	10	1.00	0.001	1.00	Excellent	
K_30	8	0.80	0.176	0.76	Excellent	
A_1	10	1.00	0.001	1.00	Excellent	
A_2	9	0.90	0.010	0.90	Excellent	
A_3	9	0.90	0.010	0.90	Excellent	
A_4	9	0.90	0.010	0.90	Excellent	
A_5	9	0.90	0.010	0.90	Excellent	
A_6	10	1.00	0.001	1.00	Excellent	
A_7	9	0.90	0.010	0.90	Excellent	
A_8	10	1.00	0.001	1.00	Excellent	0.94
A_9	10	1.00	0.001	1.00	Excellent	
A_10	9	0.90	0.010	0.90	Excellent	
A_11	10	1.00	0.001	1.00	Excellent	
A_12	9	0.90	0.010	0.90	Excellent	
A_13	9	0.90	0.010	0.90	Excellent	
A_14	10	1.00	0.001	1.00	Excellent	
A_15	9	0.90	0.010	0.90	Excellent	
A_16	10	1.00	0.001	1.00	Excellent	
P_1	10	1.00	0.001	1.00	Excellent	
P_2	10	1.00	0.001	1.00	Excellent	
P_3	8	0.80	0.176	0.76	Excellent	
P_4	10	1.00	0.001	1.00	Excellent	
P_5	10	1.00	0.001	1.00	Excellent	

Continued...

..continuing

Item	Panel in agreement	I-CVI	Pc	Kappa	Interpretation	S-CVI/Ave
P_6	10	1.00	0.001	1.00	Excellent	
P_7	10	1.00	0.001	1.00	Excellent	
P_8	9	0.90	0.010	0.90	Excellent	
P_9	9	0.90	0.010	0.90	Excellent	
P_10	10	1.00	0.001	1.00	Excellent	0.95
P_11	10	1.00	0.001	1.00	Excellent	
P_12	10	1.00	0.001	1.00	Excellent	
P_13	8	0.80	0.176	0.76	Excellent	
P_14	9	0.90	0.010	0.90	Excellent	
P_15	9	0.90	0.010	0.90	Excellent	

Modified kappa (κ) > 0.6 (acceptable); S-CVI/Ave > 0.90 (acceptable)
I-CVI: Item-content validity index; Pc: Probability of chance agreement; S-CVI/Ave: Scale-level content validity index

TABLE 4: The not ambiguous rating of each item

Item	Panel in agreement	I-CVI	Pc	Kappa	Interpretation	S-CVI/Ave
K_1	10	1.00	0.001	1.00	Excellent	
K_2	10	1.00	0.001	1.00	Excellent	
K_3	8	0.80	0.176	0.76	Excellent	
K_4	10	1.00	0.001	1.00	Excellent	
K_5	10	1.00	0.001	1.00	Excellent	
K_6	10	1.00	0.001	1.00	Excellent	
K_7	9	0.90	0.010	0.90	Excellent	
K_8	10	1.00	0.001	1.00	Excellent	
K_9	10	1.00	0.001	1.00	Excellent	
K_10	8	0.80	0.176	0.76	Excellent	
K_11	9	0.90	0.010	0.90	Excellent	
K_12	9	0.90	0.010	0.90	Excellent	
K_13	10	1.00	0.001	1.00	Excellent	
K_14	10	1.00	0.001	1.00	Excellent	
K_15	10	1.00	0.001	1.00	Excellent	
K_16	10	1.00	0.001	1.00	Excellent	0.96
K_17	10	1.00	0.001	1.00	Excellent	
K_18	10	1.00	0.001	1.00	Excellent	
K_19	10	1.00	0.001	1.00	Excellent	
K_20	10	1.00	0.001	1.00	Excellent	
K_21	10	1.00	0.001	1.00	Excellent	
K_22	10	1.00	0.001	1.00	Excellent	
K_23	10	1.00	0.001	1.00	Excellent	
K_24	10	1.00	0.001	1.00	Excellent	
K_25	9	0.90	0.010	0.90	Excellent	
K_26	9	0.90	0.010	0.90	Excellent	
K_27	9	0.90	0.010	0.90	Excellent	
K_28	10	1.00	0.001	1.00	Excellent	
K_29	10	1.00	0.001	1.00	Excellent	
K_30	8	0.80	0.176	0.76	Excellent	

Continued...

..continuing

Item	Panel in agreement	I-CVI	Pc	Kappa	Interpretation	S-CVI/Ave
A_1	10	1.00	0.001	1.00	Excellent	
A_2	9	0.90	0.010	0.90	Excellent	
A_3	9	0.90	0.010	0.90	Excellent	
A_4	9	0.90	0.010	0.90	Excellent	
A_5	9	0.90	0.010	0.90	Excellent	
A_6	10	1.00	0.001	1.00	Excellent	
A_7	9	0.90	0.010	0.90	Excellent	
A_8	10	1.00	0.001	1.00	Excellent	0.94
A_9	10	1.00	0.001	1.00	Excellent	
A_10	9	0.90	0.010	0.90	Excellent	
A_11	10	1.00	0.001	1.00	Excellent	
A_12	9	0.90	0.010	0.90	Excellent	
A_13	9	0.90	0.010	0.90	Excellent	
A_14	9	0.90	0.010	0.90	Excellent	
A_15	9	0.90	0.010	0.90	Excellent	
A_16	10	1.00	0.001	1.00	Excellent	
P_1	10	1.00	0.001	1.00	Excellent	
P_2	10	1.00	0.001	1.00	Excellent	
P_3	8	0.80	0.176	0.76	Excellent	
P_4	10	1.00	0.001	1.00	Excellent	
P_5	10	1.00	0.001	1.00	Excellent	
P_6	10	1.00	0.001	1.00	Excellent	
P_7	10	1.00	0.001	1.00	Excellent	
P_8	9	0.90	0.010	0.90	Excellent	0.95
P_9	9	0.90	0.010	0.90	Excellent	
P_10	10	1.00	0.001	1.00	Excellent	
P_11	10	1.00	0.001	1.00	Excellent	
P_12	10	1.00	0.001	1.00	Excellent	
P_13	8	0.80	0.176	0.76	Excellent	
P_14	9	0.90	0.010	0.90	Excellent	
P_15	9	0.90	0.010	0.90	Excellent	

Modified kappa (κ) > 0.6 (acceptable); S-CVI/Ave > 0.90 (acceptable)
I-CVI: Item-content validity index; Pc: Probability of chance agreement; S-CVI/Ave: Scale-level content validity index

the data were suitable for factor analysis. The eigenvalues were more than one, resulting in three meaningful factors to be extracted for attitude domain, which explained 45% of total variance. In addition, Scree Plot (Figure 1) also showed that three factors could be extracted for this domain. Similarly for practice domain, three meaningful factors were extracted, which explained 66% of total variance and the result of Scree Plot (Figure 2) also showed three factors could be extracted for this domain. The validity of the three factors were then further confirmed by communalities in which those below 0.05 were removed. The rotated component matrix displayed the factor loadings for each component, with significance determined by the sample size and a defined threshold. Items with factor loadings below 0.5 were excluded from the MyT-KAPQ. Table 5 showed the factor loaded more than 0.4 was acceptable. Factors in domain attitude loaded ranging from 0.542 to 0.876 and for domain practice loaded from 0.595 to 0.864. Therefore, all the items were acceptable. The three factors for the attitude domain were knowledge regarding myopia, socioeconomy status and lifestyle whereas the three factors for the practice domain were awareness, eye examination and eye health.

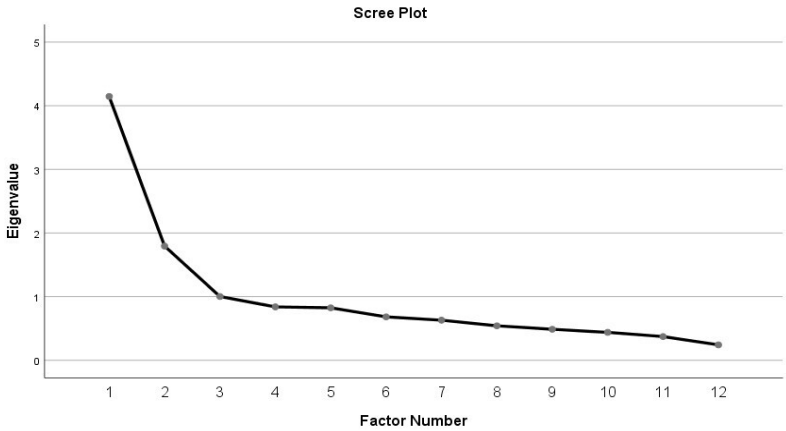

FIGURE 1: Scree plot for attitude domain

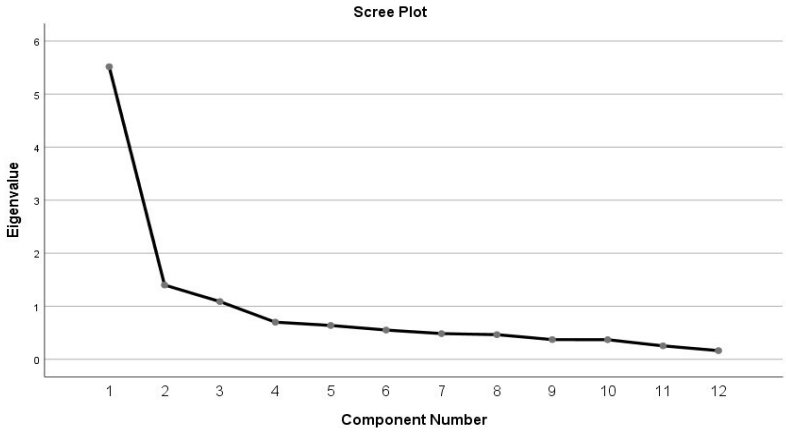

FIGURE 2: Scree plot for practice domain

Reliability

A total of 64 primary school teachers participated in the reliability determination. Reliability for the knowledge domain showed the KR-20 value of 0.69 and Cronbach's α results for attitude was 0.903 and practice was 0.91. The results indicated satisfactory internal consistency. ICC was used for test-retest reliability. Sixty-four primary school teachers remeasured after 3 weeks for test-retest reliability. ICC was evaluated by a two-way mixed model and absolute agreement type with 95% confidence interval (CI). ICC for knowledge was 0.742 (0.648-0.823 95% CI), attitude was 0.891 (0.847-0.926 95% CI) and practice was 0.919 (0.888-0.945 95% CI). The results showed that the questionnaire was reliable for different time points.

DISCUSSION

This MyT-KAPQ consists of three domains KAP with 47 items with acceptable validity and reliability. MyT-KAPQ is the first survey instrument to determine the perceptions of primary school teachers on myopia schoolchildren in Malaysia.

TABLE 5: The results of exploratory factor analysis for attitude and practice

Domains	Items	Factors loading			Cronbach α
		1	2	3	
Attitude	Do you feel children in densely populated areas have a higher tendency to get myopia compared to children in less densely populated areas?	0.72			0.76
	Do you feel near work will elongate the axial length of the eyeball, which leads to myopia among children?	0.72			
	Do you feel more children in urban areas are wearing spectacles compared to children from rural areas?	0.59			
	Do you feel increasing outdoor activities time will prevent occurrence of myopia among children?	0.55			
	Do you feel education pressure causes children to spend less time outdoors?	0.55			
	Do you feel near work, such reading books, using hand phones and digital gadgets, is associated with increased risk of myopia among children?	0.55			
	Do you feel children in rural areas have less prevalence of myopia compared to urban children?	0.54			
	Do you feel vision screening in schools is important?		0.88		0.86
	Do you feel teachers should know the symptoms associated with myopia among children?		0.86		
	Do you feel vision screening in schools should be conducted more than once a year?		0.84		
	Do you feel children whose parents have low monthly income have a higher tendency to get myopia?			0.80	0.58
	Do you feel children whose parents have tertiary education have a higher tendency to get myopia?			0.79	
Practice	How often do you participate in eye health programmes in schools?	0.86			0.88
	How often do you participate in organising eye health programmes for school children?	0.86			
	How often do you record the visual acuity of school children yearly in your school register?	0.75			
	How often do you test visual acuity of children in your school?	0.72			
	How often do you teach school children/parents the importance of getting eyes checked?	0.63			
	How often does your school conduct vision screening with Malaysian Ministry of Health?	0.60			
	How often do you read articles on myopia among children?		0.84		0.81
	How often do you participate in seminars that are related to myopia among children?		0.80		

Continued...

..continuing

Domains	Items	Factors loading			Cronbach α
		1	2	3	
	How often inform the parents/guardians of the children if they have symptoms of myopia?		0.77		
	How often do you consider school children's clarity and comfort in vision during online teaching sessions?			0.78	0.72
	How often do your advice the school children to relax their eyes for a few minutes during the teaching session? (online classes)			0.75	
	How often do you reduce the timing of online teaching sessions?			0.72	

The importance of this study was to gain more knowledge on myopia and modify the attitude and causes of behavioural change among primary school teachers (Koo & Li 2016).

The knowledge domain was created to determine the awareness of primary school teachers on the prevalence of myopia among schoolchildren, the risk factors of myopia, symptoms and effects of having myopia among schoolchildren. For knowledge, a total of 23 items were included. To validate knowledge, we used CVI on the first round and experts' approval during the FGD. Few items were removed although the CVI in the first round of the Delphi method was more than 0.78, due to the questions being more complicated to grasp by the respondents. Item K12 (sleeping under open light causes myopia among schoolchildren) was included in the first draft due to a study showing animal experiments indicated that disruptions of the dark-light cycle affecting the amplitude of diurnal cycling of dopaminergic activity, resulting in eye growth (Saw et al. 2002). However, the item was removed because the panels found that the item would be hard to understand by the respondents. Item K7 (diet is a possible risk of myopia) was included in the first draft but removed later because of poor reference. Previous study stated there was no evidence relating diet and axial length of the respondents (Li et al. 2022). Items K26 (neovascularisation retina), K27 (macular degeneration) and K30 (disturbs sleep quality) are included in the subdomain of effects of myopia among schoolchildren and were removed in the FGD due to not enough reference to support the items. Initially item K5 (do you know whether the following stated points are the risk factors for myopia among children?), K14 (the symptoms for myopia among children are…) and K25 (high myopia will cause…) were included as items in the first draft to evaluate the suitability of the instructions in this questionnaire. However, after discussion with panels, this was not included as item. Item K4 (do you know that the 2 main risk factors for myopia are genetic and environmental factors?) was separated into 2 items, genetic and environmental factors.

A total of 12 items were retained in MyT-KAPQ for attitude domain. The attitude of primary school teachers regarding myopia schoolchildren developed with the area of interest near work, outdoor activity, population, socioeconomic status and knowledge. Few items were removed although the CVI in the first round of the Delphi method was more than 0.78, due to the questions being more complicated to grasp by the respondents. Item A3 (you feel 'urbanisation' lifestyle increases the incidence of myopia among schoolchildren) and item A4 (you feel obesity is a factor that is related to myopia among schoolchildren) were removed because the items were indirectly affecting myopia, which can cause difficulty for the teachers to understand the questions. Item A7 (you feel exposure to sunlight causes pupil constriction that makes the image clearer) was included in the first draft then

removed because not supported by articles. Item A1 (you feel…) was included as an item in the first draft to determine the suitability of the phrase for the domain, however, the phrase was not considered as an item after the discussion with panel experts.

For practice domain, a total of 12 items were retained in MyT-KAPQ. Domain practice was developed with areas of interest awareness, eye examination and eye health. Few items were removed although the CVI in the first round of the Delphi method was more than 0.78, due to the questions being more complicated to grasp by the respondents. Item P3 (how often do you prescribe eye drops (preservative free) if found to have myopia symptoms among schoolchildren) and item P13 (how often do you avoid online teaching sessions) were removed after FGD due to prescribing eye drops for myopia falls outside the professional duties of teachers in Malaysia, thus, these are not relevant to current studies and also the teachers' movements on online or physical classes were depend on the instruction from higher management. Item P1 (how often do you…) is included in the first draft to check the suitability of the phrase to the domain however, it was not considered as an item during the discussion among expert panels.

In this study, only EFA had been used to determine the construct validity of the items. According to Gunawan et al. (2021), either only EFA or combination of EFA and confirmatory factor analysis (CFA) is acceptable to validate the items during questionnaire development. For the exploratory factor loading, there are ambiguous findings on the cut-off factor loading values which range between 0.3 to 0.5 in the former studies (Cui et al. 2022; Goni et al. 2020; Ngah et al. 2022; Shrestha 2021). Therefore, we took the value that was average which is more than 0.4. For the reliability of this study, KR-20 was utilised to assess the instrument's reliability for domain knowledge and Cronbach's α was used for domain attitude and practice (Yun et al. 2023). This study shows domain knowledge has moderate internal correlation and domain attitude and practice scores have excellent correlation each. According to Ntumi et al. (2023), KR-20 is used to determine the reliability of the instruments when the domain is dichotomous. The results for internal consistency for knowledge domain is 0.69, which is between 0.50 to 0.80 and is considered moderate internal reliability (Tan 2009). Reliability testing with ICC was more than 0.70 indicating moderate to good reliability among KAP.

This questionnaire is useful for upcoming research on myopia children. This questionnaire can be distributed to all primary school teachers as they are created in Malay and English, the most used language in Malaysia. As the prevalence of myopia is increasing worldwide, teachers' roles should be taken into consideration to implement strategic prevention for myopia among children.

The limitation of this study was the research team could not meet the respondents to distribute the questionnaire during the COVID-19 pandemic. This limits the understanding of the researcher on responders' behaviour on the questionnaire. EFA and ICC tests were used to determine the validity and reliability of the questionnaire. However, CFA or Rasch analysis is recommended to be performed in future studies on knowledge, attitude and practice of primary school teachers on myopia children. The sample size needed for CFA is 200 to 500 respondents and should be run using a different data set from EFA data set (Saefi et al. 2020). As the research was done during COVID-19 lockdown period, there were restrictions to collect data from a larger sample size. Another limitation of the study was the uneven distribution of the ethnicity of the teachers and their regional location in Malaysia. Therefore, factors such as ethnicity and regional location, like urban or rural area, were included as the factors to interpret the data.

CONCLUSION

A new set of MyT-KAPQ to examine KAP among primary school teachers on myopia schoolchildren in Malaysia was produced. MyT-KAPQ consists of three domains with 23 items under knowledge, 12 items under attitude and

12 items under practice. This new tool aids in creating interventions to prevent myopia progression among schoolchildren and raising awareness among educators towards myopia.

Author contributions: Study design: SSK; Supervision: SN, HAR; Writing-original draft: GG; Writing - review and editing: SN. All authors have approved the final manuscript.

Funding: No funding was received for the study. Not Applicable

Acknowledgement: Sincere thanks to the Universiti Kebangsaan Malaysia and Malaysia Education Ministry for the technical support to conduct this research. The authors would like to thank Dr Hanif Farhan for helping with the statistics evaluation. The authors would also like to thank the primary school teachers who were respondents in this research.

Conflict of interest: The authors declare no conflicts of interest.

Ethics statement: Ethical approval was granted by the Ethics and Research Committee of Universiti Kebangsaan Malaysia (UKM PPI/111/8/JEP-2020-669). The study protocol also complied to Declaration of Helsinki.

REFERENCES

Abd Rahman, M.H., Amirtharatnam, P., Sharanjeet-Kaur, S., Narayanasamy, S., Rasdi, H.F., Bastion, M.L. 2023. Development of knowledge, attitude and practice questionnaire for age-related macular degeneration patients. *Int J Ophthalmol* **16**(4): 589-600. https://doi.org/10.18240/ijo.2023.04.13

Agarwal, A., Ranjan, P., Rohilla, P., Saikaustubh, Y., Sahu, A., Dwivedi, S.N., Baitha, U., Kumar, A. 2021. Development and validation of a questionnaire to assess preventive practices against COVID-19 pandemic in the general population. *Prev Med Rep* **22**: 101339. https://doi.org/10.1016/j.pmedr.2021.101339

Andrade, C., Menon, V., Ameen, S., Kumar Praharaj, S. 2020. Designing and conducting knowledge, attitude, and practice surveys in psychiatry: practical guidance. *Indian J Psychol Med* **42**(5): 478-81. https://doi.org/10.1177/0253717620946111

Arifin, W.N. 2018. A web-based sample size calculator for reliability studies. *Educ Med J* **10**(3): 67-76. https://doi.org/10.21315/eimj2018.10.3.8

Asún, R.A., Rdz-Navarro, K., Alvarado, J.M. 2016. Developing multidimensional Likert scales using item factor analysis: The case of four-point items. *Sociol Methods Res* **45**(1): 109-33. https://doi.org/10.1177/0049124114566716

Benzir, M., Afroze, A., Zahan, A., Naznin, R.A., Khanam, A., Sumi, S.A., Haq, M.A., Lugova, H., Haque, M. 2022. A study linking axial length, corneal curvature, and eye axis with demographic characteristics in the emmetropic eyes of Bangladeshi people. *Cureus* **14**(10): e29925. https://doi.org/10.7759/cureus.29925

Costello, A.B., Osborne, J. 2005. Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Pract Assess Res Eval* **10**(1): 1-9.

Cui, L., He, A., Wang, X., Wang, Y., Huang, X., Ni, Z. 2022. Development and validation of a competency evaluation model for hospital infection prevention and control practitioners in the post-pandemic era: A mixed methods study. *J Hosp Infect* **119**: 132-40. https://doi.org/10.1016/j.jhin.2021.08.028

Eze, N.M., Asogwa, O.C., Eze, C.M. 2021. Principal component factor analysis of some development factors in Southern Nigeria and its extension to regression analysis. *J Adv Math Comput Sci* **36**(3): 132-60. https://doi.org/10.9734/JAMCS/2021/v36i330351

Ghani, N.D., Abd Rahman, M.H., Mohamad Fadzil, N., Mohammed, Z., Mohd Rasdi, H.F., Shafie, N.S. 2023. Development and validation of parental knowledge, attitude and practice in eye problem among children questionnaire (PEPC-KAPQ). *PLoS One* **18**(9): e0291062. https://doi.org/10.1371/journal.pone.0291062

Goni, M.D., Naing, N.N., Hasan, H., Wan-Arfah, N., Deris, Z.Z., Arifin, W.N., Hussin, T.M., Abdulrahman, A.S., Baaba, A.A., Arshad, M.R. 2020. Development and validation of knowledge, attitude and practice questionnaire for prevention of respiratory tract infections among Malaysian Hajj pilgrims. *BMC Public Health* **20**:1-0. https://doi.org/10.1186/s12889-020-8269-9

Gunawan, J., Marzilli, C., Aungsuroch, Y. 2021. Establishing appropriate sample size for developing and validating a questionnaire in nursing research. *Belitung Nurs J* **7**(5): 356-60. https://doi.org/10.33546/bnj.1927

Hair, J.F., Anderson, R.E., Babin, B.J., Black, W.C. 2010. *Multivariate data analysis: A global perspective*. Upper Saddle River (NJ): Pearson Education

Han, X., Liu, C., Chen, Y., He, M. 2022. Myopia prediction: A systematic review. *Eye (London, England)* **36**(5): 921-9.

Henson, R.K., Roberts, J.K. 2006. Use of exploratory factor analysis in published research: Common errors and some comment on improved practice. *Educ Psychol Meas* **66**(3): 393-416. https://doi.org/10.1177/0013164405282485

Holden, B.A., Fricke, T.R., Wilson, D.A., Jong, M., Naidoo, K.S., Sankaridurg, P., Wong, T.Y., Naduvilath, T.J., Resnikoff, S. 2016. Global prevalence of myopia and high myopia and temporal trends from 2000 through 2050. *Ophthalmology* **123**(5): 1036-42. https://doi.org/10.1016/j.ophtha.2016.01.006

Hong, Q.N., Pluye, P., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., Gagnon, MP., Griffiths, F., Nicolau, B., O'Cathain, A., Rousseau, M.C., Vedel, I. 2019. Improving the content validity of the mixed methods appraisal tool: A modified e-Delphi study. *J Clin Epidemiol* **111**: 49-59.e1. https://doi.org/10.1016/j.jclinepi.2019.03.008

Ismail, L.A., Sukumaran, S. 2022. Prevalence of refractive errors among school children in Wangsa Maju, Kuala Lumpur, Malaysia. *Med Hypothesis Discov Innov Optom* **3**(3): 106-12. https://doi.org/10.51329/mehdioptometry158

Koo, T.K., Li, M.Y. 2016. A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *J Chiropr Med* **15**(2): 155-63. https://doi.org/10.1016/j.jcm.2016.02.012

Krejcie, R.V., Morgan, D.W. 1970. Determining sample size for research activities. *Educ Psychol Meas* **30**(3): 607-10. https://doi.org/10.1177/001316447003000308

Li, M., Tan, C.S., Foo, L.L., Sugianto, R., Toh, J.Y., Sun, C.H., Yap, F., Sabanayagam, C., Chong, F.F., Saw, S.M. 2022. Dietary intake and associations with myopia in Singapore children. *Ophthalmic Physiol Opt* **42**(2): 319-26. https://doi.org/10.1111/opo.12929

Lloret, S., Ferreres, A., Hernández, A., Tomás, I. 2017. The exploratory factor analysis of items: Guided analysis based on empirical data and software. *An Psicol* **33**(2): 417-32. https://doi.org/10.6018/analesps.33.2.270211

Ngah, H., Mohd Hairon, S., Hamzah, N.A., Noordin, S., Shafei, M.N. 2022. Development and validation of knowledge, attitude, and practice questionnaire: toward safe working in confined spaces. *Int J Environ Res Public Health* **19**(3): 1242. https://doi.org/10.3390/ijerph19031242

Ntumi, S., Agbenyo, S., Bulala, T. 2023. Estimating the Psychometric Properties (Item Difficulty, Discrimination and Reliability Indices) of Test Items Using Kuder-Richardson Approach (KR-20). S*hanlax Int J Educ* **11**(3): 18-28. https://doi.org/10.34293/education.v11i3.6081

Park, D.I. 2021. Development and validation of a knowledge, attitudes and practices questionnaire on COVID-19 (KAP COVID-19). *Int J Environ Res Public Health* **18**(14):7493. https://doi.org/10.3390/ijerph18147493

Polit, D.F., Beck, C.T., Owen, S.V. 2007. Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Res Nurs Health* **30**(4): 459-67. https://doi.org/10.1002/nur.20199

Polit, D.F., Beck, C.T. 2006. The content validity index: are you sure you know what's being reported? Critique and recommendations. *Res Nurs Health* **29**(5): 489-97. https://doi.org/10.1002/nur.20147

Saefi, M., Fauzi, A., Kristiana, E., Adi, W.C., Muchson, M., Setiawan, M.E., Islami, N.N., Ningrum, D.E.A.F., Ikhsan, M.A., Ramadhani, M. 2020. Validating of knowledge, attitudes, and practices questionnaire for prevention of COVID-19 infections among Undergraduate Students: A RASCH and Factor Analysis. *EURASIA J Math Sci Tech Educ* **16**(12): em1926. https://doi.org/10.29333/ejmste/9352

Saw, S.M., Goh, P.P., Cheng, A., Shankar, A., Tan, D.T., Ellwein, L.B. 2006. Ethnicity-specific prevalences of refractive errors vary in Asian children in neighbouring Malaysia and Singapore. *Br J Ophthalmol* **90**(10): 1230-5. https://doi.org/10.1136/bjo.2006.093450

Saw, S.M., Zhang, M.Z., Hong, R.Z., Fu, Z.F., Pang, M.H., Tan, D.T. 2002. Near-work activity, night-lights, and myopia in the Singapore-China study. *Arch Ophthalmol* **120**(5): 620-7. https://doi.org/10.1001/archopht.120.5.620

Sankaridurg, P., Tahhan, N., Kandel, H., Naduvilath, T., Zou, H., Frick, K.D., Marmamula, S., Friedman, D.S., Lamoureux, E., Keeffe, J., Walline, J.J. 2021. IMI impact of myopia. *Invest Ophthalmol Visual Sci* **62**(5): 2. https://doi.org/10.1167/iovs.62.5.2

Shrestha, N. 2021. Factor analysis as a tool for survey analysis. *Am J Appl Math Stat* **9**(1): 4-11. https://doi.org/10.12691/ajams-9-1-2

Tan, S. 2009. Misuses of KR-20 and Cronbach's alpha reliability coefficients. *Educ Sci* **34**(152): 101-12.

Tariq, F., Mobeen, R., Wang, X., Lin, X., Bao, Q., Liu, J., Gao, H. 2023. Advances in myopia prevention strategies for school-aged children: a comprehensive review. *Front Public Health* **11**: 1226438. https://doi.org/10.3389/fpubh.2023.1226438

Tegegne, B., Wondimu, H. 2023. Validation of the emotional intelligence scale for University Instructors in Ethiopia. *J Ethiop Stud* **6**(2): 119-54.

Tsai, T.H., Liu, Y.L., Ma, I.H., Su, C.C., Lin, C.W., Lin, L.L., Hsiao, C.K., Wang, I.J. 2021. Evolution of the prevalence of myopia among Taiwanese

schoolchildren: a review of survey data from 1983 through 2017. *Ophthalmology* **128**(2): 290-301. https://doi.org/10.1016/j.ophtha.2020.07.017

Watkins, M.W. 2021. *A step-by-step guide to exploratory factor analysis with SPSS*. New York: Routledge.

Wilhelmsen, G.B., Felder, M. 2020. Learning is visual: Why teachers need to know about vision. In *School Management in the 21st Century* IntechOpen.

Williams, B., Onsman, A., Brown, T. 2010. Exploratory factor analysis: A five-step guide for novices. *Australas J Paramed* **8**: 1-3. https://doi.org/10.33151/ajp.8.3.93

World Health Organization (WHO). 2008. Advocacy, communication and social mobilization for TB control: A guide to developing knowledge, attitude and practice surveys. https://www.who.int/publications/i/item/9789241596176 [Accessed on 11 May 2022]

Wu, M.J., Zhao, K., Fils-Aime, F. 2022. Response rates of online surveys in published research: A meta-analysis. *Comput Human Behav* **7**: 100206. https://doi.org/10.1016/j.chbr.2022.100206

Xu, J., Shi, Y., Li, S., Ma, J., Zhang, J., Shen, Y. 2024. Development and reliability testing of a risk factor and risk outcome assessment scale for nurses in "internet+ nursing services" for the elderly. *BMC Nurs* **23**(1): 54. https://doi.org/10.1186/s12912-024-01698-2

Yun, V.W., Ulang, N.M., Husain, S.H. 2023. Measuring the internal consistency and reliability of the hierarchy of controls in preventing infectious diseases on construction sites: The Kuder-Richardson (KR-20) and Cronbach's Alpha. *J Adv Res Appl Sci Eng Technol* **33**(1): 392-405. https://doi.org/10.37934/araset.33.1.392405

Yusoff, M.S., Arifin, W.N., Hadie, S.N. 2021. ABC of questionnaire development and validation for survey research. *Educ Med J* **13**(1): 97-108. https://doi.org/10.21315/eimj2021.13.1.10