The Development and Pre-testing of Attitude and Practice Questionnaire on Ethical Decision-making During a Pandemic Among Paediatric Healthcare Professionals in Malaysia

Kader Nawaaz Idriss[1], Mohamad Ikram Ilias[1,2], Norsarwany Mohamad[1,2], Fahisham Taib[1,2]

[1]*Department of Paediatrics, School of Medical Sciences, Universiti Sains Malaysia, Kelantan, MALAYSIA*

[2]*Department of Paediatrics, Hospital Universiti Sains Malaysia, Kelantan, MALAYSIA*

ABSTRACT

Malaysia is facing a widespread COVID-19 pandemic, affecting clinical admission to hospitals. The decision-making for admission, ventilation, and aggressive management for COVID-19 patients, especially children, can be challenging. However, no single tool exists to simultaneously evaluate the domains for attitude and practice on ethical decisions for children during the pandemic. The current study aims to develop and validate an attitude and practice questionnaire on ethical decision-making during a pandemic among medical doctors working in paediatric settings. Relevant domains were identified to generate items and form a research tool through literature reviews, focus groups, and opinions of experts. The questionnaire underwent a series of validation processes, including content, face validity and exploratory factor analysis (EFA). The developed questionnaire demonstrated a satisfactory item-level content validity index, face validity, and construct validity. The minimum item content validity index (I-CVI) of the attitude items was 0.80, and the maximum was 1.00, while the minimum and maximum I-CVI for the practice section were 0.80 and 1.00, respectively. Item-level face validity index (I-FVI) of 1.00 for both domains was obtained, showing all the items were above the cut-off value (0.60). For the EFA, all the items had satisfactory factor loading (>0.3) as well as Cronbach's alpha (>0.6). This study showed a good level of I-CVI, I-FVI, and EFA in the new questionnaire. The instrument is valid and thus reliable for assessing attitudes and practices on ethical decision-making during a pandemic among medical doctors working in paediatric settings.

Keywords: *Questionnaire development, Validation, Ethical decision-making, Pandemic, Paediatric setting*

CORRESPONDING AUTHOR

Fahisham Taib, Department of Paediatrics, School of Medical Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian, Kota Bharu, Kelantan, Malaysia

Email: fahisham@gmail.com

INTRODUCTION

Malaysia is facing a widespread pandemic of COVID-19 which has affected clinical admission to hospitals (1). As the epidemiological curve is rising globally, making decisions for admission, ventilation, and aggressive management for COVID-19 patients, especially children, can be complex and challenging (2). Due to the uncertainty of the pandemic period, it is likely that every difficult decision made by managing paediatricians is crucial for the livelihood of children admitted for suspected COVID-19 or any other infection causes (3). Malaysia is a country nearly devoid of natural and human-made disasters, and Malaysians have never encountered this gigantic precedence and scare in their whole life.

Several factors influence decision-making in clinical settings. These factors influence people's choices, including past experience, cognitive biases, age and individual differences, belief in personal relevance, and an escalation of commitment. Understanding the factors influencing the decision-making process is vital to understanding the final decision. That is, the factors that influence the process may impact the outcomes (4).

Most pandemic contingency plans recognise healthcare professionals as a priority group because they will be the first line of defence in a pandemic and must maintain a health service response for the entire community. This prioritisation must be weighed, and they must be responsible for making critical decisions throughout the process (5). The aim of having these priorities is to achieve the greatest good, enabling individuals to "return to normality" in maintaining threatened health systems and essential community services. Should a pandemic escalate and the demand for intensive care unit (ICU) beds become extremely critical, healthcare workers must have a consistent ethical conscience, which might influence the appropriateness of each decision-making and utilisation of the resources (6). The potential ramifications of giving preferential treatment to individuals on any social grounds are disturbing. Some factors may be arguably legitimate reasons for seeking preferential treatment. Still, specific criteria like political status, socioeconomic standing, celebrity status or professional position might also attempt to seek special treatment in dire need.

Hypothetically, paediatric doctors will manage various illnesses during the pandemic, including COVID-19 and non-COVID-19 cases, thus making difficult decisions based on available resources. It is important to understand their attitudes and practices in decision-making when resources are scarce during the pandemic episode. Therefore, this study aims to develop a questionnaire related to doctors' attitudes and practices on their ethical decision-making during the pandemic.

METHODS

This study was conducted among the medical doctors working in a paediatric setting at a teaching hospital (Hospital Universiti Sains Malaysia) and commenced on 1 August 2020 till 30 September 2022. The development and validation of the questionnaire and analysis were conducted in two stages: the questionnaire development stage and the validation analysis (Figure 1).

Stage 1: Item Generation and Domains Development of the Questionnaire

For the first stage, the development of the questionnaire followed a series of meticulous study processes to ensure a valid and reliable measurement tool.

The approach to developing the new questionnaire started with a detailed and comprehensive review of the relevant scientific literature to identify the content of the items to be included in the questionnaire. Exploring available resources and suitable items and scales or survey tools of existing questionnaires on ethical decision-making during a pandemic for medical professionals working in paediatric settings were considered for setting the template. The development of the construct proposed for the study is known as the deductive approach due to the involvement of an in-depth review of the literature employed in this study (7).

Subsequently, the interview findings regarding the respondents' level of knowledge were used to establish appropriate domains for the questionnaire development based on the sections adequately identified in the literature (8). This study critically examined several pieces of scientific literature related to Ethical Decision-Making during a pandemic among medical doctors working in paediatric settings. The key terms such as "attitude", "practice", "ethical decision-making", and "pandemic" were used during the literature search to identify relevant sources in databases such as PubMed, Ovid Online, Scopus, ProQuest, Science Direct, and Google Scholar. However, the in-depth exploration of the relevant scholarly articles also considered similar questionnaires from other related fields of study to identify and serve as a guide to the structure of the items to be generated. The approaches identified in the literature identified the key elements incorporated into the questionnaire. Properly outlined domains are critical in the development and validation of items as well as scoring guidelines. The clarity in the construct developed is essential to ensure the questionnaire achieves its intended purpose (9).
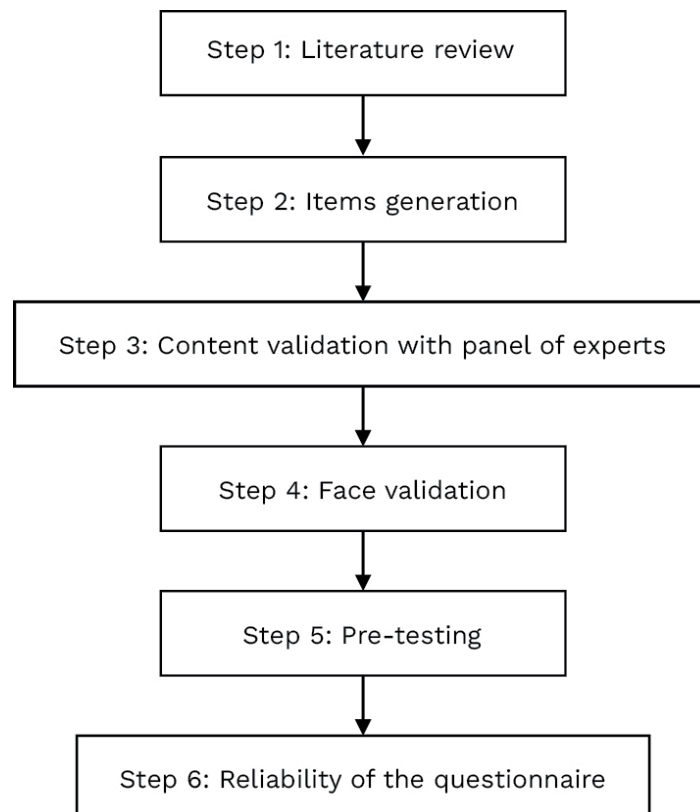

Figure 1: Schematic diagram of the development and validation of the attitude and practice on ethical decision-making during a pandemic questionnaire.

Stage 2: Content and Construct Validity

For the second stage, the validation comprised of content validity, face validity and construct validity (exploratory factor analysis [EFA]).

Content validity

The content validity of the items in the attitude and practice of the completed questionnaire was performed qualitatively by a panel of experts locally (including two external paediatricians, one ethicist, and one public health specialist) to assess how relevant and clear the items are concerning the constructs. The content validity of the questionnaire must be determined following the item generation completion. The panel of experts were chosen from fields relevant to the scope of the study. The panel selects the best items for clarity of the questions, the accuracy of the attitude and practice domains, and interpretability. The panel's suggestions include complying with grammar, applying appropriate and correct words, using the correct order of words in items, and proper scoring. This panel also helped identify and judge the content validity (relevance, coverage, and representativeness) of the items initially selected for inclusion in the questionnaire. After the item generation, it is imperative to ascertain the content validity of the items in the measurement tool by a team of experts. Experts' opinion regarding the scope of the study is essential in substantiating the relevance of items in the content of the measurement tool. The panel of experts conducted an in-depth review of the questionnaire to ascertain its comprehensiveness following the qualitative evaluation from the expert panel, as shown in a similar study in Malaysia (10). This also enables the review of the items' wording to ensure they are precise and simple and eliminate the chances of having double-barrelled items.

The panel of experts who consented to participate in the content validity procedure received a cover letter outlining the background and aims of the study. The questionnaire was subjected to quantitative and qualitative evaluation by the expert panel. The content validity index (CVI) was used for the quantitative review. The panel of experts were asked to rate each item based on a 4-rating scale for the content validation (1 = the item is not relevant to the measured domain; 2 = the item is somewhat relevant to the measured domain; 3 = the item is quite relevant to the measured domain; and 4 = the item is highly relevant to the measured domain). This procedure would ensure that the objectivity of the final questionnaire's items is well accepted and understood by the respondents (11). The item content validity index (I-CVI) value considered acceptable was set at 0.78 and above, while the scale content validity index (S-CVI) considered acceptable was at a minimum of 0.80. Based on the I-CVI values, items with I-CVI less than 0.80 were re-discussed for consideration in the questionnaire, and items with an I-CVI of 1.0 were accepted (12).

Face validity

This was conducted to validate the questionnaire by interviewing a few doctors working in the Department of Paediatrics face-to-face. Face validity was conducted on 10 senior doctors to evaluate the understanding of medical practitioners towards comprehending the questionnaire and determine how meaningful the items were to target participants (13). The participants were assigned to go through the attitude and practice sections, after which they were required to evaluate them based on the order of the questions, clarity of language, and

whether the items in each domain rightly measured the corresponding domain. Scoring was assigned for the order of items as good order, average, or poor order; language clarity as clear, average, or confusing; and suitability of construct measurement as good, average, or poor. Similarly, the item-level face validity index (I-FVI) value considered acceptable was set at 0.78 and above, while the value of scale face validity index (S-FVI) regarded as acceptable was at a minimum of 0.80. Based on the I-FVI values, items with I-FVI less than 0.70 were re-discussed for consideration in the questionnaire, and items with an I-FVI of 1.0 were accepted (12).

Exploratory factor analysis (EFA)

EFA was conducted to determine the constructs of the questionnaire by applying factor loading based on the correlation among items. The EFA was done to determine the construct validity of the attitude and practice domains of the questionnaire due to their ordinal responses. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were done for sampling adequacy. The suitability of data for factor analysis could be examined with the KMO coefficient and Bartlett sphericity test (14). The sample was considered adequate if the KMO value was more than 0.7 and Bartlett's test was significant (p < 0.001) (10). The principal axis factoring method for the component extraction was used. Oblimin rotation with Kaiser normalisation was applied to optimise the factor loading of each item on the extracted components. The dimensionality of the items in each domain was considered continuous output to facilitate its evaluation (15). Factors with eigenvalues of over one were retained using parallel analysis and scree plot. Items with a factor loading of ≥0.3 were acceptable (10).

Reliability

A reliability test was done to check internal consistency by applying Cronbach's alpha for each determined construct and item-total correlation. Reliability assessment of scale can be assessed in various ways. However, Cronbach's coefficient alpha is the determination of internal consistency and was applied in this study. It denotes the mean of all split-half coefficients emanating from the various splitting of a test (16). Another study suggested no clear-cut or set interpretation of acceptable values of Cronbach's alpha (17). A reliability coefficient of 0.70 or above is usually considered an indication of internal consistency for a questionnaire (18).

RESULTS

Descriptive Statistics of the Participants

Out of the 50 pilot study participants in the questionnaire's development and reliability, the respondents' age ranged from 25 to 52 years old, with a mean (standard deviation [SD]) age of 32.02 (6.48). The majority, 42 (82%) of the respondents, were of Malay ethnicity, and 33 (66%) were females. Most of the respondents, 30 (60%), were married at the time of the research, while the never married and divorced/widowed categories accounted for 17 (34%) and 3 (6%), respectively. The summary of the characteristics is shown in Table 1.

Table 1: Socio-demographic characteristics of the respondents (n = 50)

Characteristic	Frequency (n)	Percentage (%)
Ethnicity		
Malay	41	82.0
Chinese	4	8.0
Indian	2	4.0
Others	3	6.0
Gender		
Male	17	34.0
Female	33	66.0
Marital status		
Married/partner	30	60.0
Never married	17	34.0
Divorced/widowed	3	6.0
Position		
Medical officer	14	28.0
House officer	22	44.0
Registrar	6	12.0
Specialist/consultant	8	16.0
Years of experience		
Less than 5 years	37	74.0
6 to 10 years	6	12.0
11 to 15 years	3	6.0
16 to 20 years	3	6.0
More than 20 years	1	2.0

Item Generation and Domains Development of the Questionnaire

Based on the critical literature review, the items in the questionnaire were developed along with the instructions and scoring guidelines. The questionnaire consists of sections A, B, and C for demographic variables, attitudes, and practices. The attitude and practice sections of the questionnaire were developed based on the items relevant to the domain as extracted from literature collections.

The questionnaire was self-administered and consisted of open-ended and closed-ended questions. Section A consists of seven statements that cover socio-demographic characteristics studied, including age, gender, race, marital status, years of experience, and level of expertise. Sections B and C have 13 and 15 items, respectively. The responses were on a 5-point Likert scale with the options strongly agree, agree, not sure, disagree, and strongly disagree. All the items were worded positively in the attitude and practice sections

as a strategy to ensure respondents understood and treated things accurately (19). In-depth interviews were conducted with the target audience of doctors to explore their attitudes and prevention practices qualitatively.

The primary outcome variables for this study were the attitude and practice regarding ethical decision-making during a pandemic among medical doctors working in a paediatric setting in Malaysia. The two sections are measured on a five-point Likert scale: strongly disagree = 1; disagree = 2; not sure = 3; agree = 4; and strongly agree = 5. The total maximum scores for the attitude and practice domains are 65 and 75, respectively. On the other hand, the minimum score for attitude and practice are 13 and 15, respectively. Higher scores imply a positive attitude and practice toward ethical decision-making during a pandemic. In contrast, poor scores show mistrust of preventive strategies and negative views toward the need for ethical decision-making.

Validation Process

Content validity

A panel of experts assessed the items in the questionnaire qualitatively. Evaluation was based on the themes, structure, and content prior to developing of the final items in the questionnaire draft. Based on the revision of the questionnaire by the panel of experts, an in-depth review to ascertain its comprehensiveness was performed. Several modifications were made to the questionnaire following the content and face validation. Table 2 shows the I-CVI of the attitude items. All 13 items had excellent content validity (I-CVI ≥ 0.80). The minimum I-CVI of the attitude items was 0.80, and the maximum was 1.00. The S-CVI of the attitude items was 0.94, exceeding the recommended cut-off point of 0.90.

Table 3 demonstrates the I-CVI of the practice items in the questionnaire for the practice domain. All 14 items, as indicated, possessed excellent content validity (I-CVI ≥ 0.80). The minimum and maximum I-CVI were 0.80 and 1.00, respectively. The S-CVI of the items in the practices section was 0.97.

Table 2: Evaluation of the I-CVI of the attitude items in the questionnaire

Item number	Item statement	I-CVI	Evaluation
Q2	Healthcare workers should request extra salary due to increased risk of getting infected at work.	1.00	Excellent
Q5	Doctors have an obligation to work, and their casual leaves should be suspended at that point of time.	1.00	Excellent
Q6	It is acceptable that I stockpile medications and masks for my family and children in case of shortage nationwide.	0.80	Excellent
Q13	Children with higher survival chance will receive the ventilator.	1.00	Excellent
Q17	Healthcare workers including doctors should get the vaccine first.	1.00	Excellent
Q19	Authorities should make vaccination compulsory for everyone.	0.80	Excellent

(*Continued on next page*)

Table 2: (*Continued*)

Item number	Item statement	I–CVI	Evaluation
Q20	Only countries with better economic power should get the vaccines first and thus vaccinating their paediatric population earlier.	1.00	Excellent
Q21	Children should be vaccinated last because they are expected to have better outcome from a pandemic.	1.00	Excellent
Q22	Younger doctors are the first to work because they are less at risk compared to older doctors.	0.80	Excellent
Q23	Doctors who are single should be called to work first compared to those who have their family with children at home to decrease the risk of spreading infection.	1.00	Excellent
Q24	There should be no gender preference for the work.	1.00	Excellent
Q25	Doctors who are pregnant are allowed to stay at home or work from home.	1.00	Excellent
Q26	Doctors who refuse to come to work without a valid reason should face some form of sanctions.	1.00	Excellent

Table 3: Evaluation of the I-CVI of the practice items in the questionnaire

Item number	Item statement	I–CVI	Evaluation
Q1	A suspected positive patient collapses and personal protective equipment (PPE) is not available in the ward at that time. I will get PPE from another ward which is 5 minutes away, then attend the patient.	1.00	Excellent
Q3	I have the right to refuse to treat a patient who is probably contagious.	1.00	Excellent
Q4	As a medical practitioner I am willing to accept the risk of getting infected at work during a pandemic.	1.00	Excellent
Q7	Doctors will follow local guidelines which are developed by administrators and healthcare providers.	0.80	Excellent
Q8	Children with similar prognosis (for e.g., severe pneumonia vs ARDS) are chosen randomly. For instance, flipping a coin to decide who gets the ventilator.	1.00	Excellent
Q9	Children are treated on a first come first serve basis.	0.80	Excellent
Q10	Children affected by the virus will be given same priority as children presented to hospital without the virus.	1.00	Excellent
Q11	The sickest child will receive access to treatment first because of their vulnerability.	0.80	Excellent
Q12	Children who are more likely to require a shorter duration of treatment on a ventilator is given priority.	1.00	Excellent
Q14	The Hospital Director and the Ethics Committee get to decide on the criteria of who will get the ventilators.	1.00	Excellent
Q15	Children of royals, celebrities, politicians or those with better educational background will be given priority to treatment because if they survive, they are assumed to contribute more to society later on.	1.00	Excellent

(*Continued on next page*)

Table 3: (*Continued*)

Item number		Item statement	I-CVI	Evaluation
Q16		Treatment priority is given to children because they are expected to have more years to live.	1.00	Excellent
Q18		Family of healthcare workers should be among those given higher priority because they are also considered high risk.	1.00	Excellent
Q27		Doctors who fall ill because of the virus during a pandemic should stay at home until they recover.		

Note: ARDS = acute respiratory distress syndrome.

Face validity

For the attitude domain, out of the 13 items, as indicated, 9 possessed excellent face validity (I-CVI ≥ 0.80), while 4 items had good validity. The minimum and maximum I-FVI were 0.64 and 1.00, respectively. The S-FVI of the items in the practice section was 0.87. For the I-FVI of the practice items in the questionnaire, out of the 14 items, 10 indicated excellent content validity (I-FVI ≥ 0.78), 2 items showed good content validity (I-FVI < 0.78), and the remaining two demonstrated fair face validity (I-FVI < 0.78). The minimum and maximum I-FVI was 0.55 and 1.00, respectively. The S-CVI of the items in the practice section was 0.82.

Exploratory factor analysis (EFA)

For the construct validity, all the items in the attitude section were analysed through EFA to investigate factorability using the KMO test and Bartlett's test of sphericity. This study indicated a KMO measure of sampling adequacy to be 0.781, and Bartlett's test of sphericity was significant (<0.001). This demonstrates that EFA can be used for the data collected in this study (20), as shown in Table 4. Principal axis factoring for the attitude domain indicated a single-domain model; similarly, the EFA fixed the number of factors to a single factor based on the eigenvalue greater than one criterion. Those factors were obtained using the Oblimin method rotation to make the factors more meaningful. This propitiously resulted in single interpretable factors based on the relation between the items and the proposed domain.

Similarly, the validity of the one-factor model was further confirmed by the communalities of each attribute, as all the communalities were close to one. As shown in Figure 2, the scree plot revealed one distinct factor for attitude and two factors for practice. However, the practice section was fixed to one factor, as was proposed in the study.

The initial EFA analysis suggested 12 factors may be extracted based on an eigenvalue of 1 per Kaiser's criteria. Guided by the domain identification stage and the scree plot, only one factor demonstrated the highest eigenvalues were rotated through the force extraction for both attitude and practice domains. All items were found to have acceptable factor loadings.

In the practice domain, the requirement for the EFA was met, as indicated by a KMO value of 0.58, and Bartlett's test of sphericity value was significant ($p = 0.005$). The EFA proceeded by fixing the domain to a single factor. All the items in the practice section had a factor loading of more than 0.3 and were retained.

The reliability of attitude and practice scales items were reported as 0.737 and 0.58, respectively. Similarly, all the items analysis was applied for all scales. Inter-scale item analysis was used for each subscale separately, as shown in Table 5. According to the item analysis results, none of the items needed to be deleted because the Cronbach coefficient of the total questionnaire and the inter-scale Cronbach coefficient did not increase if items were deleted.

Table 4: EFA results of the attitude (A) and practice (B) domains based on pattern matrix

Item	Factor loading	Reliability
(A) Attitude		
Q2	0.381	0.737
Q13	0.185	
Q17	0.434	
Q19	0.595	
Q20	0.503	
Q21	0.630	
Q22	0.533	
Q23	0.718	
Q24	0.744	
Q25	0.599	
Q26	0.291	
(B) Practice		
Q3	0.649	0.69
Q4	0.206	
Q7	0.289	
Q8	0.310	
Q9	0.601	
Q10	0.366	
Q11	0.754	
Q12	0.695	
Q14	0.168	
Q15	−0.209	
Q16	−0.131	
Q18	−0.064	
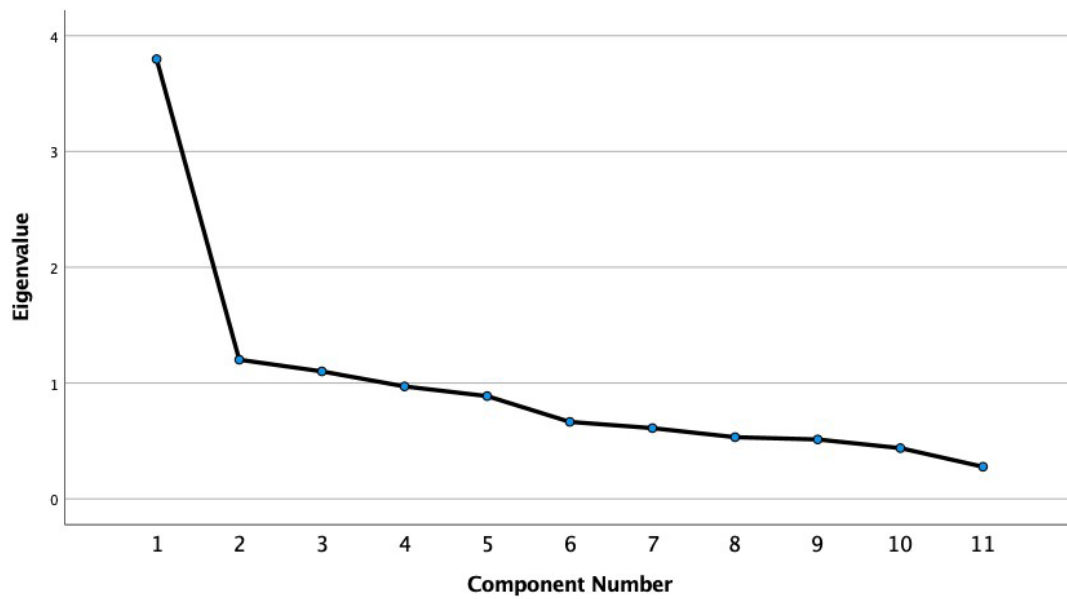
(a)
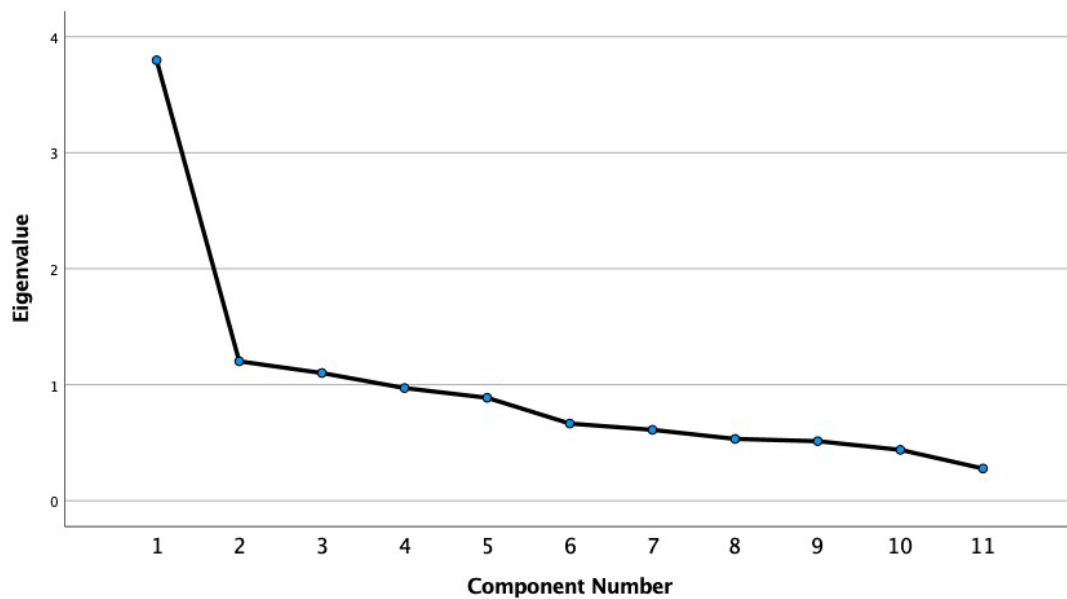
(b)

Figure 2: Scree plots for (a) attitude and (b) practice sections.

Table 5: Item statistics and analysis to attitude and practice questions towards ethical decision-making

Scale	Item	M	SD	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted	Cronbach's for each scale
Attitude	Q2	2.79	0.855	0.378	0.212	0.719	9
	Q5	2.14	1.081	0.112	0.282	0.760	38
	Q6	1.84	0.901	0.154	0.338	0.747	54
	Q13	2.12	0.870	0.283	0.186	0.731	23

(Continued on next page)

Table 5: (*Continued*)

Scale	Item	M	SD	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted	Cronbach's for each scale
	Q17	0.68	0.582	0.387	0.273	0.721	0.737
	Q19	1.21	0.861	0.527	0.353	0.700	
	Q20	0.68	0.602	0.434	0.301	0.717	
	Q21	1.19	0.739	0.524	0.393	0.704	
	Q22	1.31	0.836	0.399	0.326	0.717	
	Q23	0.95	0.803	0.501	0.571	0.705	
	Q24	1.01	0.767	0.560	0.578	0.699	
	Q25	1.34	0.786	0.403	0.408	0.716	
	Q26	0.96	0.907	0.243	0.140	0.736	
Practice	Q1	2.83	0.899	0.111	0.068	0.580	0.690
	Q3	3.71	0.870	0.218	0.422	0.559	
	Q4	2.05	0.774	0.185	0.240	0.565	
	Q7	2.29	0.996	0.203	0.406	0.563	
	Q8	2.29	0.996	0.134	0.405	0.578	
	Q9	3.40	1.039	0.334	0.431	0.533	
	Q10	3.01	0.871	0.363	0.337	0.531	
	Q11	3.19	0.934	0.356	0.571	0.530	
	Q12	3.34	0.866	0.228	0.410	0.557	
	Q14	2.57	1.078	0.325	0.231	0.535	
	Q15	2.26	0.869	0.133	0.167	0.575	
	Q16	0.75	0.650	0.140	0.278	0.571	
	Q18	1.10	0.790	0.123	0.108	0.575	
	Q27	0.97	0.723	0.256	0.200	0.554	

DISCUSSION

This study describes the development of a validated questionnaire with acceptable content and face validity and reliability, examining the attitude and practice of ethical decision-making during a pandemic among medical doctors working in a paediatric setting in Malaysia. The current study showed that the phases of designing, conceptualising, and producing a questionnaire for determining the attitude and practice of medical doctors indicated satisfactory psychometric properties. The process of validating a newly developed questionnaire determines whether the items on the questionnaire characterised the likely domain of content in all aspects. A questionnaire is regarded to be satisfactorily validated when it contains all possible items studying the concept (9). The conclusions drawn from the content validity form the basis of the construct validity and ensure strong evidence of the validity of the questionnaire (21).

The questionnaire items in both attitude and practice domains were subjected to face validation, leading to the refinement of seven items. In addition, some items were removed from the questionnaire as they were considered to lack comprehensibility. The revised items of the redrafted questionnaire comprised the questions with satisfactory accuracy, relevancy, significance, and comprehensibility as indicated by acceptable CVI and face validity index (FVI) values of more than 0.80 (22). The content and face validation processes had significantly removed some items; hence, some of the removed items may represent important attributes of medical professionals' resilience. Regarding the expert opinion and in-depth interview, some items were reworded and rephrased, for instance, the articles on the history of vaccination and the presence of comorbidities.

Similarly, based on the questionnaire's content and face validity evaluation, some items were deleted as they were shown to be problematic in terms of their relevance in assessing the attitude and practice of medical doctors towards ethical decision-making during a pandemic. The use of the extensive interview and expert opinions followed the recommendation of Ghanbari et al. (23). The experts' view on the questionnaire's content validity indicates a diverse opinion of the questionnaire's scope across different backgrounds. Their involvement contributed to the credibility of the questionnaire regarding the items contained in it and the intended domains. Furthermore, the items underwent a reliability analysis that led to the final version of the questionnaire.

The newly developed questionnaire shows a satisfactory level of face and content validity of the different domains with a CVI and FVI greater than 0.80. The development of the questions was in line with pre-set protocol as recommended in other studies conducted across various medical and health sciences covering the literature review, expert views, and presentation, assessment of existing scales and indicators of that domain (10, 24, 25). As recommended in the development and validation process series, all the questionnaire items were constructed simply. The items were positively developed to make the domains less cognitively demanding. The development of the questionnaires involved a thorough and coherent literature review and numerous intense brainstorming sessions among the researchers, resulting in the generation of 32 initial items. The initial questions that were considered were subjected to a thorough content validation process that resulted in the deletion of a few items. The main reason was that the items were less relevant to the resilience domain for medical professionals. The suggestions and comments from the panel of experts and study participants extracted from the qualitative methods could justify the extent to which the questionnaire will be standardised and ensure it is valid and reliable. This is crucial, especially for items with values less than the acceptable cut-off points (26).

The primary area of the content validation was to assess the relevance, description of values, and whether the compilation of items expresses the scope of the subdomain. The other area was on the clarity, easiness, difficulty, and readability status of the items, and that was on the presentation, format, time allocation, general presentation, appropriateness, and suitability of the questionnaire. Poorly performing items were reviewed again by a panel of experts before the items were established for the pilot study. Utilising both qualitative and quantitative analysis of the measurement tool is beneficial as it reaffirms the validity of the newly formed instrument.

The quantitative assessment findings reported that the questionnaire items were evaluated as having excellent face and content validity. It means 87% of the items developed had an I-CVI of 0.78. These findings aligned with the recommendation that the I-CVI of items in a new instrument should be between 0.78 and 0.80 (27). Regarding the number of experts and CVI obtained, the result in the present study was also in line with the recommendation by

Cocchieri et al. (28) who suggested that when there are six or more experts in the panel, the I-CVI should be 0.78 and above. The S-CVI for each section was satisfactory as it achieved the cut-off point of 0.90, except for the practice section (0.88). However, the value obtained was not far below the recommended cut-off point. This finding demonstrated that most of the items were rated as relevant by the panel of experts. The acceptable value of the I-CVI and S-CVI support the content validity of the items in the questionnaire.

Furthermore, in the attitude section, the result of the EFA showed that a one-factor domain of the instrument could represent 72.3% of the total observed variance that was part of the study's hypothesis. For all the items in the attitude section, the factor loadings were above 0.3 except for some items (Q5, Q6, Q13, and Q26), revealing close relations between the domain and statements in the questionnaire. However, these items were retained in the questionnaire due to their relevance and importance in assessing the doctors' ethical decision-making. In the practice section, the analysis also resulted in a good-fitting one-factor model. Similarly, most items have satisfactory factor loading except for Q1, Q4, Q7, Q14, Q5, Q16, Q18, and Q27. The one-factor model extracted in EFA for the attitude and practice domains is explained by 29.21% and 20.83% of the total variance, respectively. The reliability analysis of the attitude and practice domains demonstrated a satisfactory level with acceptable Cronbach's alpha value (>0.5), indicating internal consistency as recommended by Rodrigues et al. (29).

The real possibility for this finding could be because of the limited sample confined to a particular hospital department. Therefore, future research should be conducted in different hospital settings and with diverse participants from various fields of medicine to verify the content and face validity of the questionnaire. Nevertheless, this study provides substantial evidence to support newly developed questionnaires' content and face validity in a medical professional setting. Hence, it is a potential scale to measure healthcare professionals' attitude and practice on ethical decision-making during a pandemic.

In the future, the cut-off values can be decided by examining the available data. There are a few ways to achieve this. The first method is by a standardised score based on mean and standard deviation (z-score). The score is achieved by subtracting the mean from the raw score and divide by the standard deviation. The second option would be from the percentile rank of scores. This is done using classification ranges, and their corresponding percentile rank ranges that are commonly used, i.e. 0th to 24th percentile represents low, 25th to 75th percentile represents average, and 76th to 100th percentile represents high. And the third proposed method is using Ebel's method. This is performed by classifying scores into high (27% of the highest score), low (27% of the lowest score), and average scores (considered after excluding two of the former scores) (30).

CONCLUSION

In this study, a novel instrument was developed and validated to evaluate the ethical decision-making during a pandemic among medical doctors working in a paediatric setting in Malaysia. The participants consider this questionnaire simple, well-received and understood. It could also be applied to subjects from other specialities within the hospital setting without major modifications.

ACKNOWLEDGEMENTS

ETHICAL APPROVAL

This study was approved by the Jawatankuasa Etika Penyelidikan Manusia Universiti Sains Malaysia (JEPeM-USM) with the study protocol of USM/JEPeM/COVID19-37.

REFERENCES

1. Amaran S, Kamaruzaman AZM, Esa NYM, Sulaiman Z. Malaysia healthcare early response in combatting COVID-19 pandemic in 2020. Korean J Fam Med. 2021;42(6):425–37. https://doi.org/10.4082/kjfm.20.0117

2. Hashim JH, Adman MA, Hashim Z, Mohd Radi MF, Kwan SC. COVID-19 epidemic in Malaysia: epidemic progression, challenges, and response. Front Public Health. 2021;9:560592. https://doi.org/10.3389/fpubh.2021.560592

3. Farsalinos K, Poulas K, Kouretas D, Vantarakis A, Leotsinidis M, Kouvelas D, et al. Improved strategies to counter the COVID-19 pandemic: lockdowns vs. primary and community healthcare. Toxicol Rep. 2021;8:1–9. https://doi.org/10.1016/j.toxrep.2020.12.001

4. Martin K, Bickle K, Lok J. Investigating the impact of cognitive bias in nursing documentation on decision-making and judgement. Int J Ment Health Nurs. 2022;31(4):897–907. https://doi.org/10.1111/inm.12997

5. Iserson KV. Healthcare ethics during a pandemic. West J Emerg Med. 2020;21(3):477–83. https://doi.org/10.5811/westjem.2020.4.47549

6. Robert R, Kentish-Barnes N, Boyer A, Laurent A, Azoulay E, Reignier J. Ethical dilemmas due to the Covid-19 pandemic. Ann Intensive Care. 2020;10(1):84. https://doi.org/10.1186/s13613-020-00702-7

7. Gregory R, Muntermann J. Theorizing in design science research: inductive versus deductive approaches. In: Galletta DF, Liang TP, editors. Proceedings of the International Conference on Information Systems, ICIS 2011; 2011 Dec 4–7; Shanghai, China. Atlanta, GA: Association for Information Systems; 2011. p. 1–17.

8. Goni MD, Naing NN, Hasan H, Wan-Arfah N, Deris ZZ, Arifin WN, et al. A confirmatory factor analysis of the knowledge, attitude and practice questionnaire towards prevention of respiratory tract infections during Hajj and Umrah. BMC Public Health. 2020;20(1):1684. https://doi.org/10.1186/s12889-020-09756-5

9. Boateng GO, Neilands TB, Frongillo EA, Melgar-Quiñonez HR, Young SL. Best practices for developing and validating scales for health, social, and behavioral research: a primer. Front Public Health. 2018;6:149. https://doi.org/10.3389/fpubh.2018.00149

10. Goni MD, Naing NN, Hasan H, Wan-Arfah N, Deris ZZ, Arifin WN, et al. Development and validation of knowledge, attitude and practice questionnaire for prevention of respiratory tract infections among Malaysian Hajj pilgrims. BMC Public Health. 2020;20(1):189. https://doi.org/10.1186/s12889-020-8269-9

11. Polit DF, Beck CT, Owen SV. Is the CVI an acceptable indicator of content validity? appraisal and recommendations. Res Nurs Health. 2007;30(4):459–67. https://doi.org/10.1002/nur.20199

12. Rahman MA, Yusoff MSB, Roslan NS, Mohammad JA-M, Ahmad A. Development and validation of the medical professionals resilience scale. BMC Health Serv Res. 2021;21(1):482. https://doi.org/10.1186/s12913-021-06542-w

13. Abdul Kadir A, Mohd Noor N, Mukhtar AF. Development and validation of the knowledge and attitude regarding childhood vaccination (KACV) questionnaire among healthcare workers: the Malay version. Hum Vaccin Immunother. 2024;17(12):5196–204. https://doi.org/10.1080/21645515.2021.1989915

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

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

16. Yang Y, Green SB. Coefficient alpha: a reliability coefficient for the 21st century? J Psychoeduc Assess. 2011;29(4):377–92. https://doi.org/10.1177/0734282911406668

17. Taber KS. The use of Cronbach's alpha when developing and reporting research instruments in science education. Res Sci Educ. 2018;48(6):1273–96.

18. Spiliotopoulou G. Reliability reconsidered: Cronbach's alpha and paediatric assessment in occupational therapy. Aust Occup Ther J. 2009;56(3):150–5. https://doi.org/10.1111/j.1440-1630.2009.00785.x

19. An L, Bacon E, Hawley S, Yang P, Russell D, Huffman S, et al. Relationship between coronavirus-related eHealth literacy and COVID-19 knowledge, attitudes, and practices among US adults: web-based survey study. J Med Internet Res. 2021;23(3):e25042. https://doi.org/10.2196/25042

20. Kaiser HF. An index of factorial simplicity. Psychometrika. 1974;39(1):31–6. https://doi.org/10.1007/BF02291575

21. Cheraghi F, Hassani P, Yaghmaei F, Alavi-Majed H. Developing a valid and reliable self-efficacy in clinical performance scale. Int Nurs Rev. 2009;56(2):214–21. https://doi.org/10.1111/j.1466-7657.2008.00685.x

22. Hou T, Zeng W, Yang M, Chen W, Ren L, Ai J, et al. Development and evaluation of a rapid CRISPR-based diagnostic for COVID-19. PLoS Pathog. 2020;16(8):e1008705. https://doi.org/10.1371/journal.ppat.1008705

23. Ghanbari S, Ramezankhani A, Montazeri A, Mehrabi Y. Health literacy measure for adolescents (HELMA): development and psychometric properties. PLoS One. 2016;11(2):e0149202. https://doi.org/10.1371/journal.pone.0149202

24. Yusoff MSB. ABC of content validation and content validity index calculation. Educ Med J. 2019;11(2):49–54. https://doi.org/10.21315/eimj2019.11.2.6

25. Yusoff MSB. ABC of response process validation and face validity index calculation. Educ Med J. 2019;11(3):55–61. https://doi.org/10.21315/eimj2019.11.3.6

26. Bulsara C, Timler A. Using a mixed methods approach. Brightwater group research centre; 2020 [cited 2022 Oct 13]. Available from: https://www.notredame.edu.au/__data/assets/pdf_file/0031/157972/Intro-to-mixed-methods-part-1.pdf

27. Mallah N, Rodriguez-Cano R, Figueiras A, Takkouche B. Design, reliability and construct validity of a knowledge, attitude and practice questionnaire on personal use of antibiotics in Spain. Sci Rep. 2020;10(1):20668. https://doi.org/10.1038/s41598-020-77769-6

28. Cocchieri A, Magon G, Cavalletti M, Cristofori E, Zega M. Exploring hospital compliance with the primary nursing care model: validating an inventory using the Delphi method. BMC Nurs. 2021;20(1):188. https://doi.org/10.1186/s12912-021-00712-1

29. Rodrigues F, Hair JF, Neiva HP, Teixeira DS, Cid L, Monteiro D. The basic psychological need satisfaction and frustration scale in exercise (BPNSFS-E): validity, reliability, and gender invariance in Portuguese exercisers. Percept Mot Ski. 2019;126(5):949–72. https://doi.org/10.1177/0031512519863188

30. Yusoff MSB, Arifin WN, Hadie SNH. ABC of questionnaire development and validation for survey research. Educ Med J. 2021;13(1):97–108. https://doi.org/10.21315/eimj2021.13.1.10