

Development and Pilot Validation of a Knowledge, Attitude, and Practice (KAP) Questionnaire on Acute Febrile Illness among Patients in a Tertiary Care Hospital in India

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ABSTRACT

Background

Acute febrile illness (AFI) is a serious public health concern in India which includes diseases like dengue, malaria, and typhoid. Understanding patient knowledge, attitudes, and practices (KAP) is critical for effective disease care and prevention.

Aim

This study aims to develop, and pilot validate a comprehensive, culturally appropriate KAP questionnaire on AFI for patients attending a tertiary care hospital in India.

Materials and methods

A prospective, cross-sectional questionnaire development and pilot validation study was conducted at a tertiary care hospital in Bareilly, India. The questionnaire was developed through systematic literature review of previously validated AFI-related KAP instruments, followed by expert panel review. The preliminary questionnaire, developed by literature search was evaluated for relevancy and compatibility with Indian patients and further reduced to 23 items. The questions addressing knowledge (multiple-choice questions), attitudes (5-point Likert scale), and practices (Likert scale) for AFI including dengue, malaria, and typhoid were included. A pilot study was conducted with 30 adult participants (≥ 18 years) presenting with fever for less than two weeks' duration. The questionnaire was utilised bilingually (English and Hindi) via Google Forms. Pilot testing assessed feasibility, comprehension, completion time, and preliminary reliability among Indian Patients. Based on pilot findings, the questionnaire underwent systematic refinement for large scale study.

Results

The pilot study effectively revealed opportunities for improvement, such as simplifying medical terminology, removing redundant items, rewording questions with ceiling or floor effects, and improving cultural appropriateness. Participants reported that they understood the bilingual content well generally, while some technical phrases needed to be simplified further. The average completion time was 10-15 minutes, which was considered satisfactory. Preliminary reliability analysis guided item retention and alteration decisions. The resultant 23-item questionnaire revealed enhanced content validity, intelligibility, and cultural relevance while still covering all KAP areas related to AFI in the Indian setting.

Conclusion

A standardized, bilingual KAP questionnaire on acute febrile illness has been successfully developed and pilot validated for use among adult patients in Indian tertiary care settings. The questionnaire addresses common AFI relevant to the Indian epidemiological context. This validated tool provides a foundation for larger-scale KAP assessment studies and can inform targeted health education interventions for AFI prevention and control.

Keywords: Acute febrile illness; Knowledge, attitudes, and practices; Questionnaire validation; Pilot study.

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Introduction

Acute febrile illness (AFI) is a typical clinical presentation marked by a sudden onset of fever lasting two to three weeks. AFI can be recognized by the sudden onset of fever along with additional symptoms

such as chills, headache, muscle aches, lethargy, and malaise [1]. The fever may occur unexpectedly and without any obvious signs [2]. Fever is accompanied by a variety of non-specific symptoms, including headache, body pains, chills, sweating, weariness,

cough, sore throat, gastrointestinal disturbances, and more [3].

The management and control of AFI are dependent not only on healthcare infrastructure and diagnostic skills, but also on patient knowledge, attitudes, and practices (KAP) for AFI [4]. To create effective public health programs and improve illness outcomes, it is important to know how people in the community think, what they know, and how they seek health care [5]. Researchers have shown that not knowing enough about how diseases spread, not taking the right precautions, and waiting too long to get medical help all make diseases spread and cause more problems [6]. In the Indian setting, where healthcare literacy varies widely across social strata and geographical regions, measuring KAP becomes even more critical for targeted health education and behavior modification interventions.

Despite the recognized importance of KAP evaluation, there is limited availability of validated, culturally relevant questionnaires which are specifically designed to evaluate KAP for AFI in the Indian population. Most existing surveys are either disease-specific; focused primarily on dengue or malaria, performed with other geographical contexts, or lack sufficient validation in Indian settings [7]. Furthermore, many existing techniques do not directly address the spectrum of AFI in India, where patients and healthcare providers must differentiate among numerous febrile disorders [8]. The absence of a standardized, validated questionnaire that covers the broader category of AFI while being contextually appropriate to Indian healthcare settings constitutes a substantial gap in public health research and practice. Questionnaire development and validation is a thorough, multi-step procedure that assures the questionnaire effectively assesses the targeted constructs while remaining reliable, valid, and appropriate for the target population [9]. The procedure includes comprehensive literature review, selection of questions, expert review, pilot testing, and psychometric evaluation. For health-related surveys, content validity and face validity are particularly essential [10]. There are additional challenges in multicultural, multilingual environments, such as India. It includes language validation, cultural adaptation, and assuring accessibility across different literacy levels [11].

Pilot testing is important to develop questionnaire preparation mainly for assessing feasibility, identifying challenging questions, evaluating answers, and providing preliminary data on reliability and validity [12]. A well-conducted pilot study can easily identify practical challenges in questionnaire applications, highlight items that respondents find confusing or objectionable, and indicate technological

issues with data gathering methods [13]. Pilot testing in real world population assures the final applicability of questionnaire during primary study.

Tertiary care hospitals in India act as key healthcare hubs, serving a heterogeneous patient population that includes both referral complex cases and walk-in patients seeking primary care for acute diseases. These hospitals are suitable for AFI-KAP study due to large number of febrile patients, represent a diverse socioeconomic background, and have the infrastructure for systematic data collecting [14]. Understanding KAP among patients presenting to tertiary care centers can guide hospital-level assessment protocol and broaden public health measures for managing AFI [15].

The current study aimed at overcoming the observed gap by creating and pilot verifying a thorough KAP questionnaire on AFI adapted to the Indian healthcare system. This questionnaire provides a comprehensive assessment tool which can be used across a wide range of clinical and research. Such questionnaires can be combined with several prevalent febrile disorders such as dengue, malaria, and typhoid. The development procedure adhered to recognized methodological principles, including a thorough literature analysis, expert panel evaluation, and rigorous pilot testing. The questionnaire's bilingual character increases its accessibility and potential for widespread use throughout North India. This report discusses the systematic development process and offers the results of a pilot validation study conducted on adult patients at a tertiary care hospital in Bareilly, India.

The study aimed to develop a comprehensive knowledge, attitude, and practice (KAP) questionnaire consisting of 23 questions. The structure will be developed after reviewing multiple validated studies.

Material and methods

A prospective, cross-sectional questionnaire development and hospital-based pilot testing study was conducted. A comprehensive literature review was performed to collect, identify and evaluate previously validated questionnaires assessing knowledge, attitudes, practices, and treatment-seeking behaviour of AFI. The preliminary questionnaire was developed from literature search and the validated-on recommendations of expert committee who reviewed for content relevance, clarity, and difficulty level. The expert panel consisting of an epidemiologist, infectious disease specialist, statistician, and biomedical scientist. Based on recommendations, the questionnaire was reduced to 23 questions, and each question was adapted to suit the Indian context of AFI, covering diseases like dengue, malaria, and typhoid. The Likert scale was used for Attitude and Practice to measure the intensity of agreement or frequency of actions among respondents.

Inclusion criteria:

- Adults ≥ 18 years with fever < 2 weeks, who visited the hospital's during the study period and were willing to provide informed consent.

Exclusion criteria:

- Individuals under the age of 18, patients admitted to hospital wards or intensive care units (ICUs), and those who refuse or are unable to provide informed consent to participate in study.

A pilot study was conducted with 30 participants through a Google Form to test the questionnaire's reliability, feasibility, and participant understanding. Ethical clearance was obtained from Clara Swain Hospital, Bareilly, prior to commencement of the study. All subjects provided written informed consent prior to data collection. Participation was entirely

voluntary, and all participant information was kept totally personal and anonymous throughout the study. The form included bilingual content and was circulated among a small sample of adult patients visiting a tertiary care hospital in Bareilly. Initially, 12 questions were selected for pilot testing: 4 Knowledge (MCQ), 4 Attitude (Likert scale), 4 Practice (Likert scale). Based on the outcomes of pilot study, modifications were made to increase the questionnaire's validity and reliability. After analyzing the outcomes of pilot study, a standardized questionnaire was designed to collect relevant information from participants.

The questionnaire was prepared bilingually (English and Hindi) to ensure inclusivity and better comprehension for participants from varied literacy backgrounds. Language experts reviewed the Hindi translation to ensure accuracy and cultural appropriateness.

The study flow was mentioned in figure 1.

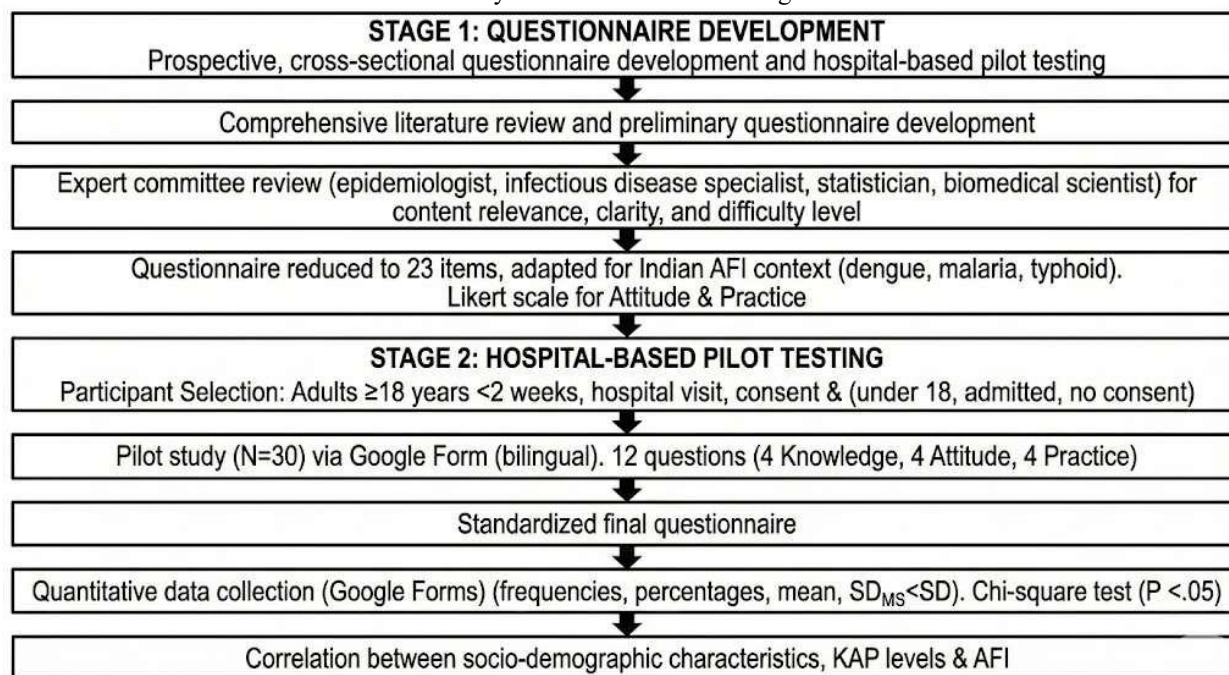


Figure 1. Study flow diagram.

The quantitative data from the google forms based survey was collected into a Ms-excel, statistical software program used to analyse the study outcomes. Descriptive statistics such as frequencies, percentages, mean values, and standard deviations were utilised to summarize the study participants' sociodemographic characteristics, levels of KAP for AFI. The Chi-square test (for categorical variables) was used to investigate the correlation between socio-demographic characteristics, KAP levels and AFI. A *P* value of < 0.05 was judged statistically significant.

Results

The pilot study recruited 30 individuals, 20 (66.7%) of whom were men and 10 (33.3%) of whom were women. The participants' average age was 31.3 ± 8.5 years.

Table 1. Sociodemographic Characteristics of Study Participants.

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	20	68
	Female	10	32

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Age group (years)	18–30	16	53.33
	31–40	10	33.33
	41–60	4	13.33
Education level	Illiterate	3	10.00
	Primary	2	6.00
	Secondary	3	10.00
	Graduate	8	26.66
	Postgraduate	14	46.66

Overall knowledge regarding AFI etiology and dengue transmission was satisfactory, though knowledge gaps were identified in understanding the definition of AFI and role of typhoid vaccination, indicating areas requiring targeted health education.

Table 2. Knowledge of Acute Febrile Illness among Participants.

Question	Correct Response (%)	Interpretation
Meaning of AFI	56	Moderate awareness; misconceptions present
Common causes of AFI	72	Good knowledge of malaria, dengue, typhoid
Dengue transmission	96	Very good awareness
Typhoid vaccination	56	Moderate awareness; gaps regarding vaccine protection

Participants demonstrated a positive attitude towards early treatment, prevention, and community participation. However, the moderate perception of AFI severity suggests a need to reinforce risk communication as shown in table 3.

Table 3. Attitude Towards AFI Prevention and Treatment.

Item	Dominant Response (%)	Interpretation
Early treatment prevents complications	96 (Agree/Strongly Agree)	Strong positive attitude
Willingness to join mosquito control programs	92 (Agree/Strongly Agree)	High community engagement
Self-medication is effective	40 (Disagree/Strongly Disagree)	Awareness of appropriate care
AFI is a serious health problem	68 (Agree/Strongly Agree)	Moderate perception of severity

Preventive practices such as mosquito control and early medical consultation were reasonably followed. However, vaccination coverage and consistent repellent use remain suboptimal (Table 4).

Table 4. Preventive and Treatment-Seeking Practices Related to AFI.

Practice	Good Practice (%)	Interpretation
Regular use of mosquito repellents	64	Moderate preventive behavior
Typhoid vaccination	48	Suboptimal vaccination uptake
Elimination of standing water	72	Good preventive practice
Prompt medical consultation for fever	84	Appropriate health-seeking behavior

The descriptive analysis showed mean knowledge score of 2.80 ± 0.92 , the mean attitude score was 16.8 ± 2.4 , and the mean practice score was 14.6 ± 3.1 . The relationships between sociodemographic factors and KAP domains were investigated using the Chi-square test. There was no statistically significant correlation between knowledge scores and educational status ($\chi^2 = 1.89$, $p = 0.17$). Similarly, there was no statistically significant correlation between knowledge level and gender ($\chi^2 = 0.60$, $p = 0.44$). Gender ($\chi^2 = 0.00$, $p = 1.00$) and reported past exposure to AFI-related information ($p > 0.05$) did not substantially correlate with attitude scores as shown in table 5.

Table 5. Mean \pm SD Scores of Knowledges, Attitude, and Practice Domains (n = 30)

Domain	No. of Items	Possible Score Range	Mean \pm SD
Knowledge	4	0–4	2.80 ± 0.92
Attitude	4	4–20	16.8 ± 2.4
Practice	4	4–20	14.6 ± 3.1

Higher education level showed a trend toward better knowledge and attitude scores, though statistical significance was not achieved, likely due to the small pilot sample size. Table 6 shows association with sociodemographic variables with KAP.

Table 6. Association of Sociodemographic Variables with Knowledge, Attitude, and Practice (KAP) Levels Related to AFI.

Variable	KAP Domain	Category	Good / Positive n (%)	Moderate–Poor / Less Positive n (%)	χ^2	p-value
Education level	Knowledge	Lower education (n = 7)	2 (28.6)	5 (71.4)	1.89	0.17
		Higher education (n = 23)	14 (60.9)	9 (39.1)		
Gender	Knowledge	Male (n = 20)	13 (65.0)	7 (35.0)	0.60	0.44
		Female (n = 10)	9 (90.0)	1 (10.0)		
Gender	Attitude	Male (n = 20)	14 (70.0)	6 (30.0)	0.00	1.00
		Female (n = 10)	7 (70.0)	3 (30.0)		
Gender	Practice	Male (n = 20)	14 (70.0)	6 (30.0)	0.19	0.67
		Female (n = 10)	6 (60.0)	4 (40.0)		

Reliability analysis was conducted section-wise to preserve construct validity of Knowledge, Attitude, and Practice domains. The internal consistency of the KAP questionnaire was tested using Cronbach's alpha. The Knowledge portion indicated moderate reliability ($\alpha = 0.50$), the Attitude section showed low to moderate reliability ($\alpha = 0.47$), and the Practice section demonstrated satisfactory reliability ($\alpha = 0.67$). As this was pilot research, the acquired results were regarded sufficient for further improvement of the tool (Table 7).

Table 7. Cronbach's Alpha Results.

Section	Cronbach's Alpha (α)	Interpretation
Knowledge (K)	0.50	Moderate / acceptable for pilot
Attitude (A)	0.47	Low–moderate (acceptable in pilot)
Practice (P)	0.67	Acceptable internal consistency

Discussion

The pilot validation study of the KAP questionnaire on AFI provided useful information that helped develop and finalize the questionnaire. The pilot phase, which was conducted with 30 participants via a digital platform, served its intended objective of identifying practical issues, assessing participant comprehension, and evaluating the questionnaire's preliminary reliability and feasibility in the target demographic. One of the key objectives of the pilot testing was to determine if the selected items were clearly easily understood by respondents from various educational and socioeconomic classes. However, comments suggested that specific medical terms, even when translated into Hindi, required further simplification or the addition of explanatory sentences to ensure universal comprehension [16].

The application of Google Forms for pilot testing proved beneficial, with few challenges. Digital administration enabled quick collection of information, automatic response logging, and easy delivery to the target audience [17].

The analysis of response patterns throughout the pilot identified issues which needed to be changed. Certain multiple-choice questions in the knowledge component demonstrated ceiling effects, with nearly all participants selecting the correct answer, indicating a lack of discriminatory power. These items were consequently changed to offer distinct options that

distinguish different levels of expertise [18]. Conversely, some questions showed floor effects, with most participants answering inaccurately, implying either poor question creation or low awareness in the community. Questions in the latter category were preserved but reworded for clarity since they addressed significant knowledge gaps that required intervention [17].

The attitude part, which used a 5-point Likert scale, generally did an excellent job of reflecting the range of beliefs and attitudes of AFI. However, pilot participants identified some repetition among key attitude questions, prompting consolidation and refinement to reduce respondent burden while retaining content validity [19]. The practice section, which used Likert scaling to quantify the frequency of health-related behaviors, found some interesting patterns. Some preventive actions elicited socially desirable responses, with individuals potentially exaggerating positive behaviors. This well-documented phenomena in health behavior research emphasizes the significance of precise language and, where appropriate, triangulation with objective measurements or proxy indicators [20].

During the pilot study, questionnaire filling time was noted, and most participants utilized 10-15 minutes to complete the 12-item questionnaire [21]. Based on the test results, it was decided to expand the final questionnaire up to 23 items while keeping the entire completion time within 20 minutes. Although the

small-scale pilot sample size hampered the internal consistency study, it provides preliminary indications of reliability for the knowledge, attitude, and practice subscales. Items with weak connection to their respective subscales were indicated for adjustment or removal [22].

The knowledge, attitude, and practice (KAP) domains of the questionnaire showed satisfactory clarity, internal consistency, and practicality overall, according to the pilot study's findings; however, minor modifications were suggested to improve content relevance and comprehension. Following expert review and pilot testing, the final version of the KAP questionnaire for acute febrile illness (AFI) has been revised to include 23 items: four knowledge items, four attitude items, four practice items, and extra demographic factors. The modified questionnaire was determined to be convenient to use, culturally appropriate, and suitable for assessing KAP associated with AFI in the local research population. The pilot results suggest the implementation of this questionnaire in a larger, appropriately powered evaluation to assess its psychometric qualities.

A thorough literature study, expert panel evaluation, and pilot testing in the target population were all part of the methodical development process. It validated the questionnaire's psychometric adequacy while subject matter experts evaluated each item's appropriateness, relevance, and clarity to ensure the questionnaire content validity. The questionnaire's 100% response rate, absence of missing data, and uniform response patterns in the knowledge, attitude, and practice domains all attest to its excellent acceptance and face validity. Additionally, the observed score distributions and the acceptable degree of variation in KAP scores imply that the tool may distinguish between various degrees of acute febrile illness-related knowledge, attitudes, and practices. The findings from pilot study provide preliminary evidence of the questionnaire's feasibility and construct relevance. Thorough psychometric testing such as factor analysis and reliability coefficients were not conducted due to the small sample size of pilot study. Future research with larger samples is required to evaluate the internal consistency, factor structure, and measurement invariance of the designed questionnaire in real world.

The questionnaire was thoroughly refined based on the complete examination of pilot study outcomes, which included quantitative metrics, qualitative participant input, and expert panel deliberation. The final 23-item measure included the tripartite framework of assessing knowledge (by multiple-choice questions), attitudes (5-point Likert scales), and practices (via frequency-based Likert scales) associated with AFI. Each question was carefully evaluated for clarity,

culturally appropriateness, and relevance for the Indian setting, notably addressing prevalent febrile infections like dengue, malaria, and typhoid [23].

The final questionnaire demonstrates an acceptable balance between scientific rigor and practical application. It is sufficiently detailed to convey the multidimensional character of KAP's approach to AFI while remaining simple enough to reduce respondent difficulties [24].

In conclusion, the pilot validation step was critical in transforming a theoretically sound but untested instrument into a refined, user-tested questionnaire suited for widespread application. The continual cycle of development, pilot testing, and refining incorporates best practices in psychometric instrument development and affirms that the final KAP questionnaire for AFI is both scientifically robust and culturally relevant for the Indian healthcare sector [25], [26].

The findings indicate generally satisfactory knowledge and positive attitudes toward AFI, with moderate preventive practices. Given the pilot nature and limited sample size, inferential findings should be interpreted with caution and primarily used to inform the design and sample size estimation of the main study.

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