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Opinion

A Practical Guide for Designing and Conducting Knowledge, Attitude, and Practice Studies Focusing on Audio-Speech Field

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Abstract

The Knowledge, Attitude, and Practice (KAP) model help understand behavioral trends by analyzing the intersection of knowledge acquisition, attitudinal shifts, and behavioral implementation in a target population. This study explores the significance of KAP studies, particularly in the context of audio-speech fields, offering a practical guide for health professionals. This study outlines critical components of KAP questionnaire design and emphasizes its role in effectively gauging and impacting behaviors and beliefs concerning audio-speech practices. The current study also provides a practical guide for designing, administering, and validating KAP studies to improve its validity and comparability. Through illustrative examples, the study advocates for the careful formulation of questions to ensure clarity and relevancy tailored to the specifics of the target population. Moreover, it underscores the importance of preliminary literature reviews, expert panel consultations, and pilot testing to refine the questionnaire and enhance its effectiveness. Practical steps for conducting a KAP study, such as sample size determination, data collection procedures, and ethical consideration, are detailed to ensure rigorous research methodology. This approach helps collect baseline data, allocate resources effectively, and evaluate interventions. Ultimately, by following this structured guide, researchers can conduct more informative KAP studies, contributing valuable insights into the field of audio-speech sciences.

Keywords: Attitudes, Health knowledge, Humans, Practice, Research design, Sample size, Speech, Surveys and questionnaires, Therapy

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Introduction

KAP

Knowledge, Attitude, and Practice (KAP) model is based on the theory that accepting an innovation within a social system requires acquiring knowledge, persuasion, decision-making, and confirmation (1). It highlights the importance of community in shaping behavior (2) and the relationship between behavioral intention and attitude (3). This model provides a systematic approach to understanding the behaviors of the target population regarding a specific issue and is employed in various decision-making contexts across diverse fields. Consequently, KAP studies are considered effective and fundamental in many sciences, particularly public health (4).

KAP study

A KAP study is a representative, quantitative study that employs a valid questionnaire to gather information on KAP concerning a specific topic within a particular population (5). This research methodology not only assesses the level of knowledge but also uncovers beliefs and misconceptions that may serve as barriers to behavioral change related to the subject matter. KAP studies were initially employed in family planning and population research within the healthcare system (6). However, due to their widespread acceptance and effectiveness, they are now considered fundamental tools in health research (4). The significance and methodology of these studies have led to the development diverse implementation protocols across various health fields, including ophthalmology (7), psychology (6), and pediatrics (8). The World Health Organization (5) has published a comprehensive guideline for conducting KAP studies on infectious diseases such as tuberculosis (5).

In addition to the main questions section, a KAP questionnaire includes a specific title (see first step), a brief introduction outlining the evaluation's purpose, instructions for responding tailored to the target group, and a section for collecting demographic and background information. Questionnaires can be designed as semi-structured or, more commonly, structured. It can be administered by an interviewer or be self-completed. Quantitative and qualitative data can be obtained from these questionnaires (6).

Although the flexibility of questionnaire design to rapidly collect data is advantageous, the various methods employed, lack of standardization, question design, and reliance on researcher-generated data may compromise the validity of the questionnaires and overlook critical questions and uncertainties about the issues.

This study hangs on the target population and study objectives, and despite the general similarities in the available guidelines, a tailored methodology for particular fields could be effective in structuring and generalizing studies within those areas; as a result, various fields of medical sciences have introduced similar guidelines to clarify the basic concepts in conducting studies by providing examples related to the field in question.

Therefore, unlike other studies, the absence of standardized guidelines for reporting KAP studies frequently results in methodological inconsistencies and may produce unreliable findings (4). Thus, guidelines are provided on a case-by-case basis specific to a particular specialty or disease (5).

Although professionals' knowledge and attitudes in various fields of audiology and speech sciences directly impact public health, they can also influence social attitudes and culture and sometimes help reduce social stigma. Compared to other health system sectors, such as nursing, research in this area is relatively limited (9). This review provides a concise guideline and integrated examples, particularly focusing on the important and often overlooked area of sign language. The aim is to draw the attention of researchers in the field to this type of study.

Therefore, this study addresses these challenges by providing a practical guide to improve the validity and comparability of KAP questionnaires, given the importance of the speed and ease of conducting KAP studies. This study focuses on questionnaire design, implementation, and reporting. For each aspect, examples are provided to simplify adherence to the proposed research. By following these recommendations, researchers can conduct more rigorous and informative KAP studies (6,10).

Applications of KAP

KAP studies provide insights into the current state or a specific topic under investigation, offering valuable

perspectives on previously unexplored areas that lack empirical data. Consequently, it is recommended that KAP studies be conducted before implementing any interventions or making decisions. This approach enables the collection of baseline data on the target population, which can then be utilized for decision-making, allocating financial and human resources, and monitoring and evaluating subsequent interventions. For instance, while research has demonstrated the efficacy of immersive technologies in enhancing educational practices for the deaf and hard of hearing (11), it is essential to assess the knowledge, attitudes, and practices of the relevant professionals and gainers before integrating these methods into educational systems (6,10,12).

Furthermore, KAP assessments conducted during program implementation, in response to emerging events, and at program completion are invaluable in determining the efficacy and effectiveness of a program or the impact of an event on the target population (5).

The ease, cost-effectiveness, and adaptability of KAP studies to diverse populations on a large scale allow the collection of extensive and varied data within single research. These have solidified KAP as a crucial and efficient tool in designing programs to enhance public knowledge of health-related concepts. Additionally, the relatively straightforward implementation compared to other qualitative methods makes KAP an accessible research tool for students (7,8).

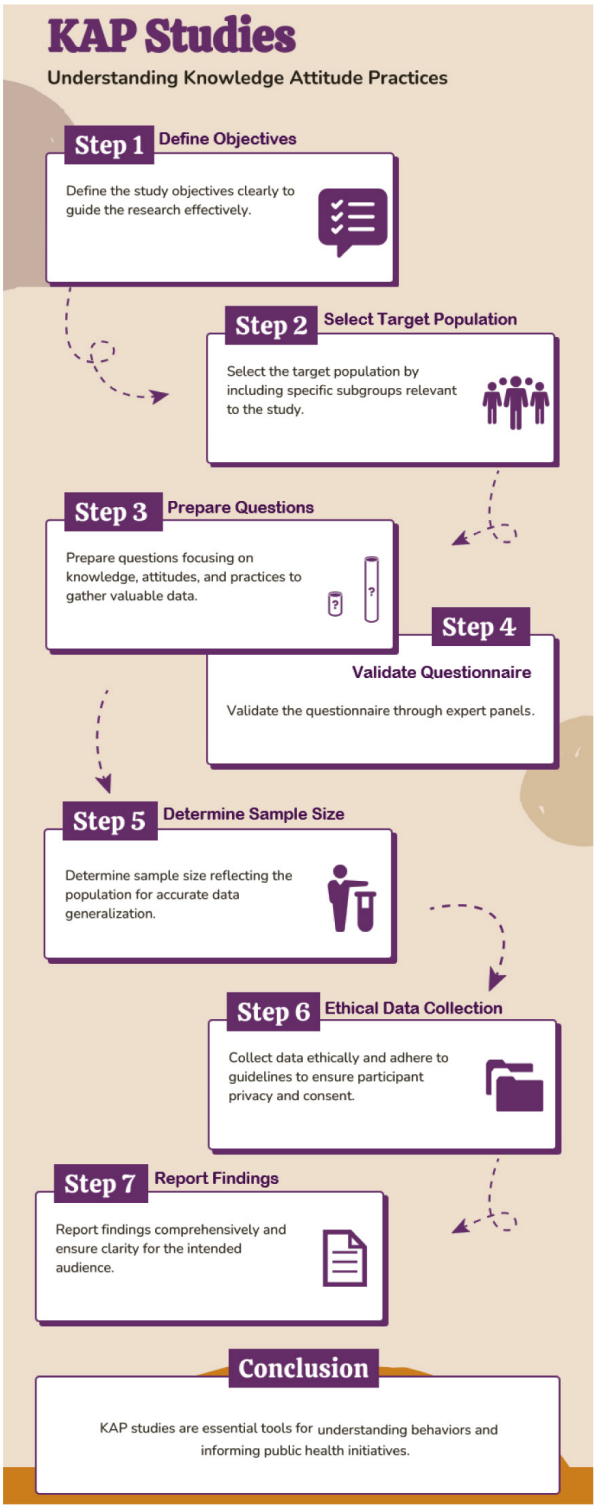

Figure 1. The steps of Implementing the KAP study.

KAP Design Steps

A thorough literature review before designing and implementing a KAP study justifies the need for such research. It provides valuable insights into the target population's knowledge, beliefs, and behaviors. Research teams should clearly define the rationale for selecting a KAP methodology over other assessment approaches (4-6).

Study objectives and title preparation

A fundamental step (Figure 1) in a KAP study is the precise and explicit determination of the research objective, its application, and the final beneficiaries of the research results. This step is crucial for defining the target population, the scope of the questions, and the extent of knowledge. For instance, a study designed to evaluate the knowledge, attitudes, and practices of speech-language pathologists and audiologists regarding the use of sign language in rehabilitation interventions would focus on clinicians as the target population and questions related to their expertise and knowledge. This example will be followed

throughout the protocol discussion to illustrate the process. When selecting a title, be ensured that it specifies the target population, the subject of inquiry, and the specific domains are explored (knowledge, attitudes, practices, or a combination thereof).

Example of a title: Knowledge, attitudes, and practices of speech-language pathologists and audiologists regarding the use of sign language in rehabilitation interventions

Target population

The target population in KAP studies is selected based on the study's objectives. It may encompass the general population (non-experts regarding the topic under investigation) or a specialized community. In both cases, dividing each population into smaller segments may be beneficial. In such instances, the inclusion criteria for the target population should be clearly defined. In a given example, only a subset of specialists who provide clinical services will be included in the target population. Consequently, many healthcare professionals unfamiliar with sign language or individuals with hearing impairments who do not offer clinical services in this area would be classified as part of the general population. However, in other studies in the field of hearing and speech, a portion of the specialized population might be included. In general, the specialized population in the field of hearing and speech consists of individuals responsible for providing services in this area. This group includes audiologists, speech-language pathologists, and other professionals involved in various speech and hearing disorders within the specific context or setting. The general population, commonly considered the recipients of healthcare services in health studies, may also be subdivided into subgroups based on factors such as age, education level, type of disorder, and cultural, social, and geographic characteristics, depending on the study objectives (6,13).

Example of target population: Audiologists and speech-language pathologists who work in a clinical setting

Question preparation, answering format, and ccoring

Before designing the questions, it is essential to determine the proportion of each section of the questionnaire according to the study objectives. Occasionally, implementation conditions and the subject matter's nature may necessitate removing a certain section of the questionnaire (*i.e.,* the practice section). To this end, based on an initial literature review and expert panels, the extent of knowledge, the importance of attitudes, and the prevalence of behavior (whether the topic has led to behavior) determine the weight of each section. Under typical conditions, an equal proportion of each section is appropriate.

In the first step, by utilizing similar studies, examining the knowledge within the study population, and conducting expert panel sessions, each question is assigned a source linked to the primary or secondary objectives associated with a relevant questionnaire section. Therefore, each question will have a separate identity.

Then, in the questionnaire design, using simple, concise, and unambiguous language can aid respondents in understanding the questions more easily, resulting in more accurate responses. The devised questions must consider the characteristics and sensitivities of the target population, avoiding any references to gender, religious, or minority sensitivities. Furthermore, the questions should not be phrased to lead or guide the respondent toward a particular answer. Ensuring that each question assesses only a single topic is important, thus avoiding compound questions. For instance, asking respondents to rate the use of sign language in rehabilitating a child's cognitive and expressive abilities would be problematic, as the respondent would not be able to distinguish between the two aspects, leading to imprecise answers. Instead, this example should be presented as two separate questions.

Approximately, three of the final questions will be prepared at this stage, considering each section's weighting.

The next step involves validating the initial questions in the expert panel and determining the response format for each question. Generally, responses in a KAP study can take various forms, including multiple-choice, yes/no, Likert scale, fill-in-the-blank, short description, or a combination of the abovementioned methods. It is believed that using diverse response

formats can contribute to engaging respondents, and consequently, enhance the accuracy of the responses. Furthermore, employing open-ended questions through interviews is more suitable and effective in instances where the researcher seeks a deeper understanding of the subject matter. Considering the differences in response formats across questionnaire sections, this will be presented separately in the KAP sections (Table 1).

Questionnaire

Knowledge section: The questions in this section were designed to assess the knowledge related to the main topic within the target group, and due to their impact on individual beliefs and actions, they hold significant importance in result analysis (4). The first step in designing questions for this section is determining the extent of existing knowledge within the target community (5). For example, the question "What is the appropriate age for teaching sign language?" is relevant to specialists in clinical areas. In contrast, it may not apply to the general public without the necessary training. Therefore, it is essential to define the boundaries of knowledge using existing studies and expert panels, considering the study's objective and target audience. It is acknowledged that awareness of any level of knowledge, even if it deviates from the strict definition of knowledge, is considered valuable (4). In some cases, assessing general awareness regarding a new concept or within a non-specialist target group may fulfill the study's objective.

The questions in this section, which encompass all aspects of the knowledge pertinent to the study, should preferably be designed openly and descriptively, including a range of simple, moderate, and challenging questions based on the expected knowledge from the target group. Open-ended questions allow individuals to express their opinions freely without the constraints of a structured format. For example, "What is the role of sign language in improving a child's expressive language?" facilitates the individual to respond in their way without restrictions. Despite the theoretical appeal of utilizing such questions (particularly when the list of possible responses is unknown), it is recommended to limit their use to a moderate extent in questionnaires (maximum 3-4 in each questionnaire) due to potential lengthy response times and the time-consuming nature of the analysis.

Additionally, it is advised to incorporate open-ended questions in the "other" options of multiple-choice questions or the free comment section at the end of the questionnaire. By providing possible responses, multiple-choice questions make answering easier and may increase participation, which is crucial in studies to ensure the results are close to reality. Moreover, they simplify the analysis of results. To leverage this advantage, the proposed options (the number of options, the number of possible selections, and the presence or absence of another option) should be

Table 1. Knowledge, attitude, and practice sections in audiology and speech sciences

Section	Definition	Example
Knowledge	Knowledge involves understanding facts, concepts, and scientific principles alongside an individual's imagination and perception. Studies show that knowledge levels reveal areas needing better information dissemination and education to encourage positive behaviors (14).	Teaching sign language enhances the cognitive skills of children with hearing impairments before age two
Attitude	Attitude is an established way of thinking or feeling about something, often reflected in a person's beliefs, feelings, and intended behaviors towards a subject or issue. In KAP studies, attitude demonstrates the degree of favorable or unfavorable disposition towards the given health topic (5).	Please rate your interest in learning sign language
Practice	Practices are the actual behaviors or actions individuals perform in response to specific situations or stimuli, reflecting their application of knowledge and attitudes in real-life settings. In KAP studies, the practice component assesses what people do regarding a particular health issue (5).	I use sign language to teach children with hearing loss/ impairments

carefully chosen under the supervision of an expert panel. It is necessary for the correctness of the correct option to be verifiable through a specified source, and the possibilities should not lead respondents to the correct answer, thereby reducing the likelihood of random selection to provide an accurate picture of the knowledge of the target population. In cases where only one option can be selected, the possibility of "no response" due to the unsatisfactory nature of the correct option for the respondent should be considered.

The use of binary questions (Yes/No) can be somewhat helpful in assessing the awareness of the target population, particularly when general awareness is the focus. However, it is preferable to use them sparingly, as a simple "Yes" or "No" response can be overly simplistic for some questions. Assigning scores to each option is crucial for accurately analyzing the collected data. In the knowledge section, the correct option will receive a higher score than the other options. It is readily apparent that utilizing Likert scale responses in this section will not be effective, as higher agreement with a statement does not necessarily indicate greater knowledge. For instance, consider the difference between "Agree" and "Strongly Agree" in rating the statement "Sign language education improves the receptive language skills of a child with hearing impairment." In the analysis of student scores, when all questions have equal levels of difficulty, an overall achievement score can be calculated. However, as mentioned, it is beneficial to utilize different difficulty levels in analyzing knowledge and their impact on other questionnaire sections. It is essential to note that analyzing these questions requires applying more advanced statistical methods.

Attitude section

The questions in this section are designed to examine the views and beliefs of the target population regarding the subject matter. Various definitions and classifications have been provided for attitudes (11, 13). KAP questionnaires primarily focus on assessing attitudes in specific domains. Baron and Byrne described attitudes as relatively enduring collections of emotions, beliefs, and behavioral inclinations directed toward particular individuals, concepts, objects, or groups (12,15,16).

The questions should be designed to evaluate the community's accurate and inaccurate beliefs related to the topic. It is recommended that the research objectives be presented as a statement and respondents be asked to indicate their level of agreement on a predetermined scale such as the Likert scale ("Strongly Disagree", "Disagree", "Neutral", "Agree", and "Strongly Agree"). For example, "Learning sign language before language acquisition effectively enhances the comprehension skills of a hearing-impaired child".

In this case, a "Yes/No" response forces the individual to select an option that carries more weight and does not reflect their true opinion. When using the Likert scale, the existence or absence of a neutral option (No opinion) and the arrangement of the response options should be carefully considered and agreed upon within the research group. Clarity of questions and attention to the fact that each question assesses only one belief or conviction will bring the accuracy and validity of the results closer to reality. Considering the importance and challenges of evaluating attitudes in the specified domains without introducing bias, it is suggested that a psychologist be utilized in the expert panel. How questions and options are presented is crucial because a single question may measure an individual's attitude or knowledge.

For example, in the question, "What is the reason for the lack of acquisition in sign language before language learning?", selecting the correct option requires specialized knowledge from the individual. Conversely, altering the response format to a Likert scale makes assessing the individual's opinion on various factors and their impact possible. Imagine providing respondents with options such as societal perspectives, lack of access, and similar factors and asking them to rate the effect of each option.

When scoring items related to attitudes, it is important to consider whether the measured attitude is negative or positive. Thus, the highest score on a scale may indicate the most positive attitude towards a given topic in one question. In contrast, in another question, it may reflect the individual's most negative attitude. Paying attention to this aspect during scoring is significant for the accuracy of the conclusions.

Practice section

The final section of a KAP questionnaire aims to assess individual performance concerning the subject matter (4). This section is designed to determine how the knowledge and attitudes acquired through the questionnaire impact the individual's behavior or the collective social behavior of the target group. Like the knowledge section, open-ended questions are the most effective for evaluating performance. However, other question types can be utilized due to practical considerations like ease and speed. For instance, the question "In what aspect of rehabilitation services have you employed sign language?" can be answered in an open-ended format, a multiple-choice format, or a multiple-choice format, allowing for further explanations.

Scoring in the performance section is straightforward and can be based on the type of response provided. It is generally recommended that each section of the KAP questionnaire be scored independently. Combining the scores from all sections may hinder the primary objective of identifying the reasons behind inconsistent performance within the target group regarding the main topic.

KAP with experience suggestion

Given the wide diversity of target populations in KAP studies, this approach enables researchers to easily and effectively assess knowledge and attitudes across various groups. The practice section of KAP studies includes various items, such as personal experience, professional experience, decision-making, and the use of information. In health literacy, these are generally considered distinct domains (17). However, the KAP model allows for a comprehensive evaluation, as it incorporates elements recognized as separate components within the definition of health literacy.

Since personal experiences are influential factors in shaping attitudes, and practice (when defined as decision-making and actions) is affected by attitudes (18), distinguishing between these two constructs can enhance the interpretability of results. This distinction has also been emphasized in health literacy research, where the knowledge and experience questionnaire was introduced (19), translated into various languages, and frequently applied in fields such as nursing (18,20).

This issue becomes particularly significant when the target population consists of professionals or decision-makers, as their professional experiences can substantially impact their attitudes and, ultimately, their actions.

Concerning the example mentioned earlier, having experience conducting a therapy session using sign language can influence the therapist's attitude toward the importance of sign language in the therapeutic or rehabilitation process. Conversely, a positive attitude of the therapist regarding sign language may lead to the decision or action to learn sign language. Thus, the question, "Have you ever worked with a Deaf individual?" is commonly included in the demographic section of many studies and can be considered an item related to experience. At the same time, the question, "Have you taken steps to learn sign language?" would be classified under the practice component. Therefore, adding an "experience" component to the current KAP model and introducing a KAP-E model, particularly for studies involving professional or expert populations, is recommended. This way, decisions based on KAP study results can more accurately identify critical points and lead to more practical solutions.

Validation of the questionnaire

The final questionnaire, approved by the expert panel, will be subjected to a validation process aimed at ensuring its face validity (clarity and comprehensibility), content validity (coverage of all relevant aspects), and structural validity (measuring intended constructs). This objective will be achieved by administering the questionnaire to a representative group of the target population. When targeting the general public, it is important to consider influential differences such as age, education level, and socio-cultural status to ensure representation from all segments of society in the group of experts.

The aforementioned pilot studies will assess the ease of comprehension, relevance to the subject matter, effectiveness in providing useful information, and interpretability and understanding of the questions by different individuals within the target population. For specialist target groups, the validation process will be adapted accordingly. In the provided example, the representative group will include audiologists

and speech-language pathologists working in clinical settings.

The number of experts involved in content validity assessment may vary depending on the subject matter and the diversity of the target population. Generally, it is recommended to have 3 to 5 experts for each section of the questionnaire. Each expert independently rates the questionnaire items and provides feedback and suggestions. Relevant content validity indices are calculated, and after incorporating any necessary revisions, the expert panel evaluates the revised version. Finally, the relevant indices are calculated and presented. As suggested in some research studies, separate analyses are required for different questionnaire sections. This pilot phase helps identify potential challenges individuals face in completing the questionnaire and provides valuable insights for improving data accuracy and reliability.

Conducting a KAP study

Sample size: Before conducting a study, the sample size, representing the minimum number of respondents required for generalizing results, should be meticulously determined based on the KAP objectives, population heterogeneity, geographic scope, accessibility to the target population, financial resources, and human capacity. This determination should leverage precise statistical methods and formulas. Since establishing a suitable sample that accurately reflects the target population while enabling data collection and analysis significantly enhances the validity of the findings, seeking expert guidance from a psychometrician is highly recommended. Their expertise in sampling design can ensure a practical and reliable sample with minimal bias (7).

Moreover, considering potential attrition rates due to limited access to individuals in certain segments of the target population or their reluctance to participate in the study, it is crucial to incorporate this factor into sample size calculations.

Data collection

When planning the execution of a study, it is crucial to consider various factors, including the accessibility of participants, study duration, human and financial resources, data collection methods (studies, interviews, observations), and the chosen platform (paper-based, online, or mixed).

The initial step in data collection is ensuring adherence to ethical guidelines and obtaining the necessary permissions. This step involves providing participants comprehensive information regarding the study's objective, estimated response time, data usage, and measures to safeguard their privacy. This information should be disseminated before seeking consent. For online platforms, the participants should be required to acknowledge reading and understanding the details mentioned above before accessing the questionnaire. It is essential to allow the participants the freedom to withdraw from the study at any point during the process. In majority of the study contexts, demographic information that may influence results or analysis is collected separately from the main study questions, often employing distinct methods. Participants are then directed to answer specific questions in each section, guided by clear instructions.

Data preparation for analysis is the subsequent step, which involves adding the data to the preferred statistical analysis software. Many platforms used for online data collection provide results in categorized formats compatible with various software tools. Descriptive statistics will include demographic information, while data obtained from the KAP questionnaire will be analyzed alongside analytical statistics that assess the relationships between different sections of the questionnaire or various questions. If necessary, qualitative analysis will be conducted on open-ended questions by an expert in this field.

Reporting

The method of presenting the final report of the study's findings depends on the guidelines of the respective organization or target journal. The KAP checklist can be utilized to ensure that the presentation of the material is appropriate and comprehensive. Additionally, when using online surveys, attention should be given to the CHERRIES (Checklist for Reporting Results of Internet E-Surveys).

Conclusion

Assimilating research methods is an effective way to generalize results, which is particularly important

in decision-making research, such as KAP studies. While KAP studies are crucial for informing health policy, their implementation seems to face significant challenges on the part of both objectives and target populations. Therefore, despite a comprehensive literature review, this study did not identify any advantages or limitations of the presented guidelines. The study attempted to adapt effective and relevant recommendations to ensure applicability across various speech, language, and hearing sciences disciplines. By offering a versatile framework, all the related fields can easily utilize the guide for designing and conducting their studies.

This study presents a structured, context-specific guideline to support the design and implementation of KAP studies in audiology and speech-language sciences, addressing notable gaps in the research—particularly the scarcity of comparable methodologies for attitude assessment. By comprehensively reviewing existing protocols from various disciplines, and adapting them to the specific needs of audiology and speech-language pathology, this study incorporated concepts such as health literacy, experience, new knowledge, online platforms, and emerging reporting standards. Consequently, it updated relevant checklists and guidelines, thereby advancing methodological rigor and offering distinct added value to the field. Nonetheless, one limitation of this study was its reliance on examples specifically developed for this article, which reflects the current paucity of relevant studies in this area. This broad applicability allows researchers in these fields to gather more accurate and extensive data using standardized and reliable tools, ultimately enabling the planning of more effective interventions.

Compliance with ethical guidelines

This is an article with no human or animal sample and, there were no ethical considerations in this research.

Ethical approval

This study obtained its ethical approval from the Ethics Committee of Shahid Beheshti University of Medical Sciences (IR.SBMU.RETECH.REC.1403.448).

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Conflict of Interest

The authors declared no conflict of interest.

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