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Effect of Educational Videos on Knowledge, Attitudes, and Practices of Ear Health: A Quasi-Experimental Study among Medical Students in Yogyakarta, Indonesia

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ABSTRACT

Introduction: Many hearing problems arise from a lack of understanding about ear health and proper care. Lack of public awareness of how to maintain ear health, coupled with improper ear cleaning techniques such as using cotton swabs or other instruments, can lead to earwax blockages or infections in the outer ear. Some ear infections can be prevented by public health promotion activities, including videos. This study aims to examine the effect of ear health education videos on knowledge, attitudes, and ear cleaning practices.
Methods: This study used a quasi-experimental pre-test and post-test design. Sixty-three medical students were recruited using consecutive sampling. After obtaining informed consent, they were asked to complete a valid and reliable Indonesian version questionnaire on knowledge, attitudes, and practices (KAP) of ear health, watch an educational video about anatomy, physiology, and ear health safety care, and then complete the same questionnaire again.
Results: The research respondents were 38 (60.3%) female students and 25 (39.7%) male students. Overall KAP scores improved significantly after video intervention ($Z = -3.92$, $p < 0.001$, $r = 0.49$, 95% CI = [0.28-0.66]). Stratified analysis of each domain revealed heterogeneous outcomes. Knowledge and attitude scores showed a non-significant increase, but practices improved significantly with a small to moderate effect ($Z = -2.03$, $p = 0.042$, $r = 0.26$, 95% CI = [0.40-3.00]), particularly regarding avoidance of unsafe ear cleaning tools and noise exposure.
Conclusion: Ear health video education did not substantially alter knowledge and attitude, but it produced significant behavioral shifts in self-reported ear-care practices. The absence of substantial change in knowledge and attitude ratings may be due to a high baseline level in this cohort, indicating a possible ceiling effect. This behavioral shift aligns with theories suggesting that multimedia interventions effectively improve procedural skills and self-efficacy, aiding the application of existing knowledge into positive action rather than promoting deeper conceptual change.

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INTRODUCTION

Hearing problems today often occur due to a lack of understanding about ear health and proper care (1–3). Lack of knowledge regarding ear health care can have serious impacts on the ears, such as hearing loss due to exposure to noise pollution (4), infections, etc. One of the common hearing problems encountered by general practitioners is earwax impaction, which is largely caused by inadequate cleaning methods and a lack of understanding of the structure and physiology of the ear (5). The phenomenon of earwax being pushed deep into the ear canal is a common occurrence. Earwax is a natural substance that plays an important role in warding off dust, bacteria, and other foreign particles (6,7). Under normal circumstances, earwax does not accumulate in the ear canal because the ear has its own mechanism for removing it. This removal mechanism is supported by the chewing and swallowing movements of the jaw and the influence of skin growth. This mechanism keeps the amount of earwax in the ear canal balanced.

However, the earwax in human ears is often mistaken by people as just an unhygienic ear waste buildup, so it is often cleaned for reasons of cleanliness (8). In fact, aggressive or improper ear canal cleaning presents significant risks. These behaviors, including over-cleaning and the persistent use of unsuitable instruments, are linked to a variety of complications. In addition to causing earwax blockages, they have also been reported to result in complications such as injury to the ear canal, outer ear infections, cotton buds being left in the ear canal, sudden deafness, and perforation of the tympanic membrane (9,10).

This phenomenon is still a problem even for health workers, especially since many health workers have inadequate knowledge, attitudes, and practices (KAP) regarding ear care (11,12). A study among healthcare workers in Najran City, Saudi Arabia, showed that self-ear cleaning procedures are often performed incorrectly, with 97.6% of individuals engaging in self-ear cleaning habits that can cause ear injury (13). A lack of knowledge about ear care among health professionals indicates a likely greater deficiency within the general population. The disparity is likely intensified by limits on public access to reliable health information, resulting in inadequate knowledge, negative attitudes, and inappropriate practices concerning ear care (13). This difference highlights the need to provide proper ear health education to the wider community to improve knowledge, attitudes, and practices of ear care among all groups.

Some cases of ear disease, such as earwax blockage, can be prevented by carrying out public health promotion activities (14). Educational videos can be an effective tool for health promotion, significantly improving patients' knowledge, mindset, and ear care. Videos are highly effective at capturing attention, helping people understand better, and are more effective at changing behavior than some other health promotion methods (15,16). Several studies have shown the effectiveness of videos in reducing smoking habits (17), increasing awareness of antibiotic use (18), and encouraging physical activity in pregnant women (19). Research by Firmansyah found that video education can significantly improve health literacy and patient engagement by delivering information in a more engaging and understandable way than conventional approaches (20). Another study by Dsouza also showed that hemodialysis patients who received educational interventions about their disease showed increased understanding of disease management, fluid adherence, and dietary adherence (21).

This study is based on a dual theoretical framework aimed at enhancing both learning and behavioral modification. The video education intervention was created based on the Cognitive Theory of Multimedia Learning (CTML), which utilizes both visual and spoken modalities to improve understanding and minimize cognitive load (22,23). We utilized health communication theories to explain the behavioral objectives of the intervention. The Health Belief Model (HBM) and the Theory of Planned Behavior (TPB) serve as the basis for shaping participants' behaviors (24). The video functions as a "call to action" by amplifying the perceived seriousness of inadequate ear care while emphasizing the advantages of the right techniques, thus reinforcing the intention to embrace safer practices. Therefore, this study was conducted with the aim of observing the effect of ear health education videos on the knowledge, attitudes, and practices of ear cleaning among medical students at Muhammadiyah University of Yogyakarta.

METHOD

This study is a quasi-experimental study with a pretest-posttest design to see the effects before and after the ear health education video intervention. This research was conducted at Muhammadiyah University of Yogyakarta. The study sample included 63 students from the Faculty of Medicine, Muhammadiyah University of Yogyakarta, recruited using a simple consecutive sampling technique. The data collection instrument used was a pre-test and post-test Knowledge, Attitude, and Practice (KAP) questionnaires. The Indonesian version of the KAP questionnaires is valid and reliable (Pearson's correlation of all items r above 0.35, and Cronbach's alpha coefficient was 0.749) and published as a preliminary study (25). Data collection was conducted online from May 9, 2025, to May 12, 2025, for three days. The questionnaire was distributed to three WhatsApp groups: the medical class of the third academic year, the second academic year, and the first academic year, and direct WhatsApp messages were sent to 45 students.

Participants viewed a concise video education aimed at enhancing knowledge, attitudes, and practices about ear health. The video has a total duration of 2 minutes and 47 seconds. The video content was organized into three primary segments: An overview of fundamental ear anatomy and the physiological function of cerumen, a comprehensive explanation of the hazards linked to improper self-cleaning, particularly the risks of utilizing cotton swabs, and a demonstration of advisable ear care practices, methods for safely cleaning the outer ear, and the indicators that necessitate consultation with a healthcare professional. The video integrated animation with voice-over narration, adhering to CTML's Modality and Multimedia principles to enhance learning efficacy. AHS created the video screenplay and visual elements, which were later evaluated for clinical correctness by AW and RF otolaryngologists from the university's faculty. The visual materials associated with this study are available at the following link: https://drive.google.com/drive/folders/1l0GeZQXAuAEcqJbmE0JWY7bqk8ouqJpn?usp=sharing.

The data were examined utilizing Statistical Product and Service Solutions (SPSS) software through univariate and bivariate analysis. Given the non-normal distribution of the post-test and difference scores, the Wilcoxon Signed-Rank Test was employed to compare pre-test and post-test scores. To assess the intervention's effect magnitude, Rosenthal's r was computed as an effect size index for the Wilcoxon Signed-Rank Test findings, with an r value of around 0.1 signifying a small effect, 0.3 a medium effect, and 0.5 a large effect.

Ethical Approval

This study was approved by the Health Research Ethics Committee of Universitas Muhammadiyah Yogyakarta, Indonesia (Approval Number: 082/EC-KEPK FKIK UMY/III/2025). All participants provided informed consent prior to participating in the study. The confidentiality of all participants was strictly maintained throughout the research process.

RESULTS

The sample characteristics in this study describe the identity of the predetermined research sample. In this study, sample characteristics were grouped by gender and year of enrollment. The results of the respondents' characteristics are shown in Table 1 below.

Table 1. Respondent Characteristics

Characteristics	n=63	(%)
Gender		
Man	25	39.7%
Woman	38	60.3%
Academic year		
Third year	31	49.2%
Second year	13	20.6%
First year	19	30.2%

Based on Table 1 above, the frequency distribution of respondents is dominated by female respondents with 38 people (60.3%) and the third academic year with 31 people (49.2%).

Table 2. Descriptive Pre-test and Post-test of KAP Questionnaire

Test	Minimum Score	Maximum Score	Average	Standard deviation
Pre-test	7	15	11.2698	1.79791
Post-test	7	14	12.1746	1.64159

Table 2 shows a description of the pre-test and post-test scores of the KAP/PSP questionnaire. Based on Table 2, there was an average increase of 0.90 points after the intervention, with the pre-test score of 11.27 (SD = 1.80) increasing to 12.17 (SD = 1.64) in the post-test. The standard deviation decreased from 1.80 to 1.64, indicating that individual scores showed greater consistency post-intervention, reflecting less variability in scores.

Table 3. Normality Test

	Kolmogorov-Smirnov	Shapiro-Wilk
Pre-test	0.002	0.075
Post-test	<0.001	<0.001
Difference score between pre-test and post-test	<0.001	0.002

Table 3 shows the normality test conducted by the researcher using the Shapiro-Wilk Test. The Shapiro-Wilk test findings indicate that the pre-test scores follow a normal distribution ($p = 0.075$), but the post-test scores and the difference between the pre-test and post-test scores follow a non-normal distribution ($p < 0.001$ and $p = 0.002$). Given that the data are not normally distributed, the Wilcoxon Signed-Rank Test was used to evaluate the significance of the differences between the pre-test and post-test results.

Table 4. Overall Statistics of KAP/PSP Pre-test and Post-test

Domain	Z-score	p-value	95 % Confidence Interval
Knowledge, Attitudes, and Practices	-3.916	<0.001	0.28-0.66

The Wilcoxon Signed-Rank Test results based on Table 4 showed a significant improvement in overall KAP scores following the educational video intervention ($Z = -3.916$, $p < 0.001$). The effect size was large ($r = 0.49$, CI [0.28-0.66]), indicating a substantial positive impact of the video. Of the 63 students, 32 showed improvements, 23 experienced no improvement or decline, and only 8 experienced a decrease.

Table 5. Summary Changes of Knowledge, Attitude, and Practice Questionnaire Items

Changes	Interpretation	Effect size	Z-score	p-value (95 % CI)
Knowledge Domain				
Increase	Post-test > Pre-test	0.37	-0.816	0.414 (-0.5-2.0)
Decrease	Post-test < Pre-test			
Same	Post-test = Pre-test			
Attitude Domain				
Increase	Post-test > Pre-test	0.12	-0.272	0.785 (-1.5-2.0)
Decrease	Post-test < Pre-test			
Same	Post-test = Pre-test			
Practice Domain				
Increase	Post-test > Pre-test	0.91	-2.032	0.042 (0.4-3.0)
Decrease	Post-test < Pre-test			
Same	Post-test = Pre-test			

Based on Table 5, the pre-test and post-test scores in the knowledge domain ($Z = -0.816$, $r = 0.37$, $p = 0.414$, CI = [-0.5-2.0]) and attitude ($Z = -0.272$, $r = 0.12$, $p = 0.785$, CI = [-1.5-2.0]) did not show a statistically significant

increase in either domain. However, there was a statistically significant increase in the practice domain in both pre-test and post-test scores (Z = -2.032, r = 0.91, p = 0.042, CI = [0.4-3.0]).

Table 6. Pre-test and Post-test Scores of Knowledges, Attitudes, and Practices of Ear Health in each Question

Question	*Pre*%(n)	*Post*%(n)	p-value
Knowledge Domain			
1. Do you have to clean earwax every day?			
Correct	11% (7)	6% (4)	0.250
Wrong	89% (56)	94% (59)	
2. Does eardrum perforation require surgery?			
Correct	46% (29)	42% (27)	0.500
Wrong	54% (34)	57% (36)	
3. Can sudden exposure to loud noises damage hearing ability?			
Correct	92% (58)	98% (62)	0.125
Wrong	8% (5)	2% (1)	
4. Do you need to consult and seek medical help if you experience poor hearing?			
Correct	100% (63)	100% (63)	-
Wrong	0% (0)	0% (0)	
5. Can changes in altitude and air pressure that are too rapid, for example when diving or landing on a plane, cause ear pain?			1.000
Correct	98% (62)	98% (62)	
Wrong	2% (1)	2% (1)	
Attitude Domain			
1. Do you believe that if your ears are exposed to loud noises (for example: bombs, firecrackers, music concerts) it can cause hearing loss or even deafness?			1.000
Correct	95% (60)	77% (61)	
Wrong	5% (3)	3% (2)	
2. Do you recommend putting water into the ear canal as a way to clean the ears?			
Correct	19% (12)	14% (9)	0.250
Wrong	81% (51)	86% (54)	
3. Do ears have to be pierced immediately after birth?			
Correct	41% (26)	40% (25)	1.000
Wrong	59% (37)	60% (38)	
4. To maintain ear health, is it necessary to visit an ENT specialist?			
Correct	78% (49)	82% (52)	0.250
Wrong	22% (14)	18% (11)	
5. Is it important to detect newborn hearing status?			
Correct	100% (63)	100% (63)	-
Wrong	0% (0)	0% (0)	
Practice Domain			
1. Do you clean your ears using sharp objects such as pencils, pins, and cotton buds?			
Correct	41% (26)	17% (11)	<0.001*
Wrong	59% (37)	83% (52)	
2. Do you blow your nose forcefully when you have a cold or flu?			
Correct	48% (30)	19% (12)	<0.001*
Wrong	52% (33)	81% (51)	
3. Do you use ear drops without consulting a doctor when you have an earache?			
Correct	13% (15)	8% (8)	0.250
Wrong	87% (55)	92% (58)	
4. Do you use a headset when listening to music at high volume for long periods of time?			
Correct	33% (21)	10% (6)	<0.001*
Wrong	67% (42)	90% (57)	
5. Do you need to give your ears oil/ear drops regularly?			
Correct	22% (14)	20% (13)	1.000
Wrong	78% (49)	80% (50)	

Table 6 shows that none of the overall scores for the knowledge domain reached statistical significance (p > 0.05), nor did they reach statistical significance for the practice domain. However, three of the five questions in the

practice domain showed statistically significant improvement ($p < 0.05$), indicating substantial improvement in behavior following the ear health video educational intervention.

Table 7. Differences in Pre-Test and Post-Test Scores Based on Gender

Test	Gender	N	Average rating	Z-score	p-value
Pre-Test	Man	25	25.70	-2.247	0.025
	Woman	38	36.14		
Post-Test	Man	25	25.70	-2.247	0.025
	Woman	38	36.14		

In Table 7, the pre-test analysis revealed a statistically significant difference between the male (mean rank = 25.70) and female (mean rank = 36.14) groups, with a Z-value of -2.247 and $p = 0.025$ ($p < 0.05$). This indicates that before the intervention, there was a substantial difference in knowledge between the two genders. Meanwhile, post-intervention, the findings showed no significant difference between the scores of males (mean rank = 28.40) and females (mean rank = 34.37), with a Z-value of -1.298 and $p = 0.194$ ($p > 0.05$).

Table 8. Differences in Pre-Test and Post-Test Scores Based on Academic Year

Test	Academic year	N	Average rating	H (Kruskal-Wallis)	p-value
Pre-test	First year	19	31.55	0.065	0.968
	Second year	13	31.27		
	Third year	31	32.58		
Post-test	First year	19	27.00	2.844	0.241
	Second year	13	30.65		
	Third year	31	35.63		

In Table 8, the Kruskal-Wallis test was used to determine the variation in pre-test and post-test scores based on the academic year (first year, second year, and third year). The pre-test results did not show a statistically significant difference between the three academic years ($H = 0.065$, $p = 0.968$), indicating a comparable level of basic knowledge across the academic years. Meanwhile, after the intervention, students from the third academic year showed the highest average rating (35.63), while students from the first academic year showed the lowest rating (27.00), although this was not statistically significant ($H = 2.844$, $p = 0.241$).

DISCUSSION

Respondent Characteristics Overview

This study involved 63 medical students selected using consecutive sampling. The majority of the sample were female, at 60.3%. These results differ from other studies that show a nearly equal gender distribution. A study conducted in Saudi Arabia with 394 medical students showed a male-to-female ratio of approximately 1:1(25). Also, a study was conducted in Nepal involved 151 preclinical medical students (78 men and 73 women) (26). According to Osle, the more dominant representation of women in the sample may occur because the level of participation of women in accessing social media and online questionnaires is higher than that of men (27).

The sample for this study consisted of students from the third academic year (49.2%), first academic year (30.2%), and second academic year (20.6%). Although the sample sizes for each class differed, this reflects the general methodology in this field, which involves sampling across multiple academic years. Consistent with this research, Alshehri's study in Saudi Arabia included a diverse distribution of participants, including third-year (25.4%), sixth-year (20.6%), fourth-year (16.5%), second-year (16.2%), first-year (10.9%), and fifth-year (10.4%) students (2).

Overview of Respondents' KAP Results (Gender and Year of Enrollment)

Pre-intervention findings showed that female students scored significantly higher than male students in terms of ear health knowledge, attitudes, and practices ($p=0.025$). This is consistent with a literature review of health literacy

among college students, which found that female students had higher health literacy (28). After the video intervention, no significant gender gap was found (p=0.194).

Kruskal-Wallis analysis showed no statistically significant changes in knowledge, attitudes, and practices (KAP) ratings at baseline or after the intervention across all cohort years. This conclusion is consistent with Alshehri's research. This also showed no significant correlation between academic year and ear cleaning skills among medical students (2). This makes ear health educational videos a relevant and useful resource for students at all year levels.

The findings of this study, corroborated by other research, indicate that standardized video-based instruction is a highly effective tool for promoting equitable learning. This research demonstrates that educational ear health video interventions can reduce knowledge gaps across demographic categories, such as gender, and offer equitable benefits to students at all levels of academic experience.

Overview of KAP Results as a Whole

The average pre-test score in this study was 11.27 out of 15 (75.1%), which indicate mediocre knowledge about safe ear care among the research sample, namely, medical students. This finding is in line with the results of the previous study by Olaosun which, shows that the habit of inadequate ear cleaning is common, even among educated young people (29). A study among Saudi Arabian health workers also showed that 97.6% of individuals engaged in self-ear cleaning, a bad habit that carries a high risk of injuring the ears (12).

A video-based educational intervention significantly improved medical students' overall knowledge, attitudes, and practices (KAP) scores ($Z = -3.916$, $p < .001$, $r = 0.49$, CI [0.28-0.66]). The average score increases of 0.90 points indicates a significant change, underscoring the effectiveness of a brief video intervention in health education. A similar KAP study on a related subject revealed that an instructional film significantly improved parents' understanding and practices regarding middle ear infections in their children (30).

In this study, 32 students (50.8%) experienced an increase in KAP post-intervention, while 23 students showed no improvement. These results illustrate the difficulty of changing behavior based on new information received. A meta-analysis of video-based health promotion by Xiao et al. highlighted that the effectiveness of video as a promotional medium is closely related to several factors, such as message credibility, duration, and the characteristics of the specific audience (31). The varied reactions in this research sample may be due to the varying abilities of individuals in terms of attention or acceptance of video messages.

Overview of KAP Results on Each Domain

Although the overall KAP score after the intervention showed a significant improvement, domain-specific analysis yielded important information regarding the impact of the intervention. Results indicated that the overall improvement was predominantly driven by changes in the practice domain ($Z = -2.032$, $r = 0.91$, $p = 0.042$, CI = (0.4-3.0), while the knowledge ($Z = -0.816$, $r = 0.37$, $p = 0.414$, CI = (-0.5-2.0) and attitude ($Z = -0.272$, $r = 0.12$, $p = 0.785$, CI = (-1.5-2.0) domains did not experience statistically significant changes after the intervention.

The lack of significant changes in knowledge and attitudes is a finding that warrants further investigation. This is likely due to a "ceiling effect," a common occurrence in educational research, where pre-test scores for samples are typically already high, reducing the potential for measurable improvement (32,33). Given that this study sample consisted of medical students who likely already had a good basic understanding of anatomy, health concepts, and attitudes toward lifestyle, a brief health education video intervention may not be sufficient to significantly alter cognitive status.

The most striking result of this study was a significant improvement in practice. This finding aligns with the KAP paradigm, which states that increased knowledge leads to attitude modification, which then leads to practice change. Our findings suggest that video presentations likely serve as a more powerful behavioral trigger than any new learning tool, particularly among medical students. Visual representation of videos can most likely stimulate and reinforce knowledge for individuals who already have good knowledge and attitudes and convert it into behavior (34). The positive improvements seen in all five practice-related variables support this view, indicating that video interventions are highly efficient in explaining and encouraging specific desired behaviors (35). However, evaluating changes in the “practice” domain remains challenging because data were taken from self-reports immediately after the intervention. This approach is susceptible to bias because participants expressed what they perceived as the

"correct" response, rather than accurately representing their actual behavior. The results suggest a strong initial desire to change; however, further research with longer-term follow-up is needed to determine whether this intention leads to sustained behavior change.

Theoretical Interpretation of the Video's Impact on KAP Domains

Health promotion interventions achieve optimal effectiveness when they are based on established theories of learning and behavior change. This study's educational video was developed based on Mayer's Cognitive Theory of Multimedia Learning (CTML) to improve knowledge transmission, in conjunction with behavior-oriented frameworks such as the Health Belief Model (HBM) and the Theory of Planned Behavior (TPB). CTML asserts that meaningful learning takes place when learners engage with verbal and visual information through dual cognitive channels, enhancing comprehension and reducing cognitive overload (21). The video effectively facilitated procedural understanding of proper ear cleaning techniques through the integration of narration and animation, consistent with the Modality Principle, which posits that graphics accompanied by narration enhance learning efficiency compared to on-screen text (22).

The findings indicate that participants showed notable enhancements in ear care practices, while changes in knowledge and attitudes were minimal. This suggests that the video was more effective in promoting procedural learning than conceptual understanding. From an educational psychology standpoint, this corresponds with Anderson's Adaptive Control of Thought-Rational (ACT-R) theory, which posits that procedural skills typically precede declarative understanding (36). This aligns with Bloom's taxonomy, focusing on development in the psychomotor domain, where learners reproduce demonstrated actions, as opposed to the cognitive or affective domains (37). The video's clear visual modeling likely enhanced behavioral imitation by minimizing cognitive load and supporting skill encoding.

These outcomes can be analyzed from a behavioral perspective using the Health Belief Model, Theory of Planned Behavior, and Bandura's Social Cognitive Theory. The intervention served as a visual prompt that enhanced perceived benefits and self-efficacy; however, it may not have adequately impacted perceived susceptibility or social norms required for attitudinal change (23). The video effectively demonstrated proper ear cleaning techniques; however, its restricted interactivity and absence of reflective engagement may have hindered more profound cognitive and emotional learning. Future multimedia health interventions should integrate reflective prompts, interactive elements, and guided questions to promote behavioral imitation, sustained conceptual understanding, and attitude transformation.

Comparison with Previous Research

This study has striking similarities with the study of Srivastava and Harinath (30), which did not show any statistically significant changes in the attitude domain. This is due to the high baseline conditions, where highly educated individuals tend to already have favorable views about seeking appropriate medical care. This parallel study strengthens the hypothesis that educated individuals may already have favorable views about medical advice, thus making the improvement through a brief ear health video educational intervention insignificant. However, both this study and the study by Srivastava and Harinath (30). Both show that video can provide statistically significant improvements in practice, thus validating the assertion that video is an influential medium for eliciting and directing behavioral intentions.

Limitations and Cautions

The researchers recognize the significant limitations of this study. The differences in scores cannot be solely credited to the video intervention, as potential pre-test effects and exposure to uncontrolled information may have impacted the results, particularly considering the study's dependence on self-reported data. Moreover, self-reported evaluations in the "practice" domain are prone to social desirability bias, potentially causing respondents to disclose aspirational behavioral objectives instead of their true practices. Ultimately, as post-test evaluations were conducted immediately following the intervention, the study is unable to ascertain whether the observed enhancements remain persistent or short-term, since permanent behavioral modifications necessitate prolonged evaluation.

Recommendations for Future Research

Based on the findings and limitations of the current study, the researchers present several recommendations anticipated to be beneficial. Further longitudinal studies, such as those conducted 1 or 3 months after the intervention, are necessary to assess the sustainability of the observed behavior changes. Future research should replicate this study with more diverse populations, including the general public or students from non-health disciplines, to assess the video's efficacy in audiences with limited prior knowledge and enhance the generalizability of the findings. To evaluate the practice domain, it is suggested that methods beyond self-reporting, such as case studies or behavioral scenarios, be included to mitigate potential bias.

CONCLUSION

The results of this study indicate that educational videos on ear health can improve the overall KAP questionnaire scores of medical students. However, stratified analysis showed significant improvements were limited to the practice domain. This phenomenon is likely attributable to a "ceiling effect," which limits the capacity for observable enhancement in the knowledge and attitude domain. The improvements were primarily limited to the practice domain, aligning with Mayer's CTML, the HBM, and the TPB, which indicate that multimedia-based interventions are more effective in enhancing procedural skills and self-efficacy compared to fostering deeper conceptual or attitudinal change. Therefore, it is important to re-examine and highlight the effect of health educational videos on two domains that have not shown significant improvement: knowledge and attitudes.

The production of educational videos focused on ear health proved to enhance understanding, attitudes, and practices related to ear care, so educational videos can be used as reliable tools for health promotion. It is crucial to note that the published research regarding the effectiveness of ear infection education programs in Indonesia remains limited. This study aims to serve as a pilot model to address the existing literature gap. This research aims to enhance public awareness of key aspects, including signs and symptoms, risk factors, consequences, and preventive and curative health practices.

AUTHOR'S CONTRIBUTION STATEMENT

AHS contributed to designing the study, collecting data, analyzing data, and synthesizing the manuscript. AW and RF contributed to reviewing and editing the manuscript.

CONFLICTS OF INTEREST

There is no conflict of interest related to materials and publication in this study.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

No generative AI tools were used to write or interpret data for this manuscript. However, one AI-assisted technology, Grammarly, was used to support language refinement to ensure grammar and tense consistency.

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