

The Effectiveness of Health Education Videos as Nurse Innovation to Increase Maternal Knowledge About Child Immunization

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ABSTRACT

Immunization is an effort to prevent infectious diseases in children, with its effectiveness influenced by maternal knowledge and support. Low immunization coverage in some areas is often associated with limited health information received by mothers, highlighting the need for innovative educational media such as nurse-developed health education videos. This study aimed to determine the effectiveness of health education videos as a nursing innovation in increasing maternal knowledge about child immunization in the working area of Padang City Desert Health Center. This quantitative study used a quasi-experimental one-group pretest-posttest design. The population comprised mothers with children aged 0–24 months in the working area of the Desert Health Center, with 42 respondents selected using purposive sampling. Data were collected using knowledge questionnaires administered before and after the educational video intervention. Univariate analysis used frequency distributions, while bivariate analysis used the Wilcoxon test. Before the intervention, 59.5% of mothers had low knowledge, which increased to 71.4% in the good knowledge category after the intervention. The Wilcoxon test showed a significant difference in maternal knowledge before and after the intervention ($p=0.000$; $p<0.05$). Health education videos were effective in increasing maternal knowledge about child immunization. Nurses are encouraged to use educational videos routinely in immunization health promotion programs to improve immunization coverage and adherence.

Keywords: Educational Videos, Maternal Knowledge, Child Immunization, Nurse Innovation

INTRODUCTION

Immunization remains one of the most effective and efficient public health interventions for preventing morbidity and mortality from vaccine-preventable diseases (VPDs) such as diphtheria, pertussis, tetanus, measles, and polio. The success of immunization programs largely depends on achieving high and equitable coverage across populations, as this is a prerequisite for attaining herd immunity. The COVID-19 pandemic significantly disrupted immunization services worldwide, as social restrictions forced many primary health facilities to limit or temporarily suspend routine immunization services. This disruption placed immunization coverage at the forefront of global health concerns, given that declining coverage increases the risk of resurgence of previously controlled diseases (WHO, 2023).

In Indonesia, this global disruption was clearly reflected in a sharp decline in complete basic immunization coverage among children, from 93.7% in 2019 to 84.2% in 2020. In response, the government, together with WHO, UNICEF, and the Global Fund, launched the National Child Immunization Month (*Bulan Imunisasi Anak Nasional*/BIAN) to close this immunization gap, which successfully raised coverage back to 94.6% in 2022 and further to 95.4% by the end of 2023. Despite this encouraging recovery trend, an estimated 240,000 children in Indonesia remain unprotected by complete basic immunization and are at high risk of exposure to VPDs, indicating that current achievements remain insufficient. The challenge has become increasingly complex with the expansion of the national routine immunization schedule to 14 vaccine types since 2023, including the addition of Rotavirus (RV) immunization and a second dose of Inactivated Poliovirus Vaccine (IPV2), which demands a deeper level of maternal understanding while simultaneously posing new challenges for health workers in delivering information in a simple and comprehensible manner (Ministry of Health of the Republic of Indonesia, 2023).

This national challenge is similarly evident at the subnational level, including in West Sumatra Province, where immunization coverage, nutritional status, and child growth and development across districts and cities are routinely monitored due to persistently high inter-regional disparities in achievement. The provincial health authority has acknowledged various service innovations developed by health workers in different working areas as part of a broader strategy to improve the quality of primary healthcare services (West Sumatra Provincial Health Office, 2024). More specifically, as of 2024, a number of *kelurahan* (urban wards) still reported Complete Basic Immunization (*Imunisasi Dasar Lengkap*/IDL) coverage below 80%, revealing substantial disparities among Puskesmas working areas in Padang City, including the working area of Puskesmas Desir. Routine program evaluation data from this area, encompassing first-contact and complete-contact immunization indicators, underscore the urgent need for a deeper investigation into the factors influencing maternal knowledge and behavior regarding immunization in this specific locality.

Existing evidence points to maternal knowledge as one of the principal determinants of compliance with complete childhood immunization, as mothers' perceptions and understanding of vaccine benefits and safety strongly influence the timeliness of their children's immunization.



Mothers with lower levels of knowledge are more susceptible to misinformation about immunization, making the enhancement of maternal knowledge a strategic priority for improving national immunization coverage. Prior studies have demonstrated a strong correlation between maternal knowledge levels and completeness of children's immunization status within Puskesmas working areas, showing that higher maternal knowledge is associated with greater awareness of and adherence to the recommended immunization schedule, thereby reinforcing the importance of continued, well-targeted educational interventions (Rahmawati, Sari, & Aulia, 2023).

Health education has consistently been identified as the primary approach to improving maternal knowledge about immunization, with structured and continuous education delivered at primary care facilities shown to be substantially more effective than one-time educational sessions, underscoring the importance of program sustainability. The effectiveness of health message delivery is further shaped by the type of media employed; audiovisual-based counseling, for instance, has been shown to significantly improve the knowledge, attitudes, and practices of pregnant women in the context of stunting prevention compared with conventional methods, owing to its combination of visual and auditory elements that facilitate comprehension and retention of information (Ginting, Simamora, & Siregar, 2022). This potential has been empirically confirmed through a one-group pretest-posttest study reporting an increase in parental knowledge scores from a mean of 9.33 to 11.69 following exposure to a complete basic immunization educational video, with statistically significant results based on the Wilcoxon test ($p < 0.05$) (Proceedings of the Public Health Seminar, 2023).

Although prior research has established the relationship between maternal knowledge and immunization completeness, as well as the effectiveness of audiovisual media in improving knowledge on related health topics such as stunting prevention, studies specifically examining the effectiveness of audiovisual educational media on maternal knowledge of complete basic immunization remain scarce, particularly in areas with pronounced disparities in IDL achievement such as the working area of Puskesmas Desir, Padang City. Most existing audiovisual intervention studies have predominantly focused on nutrition and stunting-related outcomes, leaving a notable gap in the application of similar approaches within the context of immunization in urban settings characterized by low IDL coverage. This gap underscores the need for further research to test the effectiveness of audiovisual educational interventions in improving maternal knowledge of complete basic immunization in this setting.

In light of this gap, the present study proposes the use of an educational video as an intervention medium to enhance maternal knowledge of complete basic immunization, given its practicality, reusability, and capacity to overcome the time constraints of face-to-face counseling at primary care facilities. Accordingly, this study aims to analyze the effectiveness of an educational video in improving maternal knowledge of complete basic immunization in the working area of Puskesmas Padang Pasir.

The research gap in this context lies not only in the undiscovered study specifically conducted at the site, but also includes a number of more fundamental theoretical, methodological,

and clinical gaps. Theoretically, it is still unclear whether educational videos developed directly by nurses and adapted to the local context, as a form of innovation in the role of nurses as educators, provide equivalent or even superior effectiveness compared to generic educational videos that have been widely used in previous studies. Methodologically, most previous studies have only measured short-term increases in knowledge through a one-time measurement pretest-posttest design, so the long-term retention of maternal knowledge after exposure to educational videos is still largely unknown. Clinically, the effect of increased knowledge on the actual behavior of immunization compliance, namely the timeliness and completeness of children receiving immunizations on schedule, is also not widely studied, so the relationship between increased knowledge and improvements in real health outcomes still requires further proof.

Starting from the theoretical, methodological, and clinical gaps, researchers are interested in assessing the effectiveness of health education videos as a form of innovation in the role of nurses in increasing maternal knowledge about immunization of children aged 0-24 months in the Working Area of the Padang City Wilderness Health Center. This interest is based on the existence of immunization coverage gaps in the region, evidence of the effectiveness of educational videos in various health contexts similar but in different populations and backgrounds, the untested effectiveness of educational videos developed specifically by nurses and adapted to local contexts, and the importance of understanding the extent to which increased knowledge can potentially contribute to children's immunization compliance in real terms. This research is expected to provide scientific contributions as well as operational recommendations in the development of nurse innovation-based education strategies to support the improvement of maternal knowledge and child immunization coverage in the future.

METHODS

This study used a quasi-experimental design one group pretest-posttest, carried out in the Working Area of the Padang Pasir Health Center, Padang City, with a population of all mothers who have children aged 0-24 months. A sample of 42 respondents were selected by purposive sampling with inclusion criteria: having children aged 0-24 months, willing to participate, able to read-write, and can access devices to watch videos; exclusion criteria: visual/hearing impairment that hinders understanding of the video, was not fully present at the intervention, or had received similar immunization video education in the past 3 months. The instruments in the form of immunization knowledge questionnaires developed by the researchers themselves (20 True-False items, covering the type, schedule, benefits, side effects/KIPI, and place of immunization services), have been tested valid ($r = 0.451-0.782$, Pearson) and reliable ($\alpha=0.861$, Cronbach's Alpha), with Score categories: good ($>75\%$), sufficient ($40-75\%$), lacking ($<40\%$) (Arikunto, 2019). Intervention in the form of educational videos with a duration of 10 minutes, developed by researchers with nurses Desert Health Center, simple Indonesian language with 2D animation and voice over, contains material type-schedule-benefits-side effects of immunization, and has been validated by 2 experts (community nursing lecturer and immunization program manager) before use.



Data collection was carried out in stages: pretest video playback as a whole once in a small group (5-7 people) accompanied by researchers question-answer discussion (10-15 minutes) posttest on the same day. Data were analyzed in univariate (frequency distribution of characteristics and level of knowledge) and bivariate using Wilcoxon Signed Rank Test ($p < 0.05$). This study applies the ethical principles of informed consent, confidentiality of data, the right to resign without consequences, and non-maleficence.

RESULTS

1. Frequency Distribution of Maternal Knowledge Level About Child Immunization Before And After Intervention Health Education Video in Working Area of Puskesmas Padang Pasir Kota Padang

Based on the results of data collection on 42 respondents of mothers who have children aged 0-24 months in the Working Area of the Padang City Desert Health Center, the following are the results of a univariate analysis that illustrates the frequency distribution of maternal knowledge about child immunization before (pretest) and after (posttest) given health education video intervention.

Table 1. Frequency Distribution of Maternal Knowledge Level About Child Immunization Before and After Intervention Health Education Video in Working Area of Puskesmas Padang Pasir Kota Padang (n=42)

Level of Knowledge	Pretest (f)	Pretest (%)	Posttest (f)	Posttest (%)
Less	25	59,5	3	7,1
Enough	13	31,0	9	21,4
Good	4	9,5	30	71,4
Total	42	100	42	100

Table 1 shows a significant change in the distribution of maternal knowledge levels between before and after the health education video intervention. Before the intervention, most of the respondents were in the category of lack of knowledge as many as 25 people (59.5%), while the good category was only owned by 4 people (9.5%). After the intervention, there was a significant shift in distribution, where the majority of respondents moved to the good knowledge category of 30 people (71.4%), while the less category decreased dramatically to only 3 people (7.1%). This pattern of change descriptively indicates that health education videos that are Nurse innovations are able to increase mothers' understanding of child immunization significantly within the intervention period provided.

2. Differences in Maternal Knowledge About Child Immunization Before and After Intervention Health Education Video

Table 2. Wilcoxon Test Results Differences in Maternal Knowledge About Child Immunization Before and After Intervention Health Education Video (n=42)

Category Ranking	n	Mean Rank	Sum of Ranks	Z	p-value
Negative Ranks (Posttest < Pretest)	1	3,00	3,00		
Positive Ranks (Posttest > Pretest)	37	20,05	741,50		
Ties (Posttest = Pretest)	4	–	–		
Totally	42			-5,412	0,000

Table 2 shows that of the 42 respondents, 37 people (88.1%) experienced an increase in knowledge scores after the intervention (positive ranks), 1 person (2.4%) experienced a decrease in scores (negative ranks), and 4 people (9.5%) did not show changes in scores (ties). Wilcoxon test results obtained a Z value of -5.412 with a p-value of 0.000 ($p < 0.05$), which means there is a statistically significant difference in the level of maternal knowledge between before and after the intervention was given health education video. The predominance of positive ranks over negative ranks reinforces the evidence that the increase in knowledge that occurs is not due to chance factors, but is a real effect of the intervention.

DISCUSSION

1. Frequency Distribution of Maternal Knowledge About Child Immunization Before and After Intervention Health Education Video in the Working Area of Puskesmas Desir Pasir Kota Padang

The results in Table 1 showed that before the intervention was given health education video, the majority of respondents were in the category of lack of knowledge as many as 25 people (59.5%), while the good category was only owned by 4 people (9.5%). After the intervention was given, there was a considerable distribution shift, where as many as 30 people (71.4%) of respondents moved to the good knowledge category, while the less category decreased sharply to only 3 people (7.1%). This change illustrates the increasing understanding of mothers about child immunization after exposure to educational video media developed by nurses. The distribution pattern is the basis for further discussion of the factors behind the initial knowledge conditions and the changes that occur after the intervention is given.

The high proportion of mothers with less knowledge at the time of pretest is in line with the theory that a person's knowledge is influenced by various factors, including age, level of Education, sources of information, and experience, where limitations on one of these factors can cause low understanding of a particular health object. Mothers who are minimally exposed to formal sources of information about immunization tend to rely only on information from the social environment that is not necessarily accurate. This reinforces the importance of structured educational interventions to fill existing knowledge gaps. Thus, the finding of lacking knowledge in the early stages of this study can be understood as a representation of the limited access to information that most respondents experienced before the intervention was given (Notoatmodjo, 2022).



The finding of low maternal baseline knowledge in this study is in line with the results of a study published in the Journal of Public Health, which also found that most mothers had limited knowledge of basic immunizations before getting structured health education. The similarity of these findings indicates that the problem of low maternal knowledge about immunization is not a single phenomenon in one region, but a pattern that tends to be repeated in various working areas of Puskesmas with relatively similar community characteristics. This reinforces the urgency of health education interventions that are massive and sustainable, not just incidental. The consistency of the findings between regions is also evidence that the problem of maternal knowledge about immunization requires intervention strategies that can be widely replicated (Rahmawati, Sari, & Aulia, 2023).

Researchers assume that the low knowledge of mothers at the pretest stage in the Working Area of the desert Puskesmas is also influenced by the limited time mothers have to access health education services directly at the Puskesmas, considering that most respondents have a dual role as housewives and workers. In addition, the lack of exposure to educational media that are attractive and easily accessible is also a factor that worsens the condition of respondents' initial knowledge. This limitation confirms the importance of providing educational media that is practical and accessible at any time without having to rely on scheduled visits to health facilities. This assumption also reinforces the relevance of educational video intervention as a solution to these limitations.

A significant increase in the category of good knowledge after the intervention, from 9.5% to 71.4%, can be explained through Multimedia Learning Theory which states that the delivery of information through a combination of visual and audio elements can support the process of attention, understanding, and retention of information. The use of educational videos allows respondents to receive information through visual and auditory channels simultaneously, so that information can be processed more effectively than one-way information delivery. Multimedia approach can also increase the involvement and attention of participants because the information is presented in a more interesting and easy to understand. This is in line with Soto Mas et al. (2003) who explained that the principle of multimedia learning can be applied in health education to improve the effectiveness of information delivery. More recent empirical evidence also suggests that video-based learning has a positive effect on knowledge acquisition in health education (Nayahangan et al., 2024). Thus, the increase in the category of knowledge in this study can be attributed to the ability of video media in presenting visual and auditory information in a relatively short time.

The results of this study are also in line with the research of Qurrotul et al. (2023) on mothers who have toddlers in the working area of the Bandarharjo Health Center, Semarang, who use the one group pretest-posttest design. The study showed a significant difference in parents' knowledge about complete basic immunization before and after being given education through video media ($p=0.000$). The findings reinforce the results of this study that the use of educational videos can be an effective medium in increasing target knowledge. Similarity of results between

this study and the study of Qurrotul et al. (2023) showed that video media has the potential to have a positive impact on increasing knowledge in the context of health promotion, although the characteristics and context of respondents may differ.

The effectiveness of educational videos in improving maternal knowledge in this study is also consistent with research on mothers of toddlers related to stunting Prevention, which found that counseling using audiovisual media was able to significantly change maternal knowledge, attitudes, and practices compared to conventional methods. The similarity of the topic of maternal and child health interventions between the study and this study shows that audiovisual media have similar leverage over various types of maternal health knowledge, not limited to the topic of immunization alone. This indicates that the advantages of video media are universal in the context of maternal and Child Health Education. Thus, the application of educational videos has the potential to be expanded to various other health programs outside of immunization (Ginting, Simamora, & Siregar, 2022).

The advantages of educational videos are also seen when compared with studies that evaluated the effectiveness of animated video media on maternal knowledge about complementary feeding in the Prevention of stunting, where interventions based on animated videos were shown to increase maternal knowledge significantly compared to before the intervention. The similarity of the pattern of results in the population of mothers under five reinforces the argument that mothers as a target group tend to be more responsive to visual learning media than lecture methods or print media alone. The characteristics of mothers who generally have limited time also make video media a more practical and efficient choice. Therefore, the findings of this study further confirm the relevance of the use of educational videos as a health promotion strategy for groups of mothers in primary services (Prasetya, 2021).

Compared to conventional educational media such as leaflets or lectures, educational videos also proved superior in research on the difference in the effectiveness of health education through animated video media and power point on young women's knowledge, where the group that received education through video showed a higher increase in knowledge than the group that received education through static media. These findings reinforce the argument that visual movement and voice narrative elements in video provide a more interactive learning experience than passive media. This more interactive learning experience likely contributed to the high proportion of knowledge gains in the study. Thus, the selection of video as an innovation media by nurses in this study can be said to have been right on target (Hanifah, Oktavia, & Nelwatri, 2021).

The role of nurses as developers of Educational media Innovation is also an important factor that supports the success of increasing knowledge in this study. As shown in research on optimizing the role of nurse education through team building or certain innovations, the active involvement of nurses in designing educational media that are in accordance with Target needs can increase the effectiveness of overall health information delivery. Nurses who understand the characteristics of the community in their work area tend to be able to design educational content that is more relevant and easily understood by the target. This shows that the success of



educational video interventions is not only determined by the media itself, but also by the quality of content design carried out by health workers as educators (Setiyawati, Hariyati, & Anisah, 2022).

Although in general there was a significant increase in knowledge, there were still 3 respondents (7.1%) who remained in the category of lacking knowledge after the intervention was given. This condition can be explained through the theory of factors that affect Knowledge, which states that in addition to exposure to information, internal factors such as interest, learning motivation, and individual cognitive abilities also determine the extent to which a person is able to absorb the information provided. That is, one exposure to educational media is not always enough to change the level of knowledge in all individuals, especially for those with a lower level of interest or literacy ability. Variations in individual responses to the same intervention are common in media-based health education research (Notoatmodjo, 2022).

Researchers assume that the lack of success in increasing knowledge in a small percentage of respondents is likely caused by situational factors during the intervention, such as lack of concentration of respondents due to interference from children who were brought along, or the duration of watching videos that were not followed in full by the respondents. In addition, the lower educational background of some respondents was also suspected to affect the ability to understand medical terms contained in educational videos even though they had been simplified. These conditions indicate that individual factors still need to be a concern in the design of media-based health education interventions in the future. Therefore, additional assistance for groups of respondents with certain characteristics can be considered as a complement to educational video interventions.

Theoretically, the changes in knowledge that occur in this study can also be understood through the stages of knowledge formation which includes the process of knowing (know), understanding (comprehension), to Application (application), where educational videos play a role in facilitating respondents to pass through these stages more quickly than conventional educational methods. The visualization of the immunization process shown in the video allows the respondent not only to know the information textually, but also to understand its context and relevance in everyday life. This deeper understanding process ultimately has an impact on the high proportion of respondents who move to the good knowledge category. Thus, the success of this intervention is not only measured by the increase in score alone, but also by the quality of understanding that is formed in the respondents (Dewi, 2021).

The results of this univariate analysis have important implications for health promotion programs in primary services, especially in efforts to increase child immunization coverage. The finding that educational videos are able to significantly change the distribution of maternal knowledge levels reinforces the urgency of integrating video media as a permanent part of routine educational services in Puskesmas, in line with the policy direction of strengthening digital innovation-based health promotion that the government continues to promote. The availability of practical and accessible educational media is also in line with the needs of modern mothers who

have limited time to attend face-to-face counseling on a regular basis. Therefore, these results can be the basis for consideration for policy makers at the Puskesmas level to adopt educational videos as a sustainable health promotion strategy (Ministry of Health, 2023).

Overall, the results of univariate analysis in this study show that health education videos as nurse innovations have a real impact on improving the distribution of maternal knowledge about child immunization in the Working Area of the Padang City Desert Health Center. Although a small percentage of respondents have not shown optimal changes, in general, the pattern of changes that have occurred confirms that audiovisual media-based educational approaches are worth maintaining and developing further. This success is inseparable from the active role of nurses as innovators in designing educational media that suit the needs of the local community. The findings in this univariate section then become an important basis for the discussion of bivariate analysis to examine the statistical significance of changes in knowledge that has been described.

2. Differences in Maternal Knowledge About Child Immunization Before and After Health Education Video intervention

The results of bivariate analysis in Table 2 showed that of 42 respondents, 37 people (88.1%) experienced an increase in knowledge scores after the intervention (positive ranks), 1 person (2.4%) experienced a decrease in scores (negative ranks), and 4 people (9.5%) did not show changes in scores (ties). Wilcoxon test results obtained a Z value of -5.412 with a p-value of 0.000 ($p < 0.05$), which indicates a statistically significant difference in the level of maternal knowledge between before and after the provision of health education video intervention. The significantly greater predominance of positive ranks over negative ranks reinforces the evidence that the increase in knowledge that occurs is not due to chance factors, but is a real effect of the intervention provided. These findings form the main basis for further discussion of statistical significance as well as its relevance to theory and related research.

The selection of Wilcoxon Signed Rank Test in this study was in accordance with the characteristics of ordinal data and came from the same group with two paired measurements (pretest and posttest). This test was chosen because the knowledge data is not normally distributed, so the use of parametric tests such as paired t-tests does not fully meet the required statistical assumptions. The use of nonparametric tests with a similar approach is also applied to research on the effectiveness of health education on maternal knowledge about diseases that can be prevented by immunization in Posyandu, which also conducts data normality tests first before determining the type of different tests used. The accuracy of the statistical test selection is important to ensure that the resulting conclusions really reflect the real data conditions (Balqis et al., 2023).

A p-value of 0.000 that is well below the threshold of 0.05 indicates a very strong level of significance, so the null hypothesis that there is no difference in knowledge before and after the intervention can be rejected with high confidence. The Z value of -5.412 also describes the distance



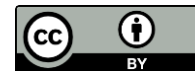
between the pretest and posttest data, indicating that the change in knowledge that occurs is consistent in the majority of respondents. This high statistical significance reinforces the validity of the conclusion that health education videos that are Nurse innovations have a real influence on improving maternal knowledge. These results also provide confidence that the findings in this study sample can be generalized to a wider population with similar characteristics.

This significant finding is in line with the results of research on the effectiveness of education in women of childbearing age related to tetanus diphtheria immunization in the Bandarharjo Health Center working area, which also used the one group pretest-posttest design and obtained Wilcoxon test results with a p-value of 0.000. The similarity of the results in these two studies, although conducted on different immunization topics, reinforces the evidence that educational videos are consistently capable of producing statistically meaningful changes in knowledge. The consistency of the results between studies with the same analysis method also shows that the effectiveness of educational videos is not an accidental finding in one particular population. This strengthens the position of educational videos as an intervention that deserves to be replicated in various immunization programs in other Puskesmas working areas (Sari, Aini, Tahitoe, & Kamila, 2023).

The results of this study are also in line with research on maternal knowledge before and after child immunization counseling using video Learning media, which found a significant increase in maternal knowledge after video-based intervention with statistically significant test results. The similarity of the pattern of knowledge change between the study and this study further reinforces the empirical evidence that educational videos have similar leverage on increasing maternal knowledge about child immunization in different contexts. The similarity of topics and directions of the results in these two studies also showed that the success of educational video interventions was consistently found in maternal populations with diverse characteristics. Thus, these findings reinforce the generalization that learning videos are an effective strategy for child immunization education (Herliana & Fitria, 2025).

The statistical significance of this study was also supported by research on the effectiveness of health education on maternal knowledge about diseases that can be prevented by immunization in Posyandu, which found a significant increase in knowledge score from an average of 6.72 to 13.56 with a p value < 0.001. Although the p-value in the study was slightly different from this study, both remained well below the significance threshold of 0.05 so that the resulting conclusions remain consistent, namely that there are significant differences in maternal knowledge after the provision of media-based health education. This difference in the magnitude of the p-value also indicates that the effectiveness of media-based education is relatively stable even though it is applied to slightly different intervention designs and populations. The similarity in the direction of the results in these two studies further strengthens the validity of educational videos as a reliable intervention media in maternal and child health programs (Balqis et al., 2023).

The dominance of positive ranks as many as 37 respondents compared to negative ranks of only 1 respondent can be explained through the theory of knowledge change, which states that the



provision of appropriate information stimulus and according to target needs will encourage cognitive changes for the better in the majority of exposed individuals. This very high proportion of positive ranks indicates that educational videos designed by nurses have managed to effectively convey health messages to almost all respondents. The low proportion of negative ranks also indicates that the risk of negative impact or confusion due to the provision of information through video is relatively small. This confirms that educational videos are a safe and effective medium to be widely applied in health promotion programs (Herliana & Fitria, 2025).

The consistency of significant results in this study was also strengthened by research on the effectiveness of exclusive breastfeeding educational videos on maternal knowledge, which used a similar quasi-experimental design and the Wilcoxon statistical test, and found a significant effect of education through video media on increasing maternal knowledge. The similarity of the research design between the study and this study, which both use the pre and post test without control approach, reinforces the methodological validity of the findings obtained. The consistency of results on a variety of maternal health topics, from exclusive breastfeeding to immunization, shows that educational videos have cross-topic effectiveness in increasing maternal knowledge. Therefore, educational videos can be considered as a flexible intervention medium for various maternal and child health programs (Damayanti, 2023).

There was 1 respondent who experienced a decrease in knowledge score after the intervention (negative ranks), which is an interesting finding to discuss further. Researchers assume that the decline in scores on the respondents are likely caused by factors of error in filling out the questionnaire posttest, such as lack of thoroughness of respondents in reading the questions due to fatigue or impaired concentration at the time of filling. In addition, respondents may experience confusion due to new information received through video, especially if there are terms that are not familiar even though they have been simplified. This condition is normal in small-scale intervention studies and does not affect the overall conclusion given the very small proportion of respondents who experience an increase.

A total of 4 respondents (9.5%) showed no change in the knowledge score (ties) after the intervention was given. This condition can be explained through the theory of factors that influence knowledge, which states that individual characteristics such as education level, age, and previous experience also determine the extent to which a person is able to absorb new information despite having received exposure to the same educational media. Respondents who previously had good enough knowledge tended not to show significant changes in scores because their knowledge achievement was relatively stable before the intervention. This shows that the effectiveness of the intervention is not always homogeneous in all respondents, but is influenced by the initial conditions of knowledge of each individual (Notoatmodjo, 2022).

The results of this study also reinforce the findings in a study that evaluated the effectiveness of audio-visual media counseling on the level of maternal knowledge about basic immunization, which showed that the group that received education through audio-visual media experienced a more significant increase in knowledge than the group that only received

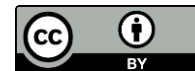


conventional lecture methods based on the results of the Wilcoxon test. Although the study used a control group design while this study used a one-group design, the similarity in the direction of the results in both studies reinforces the evidence that audio-visual media in general are superior to conventional educational methods. These advantages are consistently found across different study designs and different populations. This further confirms that the selection of video as a form of educational innovation by nurses in this study is the right and evidence-based choice (Syilvia, 2025).

The significance of the bivariate test results in this study can not be separated from the role of nurses as innovators in designing educational media in accordance with the needs and characteristics of the community in the working area of the desert Health Center. The active involvement of nurses in the video content design process, from simple language selection to visualization relevant to the local context, contributes to the high effectiveness of interventions demonstrated by statistical test results. The role of nurses as innovative educators is in line with the demands of modern primary health care that requires health workers not only to be informers, but also developers of effective and efficient educational methods. Thus, the results of this bivariate test also serve as empirical evidence for the successful role of nurse innovation in supporting health promotion programs (Setiyawati, Hariyati, & Anisah, 2022).

From the methodological side, the use of one group pretest-posttest design in this study has advantages in the form of time efficiency and research costs, but also has limitations in the absence of a control group as a comparison, so that changes in knowledge that occur potentially influenced by external factors such as the effect of repetition of measurements (testing effect). Similar design limitations were also recognized in the study on the effectiveness of video education on parents' knowledge and attitudes about complete basic immunization at Bandarharjo Health Center, which used the same analytical approach but still showed statistically valid and meaningful results. This limitation needs to be noted for future research to consider the use of a control group to strengthen the internal validity of the results of the study. Nevertheless, the very strong significance of the results in this study ($p=0.000$) still provides convincing evidence of the effectiveness of the interventions provided (Qurrotul, Setyawan, Pandu, & Kusuma, 2023).

Researchers assume that the results of this significant bivariate test have important practical implications for health promotion programs in the desert Health Center, namely that educational videos can be used as one of the standard methods in providing immunization education to mothers, both in Posyandu activities, home visits, and through social media that is widely accessed by the public today. This statistically proven effectiveness also opens up opportunities for nurses to continue to develop a variety of educational video content in accordance with the specific needs of the community in various villages with low immunization achievement. This approach is considered more efficient than conventional counseling methods that require more time and effort to reach all targets. These implications are an important basis for the sustainability of future video-based innovation programs.



Overall, the results of bivariate analysis in this study prove statistically that there is a very significant difference in the level of knowledge of mothers about child immunization before and after the provision of health education video which is an innovation of nurses in the Working Area of Puskesmas Desir Pasir Kota Padang. These findings reinforce and complement the results of the univariate analysis discussed earlier, while providing strong scientific evidence for the effectiveness of educational videos as a nurse innovation-based health promotion strategy. The consistency of the results of this study with similar studies further strengthens the recommendations for the wider application of educational videos in various primary health services. Thus, the results of this bivariate test become a solid empirical foundation for the final conclusion of the study on the effectiveness of Health Education video innovation to increase maternal knowledge about child immunization.

CONCLUSIONS

The results showed that there was an increase in maternal knowledge about child immunization after intervention in the form of health education videos. Before the intervention, most of the mothers were in the category of lack of knowledge, which amounted to 59.5%, while after the intervention the proportion of mothers with good knowledge category increased to 71.4%. The results of the Wilcoxon test showed a value of $p=0.000$ ($p<0.05$), which indicates a significant difference between the level of knowledge of mothers before and after being given educational videos. These findings indicate that health education videos can be an effective and innovative educational media in increasing maternal knowledge about child immunization. Therefore, educational videos can be considered as one of the health promotion media used by Puskesmas nurses in supporting the implementation of immunization programs, especially to improve mothers understanding of the importance of immunization, immunization schedule, and the benefits of immunization for health and Child Protection. Further research is recommended to use a design with a control group, a larger number of samples, more diverse research sites, and perform follow-up measurements to determine the retention of knowledge and the impact of educational videos on maternal compliance in completing child immunization.

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