



# The Impact of WhatsApp Social-Media on Tuberculosis Treatment Compliance at Banabungi Community Health Center in Buton Regency, Southeast Sulawesi

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## Abstract

Tuberculosis (TB) is an infectious disease caused by the Mycobacterium tuberculosis which attacks the lungs. In 2022, Buton Regency reported 255 TB cases, with the highest number occurring in the Banabungi area as many as 58 cases. This study aims to analyze the effect of education through animated videos using WhatsApp platform on tuberculosis treatment adherence. This quantitative study used an experimental quasi design with a pre-test post-test with control group. The population of this study involved all TB patients in Banabungi, Buton Regency. Saturated sampling techniques that meet the inclusion and exclusion criteria were used, totalling 54 people. Two groups were created from the samples: a control group consisting of 27 individuals and an intervention group consisting of 27 individuals. A questionnaire measuring knowledge, attitudes, and compliance was used to collect the data, which were collected between September and November of 2023. The campaign took the form of educating people about the importance of taking TB medications by sending them animated films over WhatsApp. Data were analyzed using the Paired t-test, Wilcoxon Rank Test and Independent t-test, and Mann-Whitney. There was a significant effect of education through animated videos using WhatsApp media on knowledge ( $p=0.000$ ) and attitudes ( $p=0.000$ ) on drug consumption adherence. The Mann-Whitney test showed significant differences in knowledge ( $p=0.004$ ), attitudes ( $p=0.012$ ), and compliance ( $p=0.000$ ) between the intervention group and the control group after exercising the education. Exercising WhatsApp-mediated education in the form of animated videos has a significant contribution on knowledge, attitudes, and adherence of TB patients to taking drugs.

**Keywords:** Lung Tuberculosis, Knowledge, Attitude, Action, Video, WhatsApp.

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## 1. Introduction

The bacteria Mycobacterium tuberculosis causes tuberculosis (TB), an infectious disease that primarily affects the lungs. Tuberculosis is currently targeted by the Sustainable Development Goals (SDGs) with the aim of eliminating TB epidemics by 2030 [1]. Tuberculosis is among the ten most lethal diseases globally, with an anticipated 10.6 million cases in 2021, representing a growth of 600,000 cases compared to the year before. Experts anticipate one billion cases of tuberculosis occurring in 2020 [2]. The number of tuberculosis (TB) cases in Indonesia in 2021 was 397,377,

which is an increase compared to the total number of TB cases detected in 2020, amounting to 351,936. In 2021, the Southeast Sulawesi Provincial Health Service documented a total of 14,862 cases of tuberculosis (TB) across 17 districts and cities in Southeast Sulawesi. Among these, Kendari City had the highest number of cases with 4,098, followed by Central Buton Regency with 1,754 cases and Bombana Regency with 1,542 cases [3].

In 2022, there were 255 TB cases in Buton Regency, an increase of 89 instances from 2021. Twelve TB patients died, two cases dropped out, and nine cases were resistant. The

working area of the Banabungi Community Health Center will have the most TB cases in 2022, with 58 cases, and the working area will also have the most resistant cases, with 3 cases, 1 instance of school dropout, and 1 death. One of the causes of the decline in treatment success rates is the role of PMO in supporting and hindering the continuation of optimal tuberculosis treatment [4]. The most critical aspect of attempting to cure an illness is successfully taking medication. Knowledge factors, family support, medication motivation, and poor communication of educational information (KIE) all have an impact on pulmonary tuberculosis treatment [5]. Studies indicate that many factors contribute to patient non-compliance with TB therapy, including limited understanding of TB, work disruption, financial challenges, limited healthcare access, societal stigma, medication side effects, lengthy treatment duration, reduced appetite, and inadequate communication with healthcare professionals [6]. An alternative to improving treatment compliance is to employ applications. This software can facilitate communication between patients and medical professionals, assist individuals in remembering their treatment plan, and provide information about the negative effects of medications. WhatsApp is a commonly used program for exchanging messages, regardless of the distance between the sender and recipient. WhatsApp possesses compelling qualities, rendering it more efficient than other forms of media. Prior studies have established that health promotion via WhatsApp media and leaflets positively affects attitudes and knowledge. The aforementioned impact is evident in the knowledge and attitude gains that ensue subsequent to health promotion [7]. As a result, researchers are keen to investigate the impact of WhatsApp media intervention on treatment compliance in tuberculosis patients in the Banabungi Community Health Center working region.

## 2. Methodology

The research employed a quasi-experimental design, utilizing a pretest-posttest methodology with a control group. This research was carried out in the Banabungi PHC, Buton Regency, Southeast Sulawesi, from 05 September to 01 November 2023 and has been approved by the Ethics Committee of the Faculty of Public Health, Hasanuddin University Makassar with number 4946/UN4.14.1/TP.01.02/2023. Saturated sampling met inclusion and exclusion criteria, yielding 54 respondents. The sample consisted of 27 intervention and 27 control respondents. The research instrument is a validated and reliable questionnaire. The knowledge questionnaire has 13 questions using a Guttman scale, with "correct" scoring 1 and "wrong" scoring 0. The attitude questionnaire has 10 Likert scale items with four answers: strongly agree (SS) = 4, agree (S) = 3, disagree (TS) = 2, and strongly disagree (STS) = 1. Compliance uses the Morisky Medication Adherence Scale-8 (MMAS-8) questionnaire, which comprises 8 questions with a "yes" answer category scoring 0 and a "no" answer scoring 1 and a Likert scale on the last item. This study's intervention media consisted of a 6-minute, 32-second animated animation concerning pulmonary tuberculosis treatment compliance. Multimedia programmers, pulmonary tuberculosis programmers, and medical professionals all worked together to create this film. Experts in both media and subject matter validate the produced videos to determine their value as educational media. Selected respondents were

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provided with an explanation of the research objectives and requested to provide informed consent by signing a consent form at the time of research. Following this, the participants will be separated into two groups: the control group and the intervention group. The researchers incorporated the participants in the intervention group into the WhatsApp group but did not do so for the control group. The researchers administered a pre-test to assess the knowledge, attitudes, and compliance of the participants with regard to pulmonary tuberculosis treatment in both groups. This was done subsequent to the formation of the two groups. The direct administration of the questionnaire to the respondent ensured that all questions were answered by the respondent himself. Following the pre-test, drug reminders were delivered to the intervention group every day at 20:30 a.m. from October 4, 2023, to October 31, 2023. The researchers and respondents agreed on a time for the delivery of the medication reminder message. Researchers use the WASENDER V16 application to send medication reminder messages in accordance with a predetermined schedule. The researchers initiated the intervention one week subsequent to the pre-test by disseminating an animated video to the intervention group through the social media platform WhatsApp. Meanwhile, the control group underwent treatment in accordance with the community health center program, which involved obtaining health education directly from health workers who were tasked with executing the tuberculosis program. The researcher created a poll in the WhatsApp group to ask respondents if they had watched the animated video and a quiz about the video's content to ensure that respondents watched it to the end. Following the confirmation that all participants had viewed the film, a post-test was conducted the day after the video was sent to assess the participants' knowledge, attitudes, and compliance with pulmonary tuberculosis treatment. This measurement is also conducted directly to verify that the respondent independently completes and responds to all the items on the post-test questionnaire. After collecting data, the researcher edited, coded, tabulated, and entered it. The processed data was analyzed with SPSS. The data were examined univariately and bivariately. Univariate analysis uses frequency distribution, while bivariate analysis employs the Paired Sample T Test, Wilcoxon Signed Rank Test, Independent Sample T-test, and Mann-Whitney U at 95% confidence ( $\alpha = 5\%$ ) [8].

## 3. Results

Table 1 displays that the intervention group was dominated by 17 women (63.0%), while the control group was dominated by 32 women (59.26%). Meanwhile, the 39-48-years age group dominated the intervention group with 9 (33.33%), whereas responders in the 29-38 years age range dominated the control group with 10 (37.04%). Moreover, the last education category in both the intervention group and control group was mainly comprised of respondents with a high school education, with 12 individuals (44.4%) and 11 individuals (40.7%), respectively.

Meanwhile, the occupational categories in the intervention and control groups were predominantly composed of workers, with 19 individuals (70.4%) and 16 individuals (59.35%), respectively. According to Table 2, the comparison value of the intervention and control groups in the pre-test and post-test reveals a p value of 0.000, indicating that there is a difference in knowledge scores for the pre-test

and post-test. Meanwhile, the mean value in the intervention and control groups showed that the intervention group had a greater change value than the control group, with an increase in the intervention group's mean value of 4.67 and 2.52 in the control group. Therefore, it can be inferred that knowledge has an influence on respondents' medication adherence before and after the animated video-based educational intervention via WhatsApp social media. The comparison value between the pre-test and post-test attitude scores of the control and intervention groups is 0.000, indicating that there is a significant difference in the scores for the pre-test and post-test. Conversely, the mean value in the intervention and control groups indicates that the intervention group experienced a greater shift compared to the control group, with a mean value increase of 2.6 in the intervention group and 2.2 in the control group. As a result, it can be inferred that there is an influence on respondents' views toward medicine compliance before and after the animated video-based educational intervention via WhatsApp social media. Table 3 indicates that in the pre-test, the p-value for the knowledge variable is 0.277, which is above the significance level of 0.05. There is no statistically significant difference in the pre-test scores for the knowledge variable between the intervention group and the control group. The attitude variable's p value is 0.297, which is larger than the probability value of 0.05. The findings of this test are not statistically significant, meaning there is no change in pre-test scores for attitude variables between the intervention and control groups. The sign value. Because the (2-tailed) compliance variable is  $0.118 > 0.05$ , there is no significant difference between the intervention and control groups' average compliance scores. The post-test asymptotic value for the knowledge variable (Sig. 2 tailed) is 0.004, which is above the significance level of 0.05. The findings of this test are statistically significant, indicating that there is a difference in post-test knowledge variable scores between the intervention and control groups. The Sig value (2-tailed) attitude variable is 0.012  $< 0.05$ , indicating that there is a significant difference between the intervention and control groups' average attitude scores. Asymp. (2 tailed) compliance variable is 0.000 value  $< 0.05$ . The findings of this test are statistically significant, implying that there is a difference in post-test compliance levels between the intervention and control groups. According to Table 1.3, the pre-test intervention group and control group have a p value of 0.277 for the knowledge variable, indicating that there is no significant difference between the intervention group and the control group. Following a post-test on the intervention and control groups, the p value was 0.004, indicating a significant difference between the intervention and control groups. The pre-test for the intervention and control groups in the attitude variable had a p value of 0.297, indicating that there was no significant difference between the intervention and control groups. Following a post-test on the intervention and control groups, the p value was 0.012, indicating a significant difference between the intervention and control groups. The pre-test for the intervention and control groups in the compliance variable had a p value of 0.118, indicating that there was no significant difference between the intervention and control groups. Following a post-test on the intervention and control groups, the p value was 0.000, indicating a significant difference between the intervention and control groups.

## 4. Discussion

### 4.1. The impact of knowledge and attitudes in groups before and after intervention

#### 4.1.1. Knowledge

Statistical tests reveal that there is an increase in respondents' knowledge in both the intervention and control groups. The intervention group's mean pre-test score of 6.33 increased to 11.00 after the post-test, indicating an improvement in respondents' knowledge. The average score of the control group prior to the pre-test was 6.78, whereas the average score of the intervention group increased subsequent to the pre-test. After the post-test, the intervention group's mean score increased significantly more than that of the control group. The intervention group mean value increased by 4.67, whereas the control group increased by 2.52. The p value for both groups is  $0.000 < 0.05$ , indicating a difference in knowledge levels between before and after the tests. Therefore, the animated video-based teaching intervention via WhatsApp social media affects medication adherence knowledge before and after. Yaumul Adha's (2016) research on the effect of video counseling on the level of knowledge of pulmonary tuberculosis prevention (case study at MA Husnul Khatimah, Rowosari Village, Tembalang District, Semarang City) supports the findings, indicating that the group treated with video counseling experienced an increase in knowledge from pre-test to post-test (p value = 0.000). A similar study by Aeni and Yuhandini, (2018) demonstrated that video-based media increased adolescents' understanding of BSE both prior to and following the intervention. Likewise, an investigation conducted by Angelina et al., (2019) compared the efficacy of animated videos and moving image media in enhancing mothers' understanding of balanced nutrition for toddlers. The findings of the study indicated that animation media had a greater impact on educating mothers about balanced nutrition. The amount of education, experience, information, and cultural and socioeconomic context are all factors that influence a person's knowledge. Every human being receives or captures knowledge through their five senses, following the principle of media preparation. The greater the number of senses employed to perceive something, the greater and clearer the understanding or knowledge received. As a result, video media that stimulates two senses, namely sight and hearing, gives the target a clearer understanding and knowledge than food-based media that only stimulates one type of sense [11-12]. This research further demonstrates that possessing adequate knowledge does not necessarily ensure the ability to make the appropriate decision and pursue the correct course of action. Within this study, there were participants who possessed adequate information yet demonstrated noncompliance in adhering to tuberculosis medication.

This phenomenon occurs due to multiple elements that exert an influence on this behavior. According to Notoatmodjo, (2010), both internal factors, such as a person's level of interest, intelligence, and physical well-being, and external factors, specifically the influence of their environment, including their family, community, and access to health facilities, infrastructure, and effective learning strategies and methods, shape a person's knowledge. The medium utilized greatly influences the effectiveness of health

education in enhancing knowledge, especially when employing multimedia formats such as movies or interactive games that engage many senses [14-15]. Providing educational videos using WhatsApp has demonstrated more efficacy in enhancing knowledge regarding the prevention of TB transmission in patients as compared to delivering information through leaflets [16]. WhatsApp groups demonstrate how this communication tool may streamline the research process by simplifying communication and speeding up decision-making, especially under tight deadlines [17]. Pereira et al., (2020) found that using WhatsApp groups for health education purposes among women is a viable alternative and breast cancer control approach since it can provide a space for exchanging experiences. This study investigates the use of WhatsApp as a tool to facilitate knowledge exchange for risk reduction and early diagnosis of breast cancer in women. Furthermore, this benefit extends beyond breast cancer-related messages to encompass a variety of other health programs.

#### **4.1.2. Attitudes**

The findings of statistical tests reveal that respondents' attitudes in both the intervention and control groups have improved. The intervention group's mean score increased from 23.11 to 35.81 following the post-test. Meanwhile, the mean pre-test score in the control group was 22.26, which jumped to 33.96 following the post-test. If you pay attention, the intervention group's mean score during the pre-test and after the post-test is greater than the control group's. From pre-test to post-test, the intervention group's mean score increased by 12.7, whereas the control group's mean score increased by 11.7. Angelina et al., (2019) discovered that animation media was more effective in improving mothers' attitudes about balanced nutrition than moving images in their study on the effectiveness of using moving image media and animated videos to increase mothers' knowledge about balanced nutrition in toddlers. This demonstrates that education through animation media is more effective than education through other educational media such as moving pictures or counseling (according to the community health center program in this study). In the meantime, statistical analyses indicate that both the intervention group and control group respondents' attitudes have improved ( $p$  value  $0.000 < 0.05$ ). This indicates that there is a significant disparity in scores between the pre-test and post-test. Despite a concurrent increase in scores between the pre-test and post-test, the intervention group exhibited a superior mean score (35.81) in the post-test as opposed to the control group (33.96). The results mentioned above indicate how respondents' opinions changed both before and after receiving an intervention in the form of educational animated videos. The large percentage of respondents in the good group suggests this. Newcomb defines attitude as a person's readiness to act, which is impacted by their level of knowledge [13].

## **4.2. The Impact of Knowledge, Attitudes, and Medication Compliance on the Intervention and Control Groups**

### **4.2.1. Knowledge**

We used the Mann-Whitney test to compare the beginning knowledge between the intervention and control  
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groups. The test findings show a  $p$  value of 0.277, indicating that the knowledge variable scores in the intervention and control groups are the same. An independent sample t-test was performed following the intervention. With a  $p$  value of 0.004, the results suggest that there is a significant difference between the intervention and control groups. This demonstrates the impact of leveraging WhatsApp media to provide animated video-based education to boost respondents' understanding about compliance with medication. The findings of this study align with the research conducted by Aeni and Yuhandini, (2018) on the impact of health education using video media and demonstration methods on awareness and knowledge. The research findings indicated that the female students at SMAN 1 Sumber possessed enough knowledge prior to receiving the video intervention. However, their knowledge significantly improved following the video intervention, reaching a substantial level. A recent study conducted by Putri and Fitria (2021) demonstrated a significant improvement in the knowledge of mothers with children following a nutritional intervention utilizing the WhatsApp group application. The intervention involved the use of educational videos, resulting in a notable rise of 0.9 points in knowledge scores. Furthermore, Saengow et al. (2018) empirically demonstrate that animated educational movies enhance drug comprehension among individuals with epilepsy. Animated videos are highly effective in health education for increasing health knowledge because they are artistically pleasing, simple to comprehend, informative, and effective. Animated video media has demonstrated considerable efficacy in augmenting patient awareness across diverse age cohorts and disease categories [21]. Incorporating 11 minutes of educational videos into a single meeting effectively enhances knowledge [22]. This indicates that using video as a health education medium has a favorable influence on delivering information and knowledge to the target audience. Using video as a medium of communication presents health messages more clearly and interestingly, making the audience more responsive and facilitating their understanding of the conveyed information. Various research findings indicate the effectiveness of using audio-visual media (animated videos) in increasing respondents' knowledge, particularly when supported by applications such as WhatsApp. This will increase the level of acceptance from educators for those who are educated. The accessibility of receiving information via the WhatsApp application is a good advantage for health personnel who use this tool to provide education. So that the knowledge supplied can reach patients without regard to time or place.

### **4.2.2. Attitude**

The independent sample t-test was used to conduct an initial attitude analysis between the intervention and control groups. The  $p$  value of 0.297 indicates that there is no significant difference in initial attitudes between the intervention and control groups. Meanwhile, the post-intervention test results revealed a significant difference between the intervention and control groups, with a  $p$  value of 0.12. This demonstrates that offering animated video-based teaching via WhatsApp media has an impact on

respondents' views toward medication adherence. Angelina et al., (2019) discovered that animated videos can improve mothers' attitudes about balanced nutrition in toddlers, starting with a fairly positive attitude toward fulfilling nutrition and progressing to a more positive attitude after providing intervention through animated videos. Kepti et al., (2013) found that audiovisual health education on toddler diarrhea management improved average attitude scores [22]. Similarly, Edyati's study conducted in 2014 showed a notable enhancement in the personal cleanliness attitudes of pupils at SD Negeri 1 Kepek Pengasih Kulon Progo following counseling sessions that utilized video media [10]. Rezky et al., (2021) demonstrated the impact of providing video education on attitudes about stunting among Midwifery Department students at the Makassar Ministry of Health Polytechnic [23]. The findings of the above study, as well as the findings of other similar studies, show that using animated videos as a tool to help change respondents' attitudes demonstrates the importance of media in improving respondents' attitudes toward assessing and acting more positively in compliance with taking TB medication. Seeing the animated video causes a shift in attitude, indicating that the message conveyed through the video can be absorbed and implemented in the respondent's attitude.

#### **4.2.3. Compliance**

The independent sample t-test was used to compare initial compliance between the intervention and control groups. The test findings revealed a p value of 0.118, indicating that there was no statistically significant difference in initial compliance between the intervention and control groups. Meanwhile, the Mann-Whitney test findings after the intervention revealed a significant difference between the intervention and control groups with a p value of 0.000. This suggests that using WhatsApp media to provide animated video-based teaching can boost respondents' compliance with taking TB medications. The results mentioned above align with the study conducted by Wati et al., (2017), which showed that the utilization of video-based health education effectively enhanced students' adherence to handwashing with soap. Compared to the proper hand-washing observed after the post-test, which involved watching an instructional video on correct hand-washing techniques, the pre-test showed an increase in the incidence of improper hand-washing. Another study by Jannah and Murni, (2019) likewise observed an increase in compliance with ingesting blood-boosting medications in pregnant women from pre-test to post-test after being given intervention via audio-visual media. Given the intricacy of adhering to anti-diabetic and anti-hypertension medication, instructional interventions via WhatsApp can serve as effective reinforcement to enhance compliance with therapy [27]. Many people choose WhatsApp as an educational medium, including health education, because of the multiple facilities and conveniences it provides. Rathbone et al., (2019) found that pharmacists may use WhatsApp as a valuable tool to facilitate

pharmaceutical services outside of business hours, improve service quality, and strengthen client or patient relationships [27]. The results of this research indicated that increasing patient adherence to tuberculosis medication could be achieved through the use of personal communication channels to deliver medication reminders at predetermined intervals. The increase in patient compliance from the pre-test to the post-test demonstrates this. Pandya (2020) conducted a similar investigation using WhatsApp-based interventions, specifically Mindful Eating (ME) posts, to demonstrate their efficacy for food-allergic adolescents [28]. Another study, conducted by Manav et al., (2021), on the influence of parenting education delivered via WhatsApp on maternal and baby proximity rates in Turkey yielded similar results, revealing that parental education intervention delivered via WhatsApp significantly increased levels of mother and baby attachment [29]. Educational intervention through WhatsApp is considered quite effective and efficient, although packaged in simple message form. Research by Alshahrani et al., (2021) using WhatsApp intervention media showed post-intervention using WhatsApp showed a significant improvement in the proportion of participants with moderate intensity physical activity in the workplace and recreation [30]. Compared to the control group, the average metabolic equivalent per week in the intervention group increased significantly. The difference in average total physical activity before and after intervention is significant in all domains and in all categories of activity. Video is well-accepted as a health promotion tool, especially for TB patients who are responsive, and it increases hypertension medication compliance. Audiovisual video with animation and non-monotonous explanation is ideal for conveying information to people who struggle with printed media. Nevertheless, to enhance patient adherence to medicine, the utilization of multimedia for information dissemination is more efficacious when combined with supplementary treatments, such as instructions from physicians or other healthcare professionals. Patients require comprehensive information regarding their treatment to ensure the safe and efficient utilization of the drug. To prevent the development of multidrug-resistant (MDR) or drug-resistant tuberculosis, it is crucial to strictly adhere to the prescribed medication regimen, following both the recommended dosage and schedule as instructed by the doctor. Patients must adhere to their prescribed drug regimen without skipping any doses or completely discontinuing the medicine. Furthermore, patients must exercise caution regarding potential exposure to tuberculosis (TB) bacteria, which may emanate from individuals with drug-resistant TB. It is of utmost importance to diligently adhere to the prescribed schedule and dosage of medication during the course of TB therapy. Failure to adhere to the doctor's recommendations may necessitate restarting tuberculosis treatment and recommencing tuberculosis medication. Hence, following the prescribed pharmaceutical regimen is crucial for the recovery of tuberculosis patients.

**Table 1:** Characteristics-Based Respondent Distribution.

Characteristics	Intervention groups		Control groups		Total	
	n=27	%	n=27	%	n=54	%
<b>Gender</b>						
Male	10	37.0	12	44.4	22	40.74
Female	17	63.0	15	55.6	32	59.26
<b>Age</b>						
19 – 28	3	11.11	5	18.52	8	14.82
29 – 38	6	22.22	10	37.04	16	29.62
39 – 48	9	33.33	7	25.93	16	29.62
49 – 58	8	29.63	4	14.81	12	22.23
≥ 59	1	3.70	1	3.70	2	3.71
<b>Education</b>						
Elementary school	6	22.2	7	25.9	13	24.07
Junior High School	5	18.5	7	25.9	12	22.22
Senior High School	12	44.4	11	40.7	23	42.60
College	4	14.8	2	7.4	6	11.11
<b>Occupation</b>						
Working	19	70.4	16	59.3	35	64.81
Not Working	8	29.6	11	40.7	19	35.19

Source: Primary Data, (2023)

**Table 2:** The Impact of Education on Knowledge, Attitudes, and Compliance in Intervention and Control Groups.

Variables	Intervention				Control			
	Mean ± SD	Min	Max	<i>p value</i>	Mean ± SD	Min	Max	<i>p value</i>
<b>Knowledge</b>								
Pre-Test	6.33±2.15	4	13	0.000*	6.78±2.26	4	13	0.000*
Post Test	11.00±2.13	6	13		9.30±2.41	5	13	
<b>Attitudes</b>								
Pre-Test	23.11±3.09	16	30	0.000**	22.26±2.85	18	29	0.000**
Post Test	35.81±2.56	30	40		33.96±2.70	29	39	
<b>Compliance</b>								
Pre-Test	4.77±0.86	3.00	6.0	0.000*	4.36±1.02	2.50	6.0	0.000*
Post Test	7.37±1.17	4.25	8.0		6.54±0.93	4.50	8.0	

Source: Primary Data, (2023)

\* Wilcoxon test, \*\* Paired Sample T-Test

**Table 3:** Comparative assessment of respondents' knowledge, attitudes, and compliance in the intervention group and control group.

Variables	Intervention	Control	p value
	Mean±SD	Mean±SD	
<b>Knowledge</b>			
Pre-Test	6.33±2.14	6.78±2.259	0.277*
Post Test	11.00±2.130	9.30±2.415	0.004*
<b>Attitudes</b>			
Pre-Test	23.11±3.093	22.26±2.850	0.297**
Post Test	35.81±2.558	33.96±2.696	0.012**
<b>Compliance</b>			
Pre-Test	4.77±0.858	4.36±1.024	0.118**
Post Test	7.37±1.169	6.54±0.927	0.000*

Source: Primary Data, (2023)

\* Mann Whitney Test, \*\* Independent Sampel T Test

## 5. Conclusions

- Educational interventions through video animation using the WhatsApp app have an impact on increased knowledge of tuberculosis patients about medication compliance.
- Educational interventions through video animation using WhatsApp applications have an impact on improving attitudes of TB patients towards medication adherence.
- Educational interventions through animated videos using the WhatsApp app influence the improvement of knowledge, attitudes and adherence of respondents to medication use between the intervention and control groups.

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## References

- [1] World Health Organization. (2019). WHO guidelines on tuberculosis infection prevention and control: 2019 update (No. WHO/CDS/TB/2019.1). World Health Organization.
- [2] WHO. (2021). Global Tuberculosis Report 2021. Accessed: Apr. 10, 2023. [Online]. Available: <https://www.who.int/publications/i/item/9789240037021>.
- [3] D. P. S. Tenggara. (2020). Profil Kesehatan Sulawesi Tenggara.
- [4] D. K. Butur. (2021). Profil Kesehatan Kabupaten Buton Utara 2020.
- [5] M. Napitupulu. (2020). Hubungan Peran Pengawas Menelan Obat (PMO) dengan Keberhasilan Minum Obat Pasien tuberculosis Paru di Wilayah Kerja Puskesmas Ulak Tano Kab. Padang Lawas Utara. *Jurnal Komunitas Kesehatan Masyarakat*. 2 (1): 41-47.
- [6] F. H. Gebreweld, M. M. Kifle, F. E. Gebremicheal, L. L. Simel, M. M. Gezae, S. S. Ghebreyesus, N. G. Wahd. (2018). Factors influencing adherence to tuberculosis treatment in Asmara, Eritrea: A qualitative study. *Journal of Health, Population and Nutrition*. 37: 1-9.
- [7] M. Aliva, H. S. E. Rahayu, S. Margowati. (2021). Pengaruh Promosi Kesehatan Melalui Media Leaflet Dan Whatsapp Terhadap Kepatuhan Minum Tablet Zat Besi Pada Ibu Hamil Di Puskesmas Tempuran. *Indonesia Jurnal Kebidanan*. 5 (2): 60-69.
- [8] N. Aeni, S. Yuhandini. (2018). Pengaruh Pendidikan Kesehatan Dengan Media Video Dan Metode Demonstrasi Terhadap Pengetahuan SADARI. *Jurnal Care*. 6 (2).
- [9] C. A. Febriani, D. D. Nuryani, D. Elviyanti. (2019).

- Efektifitas Pemanfaatan Media Gambar Bergerak dan Video Animasi terhadap Peningkatan Pengetahuan dan Sikap Ibu tentang Gizi Seimbang pada Balita. *Jurnal Kesehatan*. 10 (2): 181-186.
- [10] L. Edyati, E. Khusnal. (2014). Pengaruh Penyuluhan Kesehatan Dengan Media Vidio Terhadap Pengetahuan dan Sikap Personal Hygiene Siswa SD Negeri 1 Kepuk Pengasih Kulon Porogo (Doctoral dissertation, STIKES'Aisyiyah Yogyakarta).
- [11] F. N. Rohman, E. Soviana, S. Gz, M. Gizi, S. K. M. D. Widowati. (2015). Pengaruh Penyuluhan Menggunakan Media Animasi Terhadap Pengetahuan Personal Hygiene Pada Siswa Di MI Negeri Baki Sukoharjo (Doctoral dissertation, Universitas Muhammadiyah Surakarta).
- [12] S. Notoatmodjo. (2010). Ilmu perilaku kesehatan. Jakarta: rineka cipta. 200: 26-35.
- [13] F. Tuzzahro. E. Soviana, S. Gz, M. Gizi, R. Sudaryanto, S. GZ. (2015). Pengaruh Penyuluhan Gizi Seimbang Dengan Media Video, Poster dan Permainan Kwartet Gizi Terhadap Pengetahuan Gizi dan Status Gizi Siswa Di Sekolah Dasar Negeri Karangasem Iii Kota Surakarta (Doctoral dissertation, Universitas Muhammadiyah Surakarta).
- [14] A. Y. Adha, D. R. Wulandari, A. B. Himawan. (2016). Perbedaan Efektivitas Pemberian Penyuluhan Dengan Vidio dan Simulasi Terhadap Tingkat Pengetahuan Pencegahan TB Paru (Studi Kasus Di Ma Husnul Khatimah Kelurahan Rowosari Kecamatan Tembalang Kota Semarang) (Doctoral dissertation, Diponegoro University).
- [15] A. I. Latif, N. H. Tiala. (2021). Efektivitas Video Edukasi Melalui Whatsapp Dalam Meningkatkan Pengetahuan Tentang Pencegahan Penularan Pasien Tuberkulosis Paru. *Jurnal Kesehatan*. 14 (2): 111-115.
- [16] T. Jailobaev, K. Jailobaeva, M. Baialieva, G. Baialieva, G. Asilbekova. (2021). WhatsApp Groups in Social Research: New Opportunities for Fieldwork Communication and Management. *Bulletin of Sociological Methodology/Bulletin de Méthodologie Sociologique*. 149 (1): 60-82.
- [17] A. A. C. Pereira, J. R. Destro, M. P. Bernuci, L. F. Garcia, T. F. R. Lucena. (2020). Effects of a whatsapp-delivered education intervention to enhance breast cancer knowledge in women: Mixed-methods study. *JMIR mHealth uHealth*. 8 (7): e17430.
- [18] W. A. K. Putri, V. D. Fitria. (2021). Efektifitas Peningkatan Pengetahuan Pemberian Makanan Bayi dan Anak (PMBA) Melalui Whatsapp Grup Menggunakan Media Infografis dan Video The Effectiveness of Increasing Knowledge of Infant and Child Feeding through whatsapp groups Using Infographics and vedio. *Jurnal Andaliman: Jurnal Gizi Pangan, Klinik dan Masyarakat*. 1 (2).
- [19] V. E. Saengow, P. Chancharoenchai, W. Saartying, W. Pimpa, N. Chotichanon, T. Lewsirirat, P. Srisantisuk. (2018). Epilepsy video animation: Impact on knowledge and drug adherence in pediatric epilepsy patients and caregivers. *Clinical Neurology and Neurosurgery*. 172: 59-61.
- [20] S. Aisah, S. Ismail, A. Margawati. (2021). Edukasi Kesehatan dengan Media Video Animasi: Scoping Review. *Jurnal Perawat Indonesia*. 5 (1): 641-655.
- [21] K. D. Rahayu, I. Kartika, D. Mahmudah. (2020). Pengaruh Paket Edukasi Dasar Audiovisual SADARI terhadap Pengetahuan tentang SADARI pada Remaja Puteri. *Media Karya Kesehat*. 3 (1).
- [22] R. E. Kepti, Y. Rustina, W. Widyatuti. (2013). Efektifitas Audiovisual Sebagai Media Penyuluhan Kesehatan Terhadap Peningkatan Pengetahuan dan Sikap Ibu dalam Tata Laksana Balita dengan Diare di Dua Rumah Sakit Kota Malang. *Journal of Nursing Science Update (JNSU)*. 1 (1): 53-60.
- [23] F. Rezky, A. Adam, Nursalim, R. Suriani. (2021). The Effect of Nutritional Education through Videos on Knowledge and Attitude of Midwives Department Students About stunting. *Media Gizi Pangan*. 28.
- [24] N. Wati, N. Yuniar. (2017). Pengaruh Intervensi Penayangan Video terhadap Pengetahuan, Sikap dan Tindakan Tetang Cuci Tangan Pakai Sabun Pada Siswa SDN 10 Kabawo Tahun 2016 (Doctoral dissertation, Haluoleo University).
- [25] M. Jannah, N. N. A. Murni. (2019). Penggunaan Media Audio Visual Meningkatkan Kepatuhan Konsumsi Tablet Tambah Darah Pada Ibu Hamil. *Jurnal Kesehatan Prima*. 13 (2): 108-114.
- [26] A. C. Sartori, T. F. R. Lucena, C. T. Lopes, M. P. Bernuci, M. U. Yamaguchi. (2019). Educational Intervention Using WhatsApp on Medication Adherence in Hypertension and Diabetes Patients: A Randomized Clinical Trial. *Telemedicine and e-Health*. 26 (12): 1526-1532.
- [27] A. P. Rathbone, R. Norris, P. Parker, A. Lindsley, A. Robinson, W. Baqir, A. Husband. (2020). Exploring the use of WhatsApp in out-of-hours pharmacy services: a multi-site qualitative study. *Research in Social and Administrative Pharmacy*. 16 (4): 503-510.
- [28] S. P. Pandya. (2020). Adolescents living with food allergies in select global cities : Does a WhatsApp-based mindful eating intervention promote wellbeing and enhance their self-concept ? *Journal of Pediatric Nursing*. 55: 83-94.
- [29] A. I. Manav, E. Gozuyesil, E. Tar. (2021). The effects of the parenting education performed through Whatsapp on the level of maternal-paternal and infant attachment in Turkey. *Journal of pediatric nursing*. 61: e57-e64.
- [30] A. Alshahrani, A. Siddiqui, S. Khalil, S. Farag, N. Alshahrani, A. Alsabaani, H. Korairi. (2021). WhatsApp-based intervention for promoting physical activity among female college students, Saudi Arabia: a randomized controlled trial. *Eastern Mediterranean health journal*. 27 (8): 782-789.