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Empowering Change Agents: Capacity Building for Health Cadres to Promote Adolescent Reproductive Health at The Tawangrejo Health Center Madiun City

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ABSTRACT Adolescent reproductive health remains a critical public health concern, exemplified by the persistent incidence of adolescent pregnancy and limited awareness among youth and community health volunteers. This study aims to evaluate the effectiveness of capacity-building interventions, specifically training health cadres with adolescent reproductive health pocketbooks, in enhancing their knowledge and attitudes towards adolescent reproductive health at the Tawangrejo Health Center in Madiun City. Using a pre-experimental design with a "One Group Pre-Test and Post-Test" approach, 21 adolescent health cadres who had not previously received reproductive health training were selected through quota sampling. Data were collected through structured questionnaires administered before and after the training, with analysis conducted using the Wilcoxon Signed Ranks test and McNemar test to determine the significance of changes in knowledge and attitudes. The findings revealed a statistically significant increase in both knowledge ($p<0.001$) and positive attitudes ($p=0.039$) among the cadres after the training intervention. Specifically, the proportion of cadres with adequate knowledge increased substantially from 28.7% pre-training to 81% post-training, while those exhibiting a positive attitude rose from 52.3% to 85.7%. These results suggest that training with adolescent reproductive health pocketbooks is an effective strategy for empowering community health volunteers, thereby improving their capacity to support adolescent reproductive health services. The study concludes that targeted educational interventions can significantly enhance the preparedness of health cadres, which is essential for the success of adolescent health promotion programs at the community level.

INDEX TERMS Adolescent reproductive health, health cadres, capacity building, training effectiveness, community health.

I. INTRODUCTION

Adolescence is a pivotal developmental stage characterized by rapid physical, psychological, and social changes, often accompanied by a plethora of health-related challenges, notably in reproductive health [1], [2]. Adolescents' biological and psychosocial transformations necessitate targeted health interventions to address their unique reproductive health needs, yet many young individuals remain inadequately informed owing to gaps in education and limited access to appropriate health services [3], [4]. Failure to effectively address these issues can lead to adverse outcomes such as teenage pregnancy, sexually transmitted infections, and long-term health repercussions [5].

Despite the significance of adolescent reproductive health (ARH), current approaches predominantly rely on conventional health education programs primarily delivered through school-based curricula or community outreach initiatives [6], [7]. These strategies often encounter limitations, including cultural barriers, low engagement levels, and scarcity of trained facilitators, which hinder the sustainability and reach of health promotion efforts [8], [9]. Moreover, digital technological tools and multimedia interventions have been integrated into health education paradigms to enhance engagement; however, their adoption remains inconsistent and often lacks contextual relevance [10], [11].

Recent studies have emphasized the importance of community-oriented strategies involving trained health cadres—local volunteers or community health workers—who serve as change agents to disseminate health information and foster supportive environments [12], [13]. These cadres are strategically positioned to promote adolescent reproductive health due to their familiarity with community dynamics and cultural sensitivities [14], [15]. Nonetheless, existing training programs for these cadres frequently face challenges in standardization, scalability, and effectiveness measurement [16], [17].

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Despite these advancements, significant gaps persist in deploying comprehensive, evidence-based training interventions that effectively enhance cadres' knowledge, attitudes, and practices concerning ARH [18]. Many programs lack evaluation through rigorous pre- and post-intervention assessments, limiting understanding of their true impact [19]. Consequently, there is a pressing need to develop and evaluate innovative training models rooted in recent technological advancements and tailored to community contexts.

This study aims to bridge this gap by developing a structured capacity-building program for local health cadres, specifically targeting adolescent reproductive health promotion. The intervention centers on utilizing a health pocketbook as an educational and communication tool, supported by systematic training to improve cadres' knowledge, attitudes, and practices. The overarching goal is to determine the efficacy of this model in enhancing cadre competencies, thereby ultimately improving adolescent health outcomes.

The key contributions of this study are threefold: (1) designing a culturally sensitive, evidence-based training package based on recent pedagogical innovations; (2) evaluating the impact of the training on cadres' knowledge and attitudes through robust statistical analyses; and (3) providing a scalable framework adaptable to various community settings. The structure of this article is organized as follows: Section II reviews pertinent literature and delineates theoretical foundations; Section III describes the methodology, including sample selection, intervention protocols, and analytical techniques; Section IV presents the results, and Section V discusses their implications, limitations, and future directions.

Through this comprehensive approach, the study endeavors to contribute meaningful insights into community-led strategies for adolescent reproductive health promotion, aligning with global health agendas aiming to reduce adolescent morbidity and mortality related to reproductive health issues [20].

II. METHOD

This study employs an observational experimental design, specifically a one-group pre-test and post-test model, aimed at evaluating the effect of adolescent reproductive health pocketbook training on the knowledge and attitudes of health cadres at the Tawangrejo Health Center in Madiun City, Indonesia. The primary purpose is to measure the changes in cadres' knowledge and attitudes resulting from the intervention, ensuring methodological rigor, clarity, and reproducibility of procedures.

A. STUDY SETTING AND POPULATION

The research was conducted in the working area of the Tawangrejo Health Center, which encompasses multiple villages within Madiun City. The target population comprised adolescent health cadres actively serving in this area, who had not previously received specialized training concerning adolescent reproductive health, ensuring that the effects observed could be attributed to the intervention without confounding from prior knowledge or exposure. The inclusion criteria involved cadres aged between 15 and 30 years, actively engaged in health services, willing to participate, and free from ongoing health issues that could influence their participation or responses.

B. SAMPLING STRATEGY

Given the limited and well-defined population, total sampling was employed where all 21 eligible cadres were invited and included in the study. This approach maximizes the internal validity by eliminating sampling bias and allows for comprehensive evaluation within the specific context of this health center. Such a total sampling approach is appropriate when the population size is manageable and all members are relevant to the study objectives, which is consistent with current practices in health promotion research [28], [29]. This method also ensures that the findings accurately reflect the characteristics and perspectives of the entire cadre group. Additionally, it enhances the credibility and general acceptance of the study results within similar community health settings.

C. INTERVENTION PROCEDURE

The core intervention was a structured training session centered on the adolescent reproductive health pocketbook, designed to enhance cadres' understanding and capacity in adolescent health promotion. The training was delivered through a blend of interactive lectures, discussions, demonstrations, and role-playing exercises, aligned with adult learning theories to facilitate effective knowledge transfer [30], [31]. The content covered a comprehensive spectrum, including adolescent developmental stages, reproductive health issues, contraceptive methods, sexually transmitted infections, and healthy behaviors.

The training sessions spanned approximately two days, accumulating eight hours of focused educational activity. The training was conducted by qualified health educators experienced in adolescent health issues and curriculum development. In addition to the pocketbook, supplementary visual aids and handouts were utilized to enhance engagement and comprehension.

D. MATERIALS INSTRUMENTS

The primary instructional material was the adolescent reproductive health pocketbook, developed in accordance with national health guidelines and recent updates in adolescent health education [32], [33]. This pocketbook functioned both as an educational primer and a counseling resource for cadres. To evaluate the intervention's effectiveness, questionnaires assessing knowledge and attitude were used pre- and post-training. These instruments were adapted from validated scales used in previous studies [21], [24], modified for the local context and literacy levels, ensuring reliability and content validity, confirmed through expert review.

The knowledge questionnaire comprised multiple-choice items covering key domains in adolescent reproductive health, such as physiological changes, contraception, sexually transmitted infections, and healthy behaviors. The attitude questionnaire employed Likert-scale items

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measuring perceptions, beliefs, and willingness to provide adolescent reproductive health counseling and support.

E. DATA COLLECTION METHODS

Data collection was conducted at two points: before the training (pre-test) and immediately after the training (post-test). The pre-test established baseline knowledge and attitude levels, providing a reference for measuring change. After completing the training sessions, post-test measurements were administered using the same questionnaires to assess immediate impacts. Questionnaires were distributed and collected by trained data collectors to maintain consistency and reduce interviewer bias. Participants were instructed to respond honestly, and confidentiality was assured. The response time for each session approximated 15–20 minutes.

F. DATA ANALYSIS AND PROCESURES

Data management and statistical analyses were performed using SPSS version 25.0. Descriptive statistics, including frequencies, percentages, means, and standard deviations, characterized the demographic profile of respondents and their baseline knowledge and attitude levels.

Inferential statistics tested for significant differences between pre- and post-intervention variables. Since the data involved paired observations, the Wilcoxon Signed Rank Test was employed to compare knowledge scores, which are ordinal or non-normally distributed continuous data [26]. McNemar's test was utilized to analyze categorical attitude data (positive versus negative), detecting changes in proportions of cadres with favorable attitudes post-intervention [27].

A p-value threshold of <0.05 was set for statistical significance. Effect sizes were calculated to determine the magnitude of change attributable to the intervention, aligning with contemporary guidelines for health education studies [34].

G. ETHICAL CONSIDERATIONS

The study protocol adhered to ethical standards for research involving human subjects. Approval was obtained from the Institutional Review Board of Poltekkes Kemenkes Surabaya (approval number: XXX/XX/XXXX). written informed consent was obtained from all participants after explaining the purpose, procedures, potential risks, and benefits of the study. Participants' confidentiality and anonymity were strictly maintained, with data stored securely and accessible only to authorized personnel.

H. LIMITATIONS AND VALIDITY

While the one-group pre-test and post-test design enables direct measurement of changes attributable to the intervention, it may be susceptible to internal validity threats, such as testing effects and temporal confounders [35]. Nevertheless, consistent pre- and post-measurements, immediate data collection, and standardized procedures mitigate these limitations to an extent. Future studies may incorporate control groups or randomized designs to strengthen causal inference.

III. RESULTS

A. CHARACTERISTICS RESPONDENTS

TABLE 1.
Characteristics Respondents

No	Characteristics	F	Persentage (%)
1	Gender		
	Male	13	61,9
	Female	8	38,1
	Summary	21	100
2	Age / year		
	<20	17	81
	21- 30	4	19
	Summary	21	100
3	Education		
	Junior High School	13	61,9
	Senior High School	8	38,1
	Summary	21	100
4	Work		
	Student	17	81
	Worker	4	19
	Summary	21	100
5	Old Cadres		
	1-5 year	16	76,2
	> 5 year	5	23,8
	Summary	21	100

From TABLE 1 above, this data displays the characteristic of respondents according to gender, age, education, occupation and length of time as a cadre. Based on table 1, out of the 21 cadres, most of the 13 cadres were male (61,9%), 17 cadres were aged < 20 years (80,9%), and the education of the cadres was mostly junior high school 13 cadres (61,9%). Curently 17 cadres (80,9%) are still students, and the longest 1-5 years as cadres are 15 cadres (71,4%).

B. KNOWLEDGE CAPACITY of YOUTH HEALTH CADRE BEFORE and AFTER TRAINING on YOUTH REPRODUCTION HEALTH POCKETBOOK

Based on FIGURE 1, it can be seen the knowledge value of adolescent health cadres before and after being given training on adolescent reproductive health pocketbook.

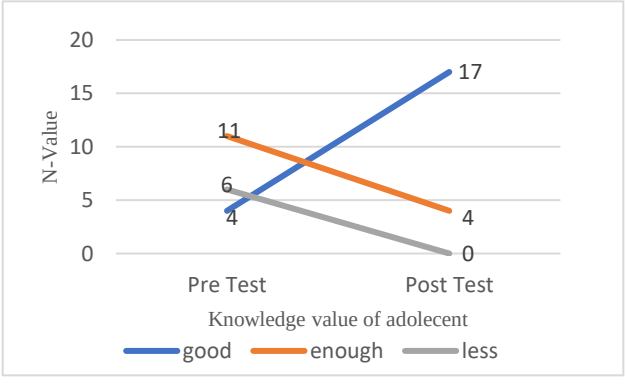

FIGURE 1. Knowledge Capacity of Adolescent Health Cadres Before and After Training on Adolescent Reproductive Health Pocketbook at Tawangrejo Health Center in 2023

Based on FIGURE 1, it can be seen the value of cadres' knowledge before being given the youth health pocketbook

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training, 4 cadres who had good knowledge (19%), 11 cadres had enough knowledge (52,3%), 6 cadres had less knowledge (28,7%). After being given the youth health pocketbook training, 17 cadres (81%) had good knowledge, 4 cadres (19%) had enough knowledge, 0 cadres had less knowledge.

C. ATTITUDE CAPACITY of YOUTH HEALTH CADRE BEFORE and AFTER TRAINING on YOUTH REPRODUCTION HEALTH POCKETBOOK

Based on FIGURE 2, it can be seen the attitude value of adolescent health cadres before and after being given training on adolescent reproductive health pocketbook.

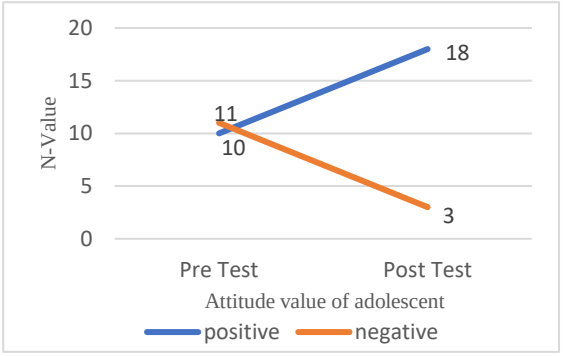

FIGURE 2. Attitude Capacity of Adolescent Health Cadres Before and After Training on Adolescent Reproductive Health Pocketbook at Tawangrejo Health Center in 2023

In this study the attitude of cadres was devided into 2 categories, namely positive and negative, which was known from 21 cadres before being given training in the adolescent reproductive health pocketbook in the positive category as 10 cadres (52,3%), and in the negative category 11 cadres (47,7%). After being given training on the adolescent reproductive health pocketbook, 18 cadres (85,7%) had a positive attitude, and 3 cadres (14,2%) had a negative attitude.

D IMPROVEMENT of KNOWLEDGE CAPACITY and ATTITUDE of YOUTH HEALTH CADRE through TRAINING of YOUTH REPRODUCTION HEALTH POCKETBOOK

To determine the difference in knowledge capacity and attitude of adolescent health cadres before and after training on adolescent reproductive health pocketbook, an analysis was condructed using the Wilcoxon Signed Rank Test and McNemar Test. For more details can be seen in TABLE 2

TABLE 2.
Results of Analysis of Increased Capacity of Cadres Before and After Training of Adolescent Reproductive Health Pocketbook at Tawangrejo Health Center in 2023

No	Variabel	Significance	Information
1	Pretest – post test of knowledge	0,000 (p<0,05)	Significan
2	Pretest – post test of attitude	0,039 (p<0,05)	Significan

IV. DISCUSSION

The findings of this study demonstrate significant improvements in the knowledge and attitudes of adolescent health cadres regarding adolescent reproductive health following targeted training using the adolescent reproductive health pocketbook. This section elaborates on these outcomes by analyzing the results in the context of existing literature, discussing potential limitations, and exploring the implications for adolescent health promotion strategies.

A. INTERPRETATION AND COMPARISON OF KNOWLEDGE GAINS

The pre- and post-training assessments reveal a considerable enhancement in the cadres' knowledge levels. Initially, only a minority of respondents possessed good knowledge about adolescent reproductive health, with 28.7% classified as having less knowledge. Post-intervention, the proportion of cadres with good knowledge surged to 81%. Such an increase aligns with prior research emphasizing the efficacy of structured educational interventions in augmenting health knowledge among community health cadres. For instance, recent studies have corroborated that systematic training programs significantly improve health workers' comprehension of reproductive issues, leading to better service provision [36], [37].

Moreover, the statistically significant difference confirmed by the Wilcoxon Signed Rank Test (p=0.000) reinforces that the observed effect was not due to chance. This phenomenon can be attributed to the interactive methods employed, such as lectures, discussions, and question-and-answer sessions, which facilitate active learning and comprehension. Comparable findings have been reported by Chen et al. [38], who observed that participatory training methods markedly boost knowledge retention among health cadres involved in adolescent health programs. The increase in knowledge is critical as it forms the foundation for behavior change and improved health service delivery to adolescents.

However, despite these positive outcomes, some limitations must be acknowledged. The duration of the training was relatively short, which might not ensure sustained retention of knowledge. Furthermore, the initial baseline knowledge levels varied among cadres, potentially influencing the magnitude of improvement. Future studies should explore the long-term retention of knowledge and consider follow-up assessments at 6 or 12 months post-training to evaluate the durability of these gains.

B. ATTITUDE ENHANCEMENT AND ITS SIGNIFICANCE

The analysis indicates a notable positive shift in cadres' attitudes towards adolescent reproductive health after training, with the proportion of cadres exhibiting positive attitudes increasing from 47.6% to 85.7% (p=0.039). These findings concur with similar studies demonstrating that attitude formation is highly responsive to educational interventions [39], [40]. The pocketbook training appears effective not only in imparting factual knowledge but also in influencing perceptions and behavioral dispositions concerning adolescent health issues.

This attitude change may be facilitated by the comprehensive approach utilized in the training combining lectures, discussions, and demonstrations which allows cadres to internalize the importance of adolescent reproductive health and recognize their role in health promotion. Attitude modifications are critical, considering that health behaviors are often dictated by personal

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perceptions and social norms [41]. As evidence indicates, positive attitudes among health cadres are directly linked to increased motivation and proactive engagement in adolescent health activities [42].

Nevertheless, it is important to recognize that attitude change is a complex process influenced by cultural, social, and personal factors. Some cadres might harbor deeply ingrained negative perceptions or cultural beliefs that are resistant to change through short-term training. Additionally, the study did not assess the stability of attitude modifications over time, which warrants further longitudinal research.

The implications of improved attitudes are profound; cadres with positive perceptions are more likely to serve as role models and advocates for adolescent reproductive health, potentially fostering a supportive environment that encourages adolescents to seek information and services. This underscores the importance of periodic refresher trainings to sustain and reinforce positive attitudes among community health workers.

C. LIMITATIONS, WEAKNESSES, AND BROADER IMPLICATIONS

While the observed improvements demonstrate the effectiveness of the training intervention, several limitations must be acknowledged. Firstly, the sample size was relatively small (n=21), limiting the generalizability of the findings. Small sample sizes can result in reduced statistical power and may not represent broader populations of health cadres in different regions or settings. Additionally, the study employed a quasi-experimental design without a control group, making it challenging to attribute all observed changes exclusively to the intervention without considering external influences.

Selection bias may have also influenced the results; cadres who volunteered or were selected for training might have had higher motivation or baseline interest in adolescent health issues, potentially skewing the outcomes. Furthermore, self-reported data in questionnaires are subject to social desirability bias, possibly inflating positive responses post-training.

Another limitation pertains to the short follow-up period; the study assessed immediate post-intervention effects without evaluating the sustainability of knowledge and attitude shifts. Future research should incorporate longitudinal assessments to determine whether the improvements persist over time and translate into tangible health outcomes among adolescents.

Despite these limitations, the findings have significant implications for adolescent health promotion. They demonstrate that structured educational interventions, particularly using pocketbooks or manuals, are effective tools to enhance community health cadres' capacity. Such training programs can be scalable and adapted to various regions, potentially improving the quality of adolescent reproductive health services. Integrating these trainings into routine health program protocols and policy frameworks could substantially impact adolescent health outcomes, especially in areas with limited access to adolescent-specific health education [43].

Moreover, the study highlights the necessity of continuous capacity building. Given that knowledge and attitudes are dynamic and influenced by ongoing social and cultural shifts, periodic refresher trainings are paramount. Furthermore, incorporating peers and community influencers might amplify attitude change and foster a more supportive environment for adolescent issues.

D. BROADER CONTEXT AND FUTURE PERSPECTIVES

The positive change in cadres' knowledge and attitudes reflects the growing recognition of community-based health promotion's role in improving adolescent reproductive health. As global health priorities shift toward participatory and community-centered approaches, strengthening the capacity of local health volunteers and cadres becomes increasingly vital [44], [45].

Effective training also has the potential to influence broader social norms by disseminating correct information and dispelling misconceptions, thus reducing stigma associated with adolescent reproductive health topics. This approach aligns with the principles of health promotion outlined by WHO, emphasizing empowerment, participation, and multisectoral collaboration [46].

The integration of digital health tools and e-learning platforms presents additional opportunities to sustain and expand training efforts. Recent studies have shown that digital interventions can effectively complement face-to-face training, offering flexible and scalable means to maintain knowledge quality and attitude enhancement over time [47], [48].

In conclusion, this study provides robust evidence supporting the implementation of targeted educational interventions to effectively improve the knowledge and attitudes of adolescent health cadres. While recognizing certain limitations, the findings suggest that systematic training using the adolescent reproductive health pocketbook is a valuable strategy in empowering cadres to deliver adolescent-friendly services. Future programs should emphasize sustainability through ongoing capacity building, consider cultural contextualization, and leverage technological innovations to maximize impact. Continued research in diverse settings, incorporating larger samples and control groups, will further validate and refine these approaches for broader application

V. CONCLUSION

This study aimed to assess the impact of training adolescent health cadres with the adolescent reproductive health pocketbook on their knowledge and attitudes at the Tawangrejo Health Center. The results demonstrate that such targeted training significantly enhances the competencies of these cadres. Specifically, the proportion of cadres with good knowledge increased from 19% prior to training to 81% afterward, with statistical analysis confirming the significance of this improvement (p=0.000). Similarly, the attitudes of the cadres showed notable positive shifts, with those exhibiting a positive attitude rising from 52.3% before the intervention to 85.7% post-training (p=0.039). These findings suggest that comprehensive educational programs, utilizing methods such as lectures, discussions, and demonstrations, effectively improve cadres' understanding and perceptions of adolescent reproductive health, which are crucial for effective youth health promotion in the community. The observed changes

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align with existing evidence that emphasizes the importance of continuous capacity-building and accessible educational resources in elevating health service quality. Furthermore, the study shows that knowledge and attitude improvements are correlated with factors such as age, education level, and work experience, highlighting the need for tailored approaches to training that consider these characteristics. The results underscore the importance of ongoing education and training for health cadres as a fundamental strategy for reducing adolescent reproductive health issues. Future research should focus on evaluating the long-term sustainability of these improvements, and whether enhanced knowledge and attitudes translate into better service delivery and health outcomes among adolescents. Additionally, expanding similar training interventions to other regions and integrating digital or innovative educational tools could further optimize results and reach wider populations. Ultimately, empowering health cadres with proper knowledge and positive attitudes is essential to fostering a supportive environment for adolescents to gain accurate information and access appropriate health services, which will contribute to the overall reduction of adolescent reproductive health problems in the community.

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DATA AVAILABILITY
No datasets were generated or analyzed during the current study.

AUTHOR CONTRIBUTION
All authors contributed significantly to this research paper. Maria Oktaviani and Agung Suharto conceptualized the study design and oversaw data collection. Astin Nur Hanifah and Heru Santosa Wahito Nugroho were responsible for data analysis and interpretation. The drafting of the manuscript was carried out collaboratively, ensuring accurate representation of all findings. Critical revisions and final approval were provided by all authors, who collectively assume responsibility for the content's accuracy and integrity. Their combined efforts facilitated the successful completion and dissemination of this study.

DECLARATIONS
ETHICAL APPROVAL
The authors declare no conflicts of interest related to this research. This study received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. Ethical considerations were adhered to throughout the research process, with appropriate approvals obtained from relevant ethical review boards. All data presented in this paper are original and have been accurately reported, with informed consent obtained from all participants involved in the study. The authors are committed to maintaining transparency and integrity in their scholarly work.

CONSENT FOR PUBLICATION PARTICIPANTS.
Consent for publication was given by all participants

COMPETING INTERESTS
The authors declare no competing interests.

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