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Short-Term Changes in HIV/AIDS Prevention Knowledge and Attitudes Following Leaflet-Supported Education Among Vocational Students in Palu, Indonesia

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ABSTRACT
Background: Adolescent HIV prevention literacy remains a school-health concern. This study assessed immediate knowledge and attitude changes following leaflet-supported education in Palu, Indonesia.
Methods: A one-group pretest–posttest study included 77 randomly selected students from 96 eligible Grade 11 vocational students. Three approximately 50-minute sessions (18–20 March 2025) combined leaflets, lectures, and discussion. Knowledge and attitudes were assessed before and immediately after sessions. Paired t-tests compared baseline with the final assessment.
Results: Knowledge increased from 12.34 to 20.49 (paired mean improvement 8.156; 95% CI 7.364–8.948; $p < 0.001$). Attitude scores increased from 64.41 to 81.81 (paired improvement 17.403; 95% CI 15.937–18.868; $p < 0.001$).
Conclusion: The educational program was associated with improved immediate questionnaire scores.

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INTRODUCTION

Human immunodeficiency virus (HIV) remains a major public health concern, and adolescents require accurate, accessible information about prevention, testing, and care. The Joint United Nations Programme on HIV/AIDS (UNAIDS, 2024) estimated that 39.9 million people were living with HIV worldwide in 2023. Adolescent girls and young women remain affected disproportionately in many settings, illustrating the need for inclusive prevention strategies (UNAIDS, 2024). The World Health Organization (WHO, 2021) recommends combination prevention, including accurate risk information, HIV testing, and effective biomedical prevention options. Comprehensive and inclusive school-based education also supports students' capacity to understand health information without perpetuating stigma (UNESCO, 2023).

School-based education can address gaps in HIV literacy. A recent meta-analysis identified improvements in adolescents' knowledge and attitudes after educational programs, although delivery modes and study designs varied (Ratnawati et al., 2024). Indonesian studies have also described favorable changes after HIV information delivered through leaflets and other resources (Rochmawati et al., 2022; Gusrianti et al., 2023; Wilandika et al., 2021). Immediate questionnaire improvements should not be equated with changes in behavior or a reduction in HIV incidence.

Leaflets are accessible educational resources that may reinforce classroom teaching. Earlier Indonesian studies evaluated leaflet-based education, educational pocketbooks, and structured counseling (Rochmawati et al., 2022; Fajrin et al., 2024; Rahman et al., 2022). The specific contribution of this study is a local account of short-term knowledge and attitude measurements among vocational students in Central Sulawesi rather than the introduction of a new educational modality.

In a preliminary exploratory interview at SMK Negeri 6 Palu, nine of ten students were reported to have limited HIV/AIDS knowledge. The present study examined changes in questionnaire-based knowledge and attitudes after three days of education combining leaflets, lectures, and discussion. Preventive behaviors and HIV incidence were not measured.

METHODS

Research Design and Setting

This quantitative one-group pretest–posttest study was conducted at SMK Negeri 6 Palu, Central Sulawesi, from 18 to 20 March 2025. Students completed a baseline assessment before the first session and an immediate posttest following each of three sessions. The primary inferential comparison presented here was baseline versus the final posttest. There was no control group, so causal attribution is not possible.

Population, Sampling, and Eligibility

The source population was 96 Grade 11 students in Computer and Network Engineering classes XI-A, XI-B, and XI-C. A Slovin calculation with a 5% precision parameter yielded 77 selected participants (class allocations 29, 24, and 24); this was a sampling calculation. Class-specific random draws were used. Eligibility included enrollment, age 15–19 years, ability to read the intervention material, and consent. Students with substantial physical or cognitive difficulties preventing participation or who declined consent were excluded.

Educational Intervention and Data Collection

The intervention comprised three approximately 50-minute sessions on 18, 19, and 20 March 2025. Each session combined a leaflet, lecture, and questions and answers about HIV/AIDS definitions, progression, transmission, prevention, detection, and treatment. The baseline questionnaire was administered before the first session, with immediate posttests after each session.

Measurements

Knowledge was assessed using 24 true/false items (correct = 1, incorrect = 0; possible total 0–24). Attitudes were assessed using 23 four-point Likert statements (possible total 23–92), with reverse scoring as applicable. Instruments were adapted from previous questionnaires in the previous research.

Statistical Analysis

Frequencies and percentages described participant characteristics, while means, standard deviations, and observed ranges summarized questionnaire scores. Baseline and final scores were compared using paired-samples t-tests (two-sided alpha 0.05), and SPSS output displayed as $p = 0.000$ was interpreted as $p < 0.001$.

Ethical Considerations

Ethical clearance was granted by the Research Ethics Committee of Poltekkes Kemenkes Palu (No. 000697/KEPK POLTEKKES KEMENKES PALU/2025). School permission and signed participant consent forms were described, and participant data were handled confidentially. As some participants were younger than 18 years, the author must confirm whether parent/guardian permission with adolescent assent was obtained or an ethics-authorized waiver applied. These procedures cannot be asserted from the available record.

RESULTS

Participant Characteristics

Seventy-seven students participated. Most were female (47/77, 61.0%) and 16 years old (44/77, 57.1%) (Table 1).

Table 1. Participant characteristics (N = 77)

Characteristic	n	%
Age: 16 years	44	57.1
Age: 17 years	27	35.1
Age: 18 years	6	7.8
Sex: male	30	39.0
Sex: female	47	61.0
Total	77	100.0

Source: Primary research data (2025)

Changes in Knowledge and Attitude Scores

Mean knowledge scores rose from 12.34 at baseline to 16.65, 18.27, and 20.49 across three immediate posttests (Table 2). Attitude scores were 64.41, 76.31, 77.82, and 81.81. The descriptive attitude means are presented consistently using the values from Table 2.

Table 2. Knowledge and attitude scores across measurement points

Outcome and assessment	Mean	SD	Observed range
Knowledge, baseline	12.34	2.64	7–20
Knowledge, posttest 1	16.65	2.85	10–23
Knowledge, posttest 2	18.27	2.39	13–24
Knowledge, posttest 3	20.49	2.06	15–24
Attitudes, baseline	64.41	7.95	44–85
Attitudes, posttest 1	76.31	5.30	61–88
Attitudes, posttest 2	77.82	5.01	62–88
Attitudes, posttest 3	81.81	3.45	73–90

Source: Primary research data (2025).

Inferential Analysis

At baseline and final testing, the mean paired knowledge improvement was 8.156 points (95% CI 7.364–8.948; $t(76) = 20.501$; $p < 0.001$). The mean attitude improvement was 17.403 points (95% CI 15.937–18.868; $t(76) = 23.650$; $p < 0.001$). Table 3 reports final-minus-baseline improvements.

Table 3. Paired baseline-to-final comparisons (N = 77)

Outcome	Mean improvement	95% CI	t (df)	p value
Knowledge	8.156	7.364 to 8.948	20.501 (76)	< 0.001
Attitudes	17.403	15.937 to 18.868	23.650 (76)	< 0.001

Source: Primary research data (2025).

DISCUSSION

An important finding of the present study is the magnitude of the observed improvement in HIV/AIDS prevention knowledge. The mean knowledge score increased from 12.34 to 20.49 on a 24-point scale, indicating that participants answered substantially more questions correctly following the educational sessions. This finding suggests that the educational content was accessible to students with varying levels of prior knowledge. However, the increase should be interpreted as improved performance on a knowledge assessment rather than definitive evidence of comprehensive HIV literacy. Ratnawati et al. (2024), in a meta-analysis involving 14 randomized controlled trials, reported significant improvements in HIV prevention knowledge among adolescents receiving educational interventions (standardized mean difference = 1.13; 95% CI: 0.78–1.49). Their findings provide broader evidence supporting educational approaches that facilitate adolescents' understanding of HIV prevention. Nevertheless, the present study extends this discussion by demonstrating that measurable knowledge improvements can occur within a relatively brief educational period in an Indonesian vocational school setting.

The improvement in knowledge is consistent with previous Indonesian studies using printed or structured HIV education. Rochmawati et al. (2022) reported higher knowledge after leaflet-based education, and Gusrianti et al. (2023) evaluated leaflet and video-based counseling for adolescents. Together, these sources support the practical plausibility of structured education while also underscoring that differences in intervention intensity, context, and measurement limit direct effect-size comparison. More recent e-leaflet research has also explored adolescent HIV knowledge, although intervention formats and designs differ (Hamalding et al., 2025).

Another noteworthy finding concerns the substantial improvement in attitudes toward HIV/AIDS prevention, with the mean score increasing from approximately 64.42 to 81.82. This change may reflect greater acceptance of preventive health messages, improved perceptions of personal responsibility, and increased awareness of the importance of HIV prevention. Nevertheless, the specific psychological mechanisms underlying the change cannot be established because the study measured overall attitude scores rather than individual motivational or behavioral constructs. Evidence from Fajrin et al. (2024) demonstrates the potential of printed educational materials, including pocketbooks, to improve adolescents' knowledge and attitudes toward HIV/AIDS prevention. Furthermore, Ratnawati et al. (2024) identified a statistically significant improvement in attitudes following adolescent HIV educational interventions (standardized mean difference = 0.48; 95% CI: 0.02–0.95). These findings support the importance of incorporating attitudinal outcomes into school-based health education evaluations. However, favorable attitudes should be regarded as an intermediate educational outcome rather than direct evidence of safer behavior, sustained prevention practices, or reduced HIV transmission.

Higher attitude scores may indicate increased openness to HIV-prevention information, but they should not be interpreted as observed changes in prevention practices. Other educational studies have reported attitude changes after counseling or printed information (Rahman et al., 2022; Fajrin et al., 2024). Respectful nursing education should explain HIV transmission and non-transmission accurately and avoid stigmatizing people living with HIV (WHO, 2021).

The findings also raise important questions about the sustainability of educational improvements beyond the immediate intervention period. Although the present study demonstrated progressive increases in knowledge and attitude scores across three consecutive educational sessions, the absence of delayed follow-up measurements limits conclusions regarding long-term retention. Accordingly, the present study highlights the need for future evaluations incorporating follow-up assessments at one, three, and six months to examine knowledge retention, attitude stability, and the extent to which educational improvements translate into meaningful preventive behaviors.

From a broader nursing and public health perspective, the findings highlight opportunities to strengthen adolescent HIV prevention education through collaboration between healthcare professionals and educational institutions. School nurses and community health nurses can contribute to the development of structured educational materials, identify misconceptions, facilitate confidential discussions, and promote appropriate referral pathways for adolescent-friendly health services. The inclusion of interactive discussions alongside printed information may provide opportunities to clarify misunderstandings and reinforce accurate prevention messages. Ratnawati et al. (2024) found that educational programs incorporating group-based approaches, peer education, and audiovisual components were associated with favorable adolescent HIV prevention outcomes. In the context of SMK Negeri 6 Palu, these findings provide a rationale for developing more comprehensive, culturally appropriate, and age-sensitive HIV prevention programs. Nevertheless, the feasibility, acceptability, and long-term effectiveness of such programs should be established through controlled studies before their broader implementation.

The three-session education program was followed by immediate increases in measured knowledge and attitudes. The direction and precision of the paired comparisons were consistent with short-term improvement. Nevertheless, because the research lacked a comparison group, these changes cannot be attributed exclusively to the educational activities. Familiarity with repeated questionnaires, educator attention, and unmeasured influences may also have contributed.

Increases across successive posttests may be consistent with reinforcement through repeat exposure, opportunities for questions, or familiarity with the assessment format. As lectures, discussion, and leaflets were delivered together, their relative effects cannot be determined. Future studies should compare educational strategies directly, include control groups, and assess retention and behavior after the final session.

Nurses and school personnel may use these local findings to inform development of age-appropriate sessions addressing transmission myths, testing, and referral to youth-friendly services. Information should be accurate, non-stigmatizing, and adapted to the educational setting (WHO, 2021, 2024a,). Such practice applications require further evaluation rather than being considered established by the present uncontrolled study.

Strengths and Limitations

Strengths include clear intervention timing, a defined classroom sampling frame, and repeated assessments. Limitations include one school and one educational program, the absence of a comparison group, immediate self-report measures, possible response bias, and an inability to isolate the effect of the leaflet.

CONCLUSIONS AND SUGGESTIONS

In 77 vocational students, a three-day leaflet-supported educational program was associated with higher immediate posttest scores for HIV/AIDS prevention knowledge and attitudes. Further controlled research should verify longer-term knowledge retention and behavioral outcomes.

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