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Original Research Paper

How HIV/AIDS health education boosts high school students' knowledge

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Abstract
The incidence of HIV/AIDS continues to rise. The high number of cases among adolescents is due to their lack of knowledge and attitudes about HIV/AIDS, which directly affects the prevention of this disease. Knowledge about HIV/AIDS is considered crucial, as it plays a role in shaping public perceptions, thereby influencing their understanding and awareness. HIV/AIDS health education for adolescents can be an effective approach to developing their knowledge about reproductive health and sexually transmitted diseases. This study aims to investigate the impact of HIV/AIDS health education on the knowledge level of 11th-grade students at *SMA Negeri* 1 Pundong. This study employed nonequivalent pretest-posttest control group design. The sampling technique used was probability sampling, with a total of 32 respondents divided into an experimental group of 16 and a control group of 16. Data were analyzed using non-parametric tests: the Wilcoxon matched-pairs test and the Mann-Whitney U test. Based on the pretest and posttest results, the average knowledge score in the experimental group increased from 60.69 to 83.00, while in the control group it rose from 63.70 to 73.00. The analysis showed a significant difference in knowledge levels before and after the HIV/AIDS health education intervention in both the experimental and control groups, with a p-value of 0.004 ($p < 0.05$). This study concludes that HIV/AIDS health education has a significant effect on improving the knowledge of 11th-grade students at *SMA Negeri* 1 Pundong.

Keywords: adolescents; knowledge; health education; HIV/AIDS

1. Introduction

HIV (Human Immunodeficiency Virus) is a virus that attacks the human immune system, while AIDS (Acquired Immunodeficiency Syndrome) is the resulting syndrome that occurs due to infection with the HIV virus. The progression of this disease is typically slow, and symptoms of AIDS generally appear around 10 years, or even more, after initial HIV infection (Noviana, 2021). Recently, the number of people living with HIV/AIDS has been increasing, particularly among adolescents (Berek et al., 2019).

According to UNAIDS (Joint United Nations Programme on HIV/AIDS), in 2022, the prevalence of HIV among adolescent girls aged 15–24 years was three times higher than among adolescent boys of the same age group. Every day, around 4,000 people are newly infected with HIV, including 1,100 young people aged 15–24 years (UNAIDS, 2020). The Indonesian Ministry of Health, based on data from the HIV/AIDS Information System (SIHA), reported that in the first quarter of 2022 (January–March), there were 10,525 new cases of HIV/AIDS in Indonesia. The highest prevalence of AIDS occurred in the 20–29-year age group (31.8%), followed by the 30–39-year age group (31.4%) and the 40–49-year age group (14.4%) (Kementrian Kesehatan RI, 2022).

In the Special Region of Yogyakarta (DIY), data from 2021 show that the highest percentage of HIV cases by age and gender was in the 25–49-year age group (46.2%), followed by the 20–24-year age group (30.9%). New AIDS cases were most prevalent among those aged 20–29 years (25.6%).

Bantul Regency reported the highest number of new AIDS cases (38), while Yogyakarta City had the lowest (6 cases) (Dinas Kesehatan DIY, 2022). In Bantul Regency in 2021, 40% of positive HIV and AIDS cases were among those aged 20–29 years. In total, there were 109 HIV cases and 24 AIDS cases reported in Bantul Regency that year (Dinas Kesehatan Kabupaten Bantul, 2022). Given the average incubation period of around 5–10 years, these reports suggest that the initial contact with HIV likely occurs during adolescence, making this age group particularly vulnerable (Husaini et al., 2017).

The high number of HIV/AIDS cases among adolescents is primarily due to a lack of knowledge and attitudes regarding HIV/AIDS, which directly affects efforts to prevent the disease. Good knowledge about HIV/AIDS is essential for shaping proper attitudes towards prevention among adolescents. Knowledge does not come solely from formal education; clear and accurate information from various sources also contributes significantly (Ismail et al., 2022). Health education provided to students not only adds to their information but also expands their understanding of HIV/AIDS risks and enhances their knowledge base. An increase in knowledge after health education interventions is considered a successful outcome, as knowledge is a crucial factor that influences behavior. This condition can help students recognize the importance of early detection of HIV/AIDS (Nuryawati, 2021).

According to Indonesian Ministry of Health Regulation No. 28 of 2017, midwives have the authority to provide reproductive health education and counseling services as part of their midwifery practice (Permenkes RI, 2017). Based on this background, the researcher is interested in conducting a quasi-experimental study on the impact of health education on adolescents' knowledge of HIV/AIDS at *SMA Negeri* (State Senior High School) 1 Pundong, using a nonequivalent pretest and posttest control group design.

2. Research Method

This study was a quasi-experimental research project. The design of the study used a nonequivalent pretest and posttest control group design to examine the effect of HIV/AIDS health education on the knowledge level of adolescents about HIV/AIDS. The dependent variable in this study was the level of knowledge about HIV/AIDS among 11th-grade students at *SMA Negeri* 1 Pundong, while the independent variable was the HIV/AIDS health education. The research instrument consisted of an HIV/AIDS knowledge questionnaire with 22 questions, developed by the researcher and previously tested for validity and reliability among 10th-grade students at *SMA Negeri* 1 Pundong who met the inclusion criteria for this study. The study was conducted at *SMA Negeri* 1 Pundong in July 2023. The study population included all 11th-grade students at *SMA Negeri* 1 Pundong, totaling 216 students. The research sample consisted of 32 adolescents (16 in the intervention group and 16 in the control group), selected based on the inclusion criteria. Proportional sampling technique was used to identify eligible students, followed by random selection to assign them to either the intervention or control group. The inclusion criteria were students aged 15–17 years, enrolled at *SMA Negeri* 1 Pundong, and willing to participate as respondents. The exclusion criteria included students who were absent during the study or who did not agree to participate. Data analysis was carried out using non-parametric tests: the Wilcoxon matched-pairs test was used to examine the effect of HIV/AIDS health education on knowledge levels before and after the intervention within both groups, and the Mann-Whitney U test was used to compare the differences between the intervention and control groups. This study received ethical clearance, with the ethical approval number No.279/KEP-UNISA/IV/2023.

3. Results and Discussion

3.1.Results

The results of this study are presented in the tables below:

The characteristics of the respondents, based on age and gender, are shown in Table 1.

Table 1. Distribution of Respondents by Age and Gender

Characteristic	Frequency	Percentage (%)
Age		
15 years	6	18.8
16 years	24	75.0
17 years	2	6.2
Total	32	100.0
Gender		
Male	5	15.6
Female	2	84.4
Total	**32**	**100.0**

Based on Table 1, most of the respondents were 16 years old—24 people (75.0%), which is considered the middle adolescent age group. In addition, 84.4% or 27 respondents were female.

Table 2. Knowledge Levels Distribution Before HIV/AIDS Health Education

Group	Experiment	Control
N	16	16
Mean	60.69	63.70
Median	64.00	64.00
Modus	55	64
Min-Max	32 – 73	45 – 95
SD	11.104	11.109

Table 2 shows that the average knowledge score about HIV/AIDS among 11th-grade students at *SMA Negeri* 1 Pundong before the health education intervention was 60.69 in the experimental group and 63.70 in the control group. The control group had a slightly higher average knowledge score before the intervention, with a difference of 3.01 points compared to the experimental group.

Table 3. Knowledge Levels Distribution After HIV/AIDS Health Education

Group	Experiment	Control
N	16	16
Mean	83.00	73.00
Median	84.00	68.00
Modus	91	64
Min-Max	59 – 100	55-86
SD	11.367	10.900

Table 3 shows the average knowledge scores about HIV/AIDS among 11th-grade students at *SMA Negeri* 1 Pundong after the intervention: 83.00 in the experimental group and 73.00 in the control group, which did not receive the intervention.

Before analyzing the data further, normality tests were conducted. The results of the normality tests are presented in Table 4.

Table 4. Normality Test Results

Variable	g (p)	Conclusion
Pretest Experiment Group	0.049	Not Normal
Posttest Experiment Group	0.264	Normal
Pretest Control Group	0.039	Not Normal
Posttest Control Group	0.021	Not Normal

Table 4 shows that the significance values for the pretest in both the experimental and control groups, as well as the posttest in the control group, were all below 0.05. Therefore, the data were not normally distributed. Because of this, non-parametric tests were used: the Wilcoxon matched-pairs test and the Mann-Whitney U test, in order to know the influence of health education on HIV/AIDS .

Table 5. Wilcoxon Matched-Pairs Test Results

Variable	Experiment Group		Control Group	
	N	P Value	N	P Value
Negative Ranks	0		1	
Positive Ranks	16	0.000	11	0.009
Ties	0		4	
Total	**16**		**16**	

Table 5 shows that there were no negative ranks (no decrease) between pretest and posttest scores in the experimental group, while there were 16 positive ranks, indicating that all 16 students in the experimental group experienced an increase in knowledge after the intervention. There were no ties in the experimental group, meaning none of the students had the same pretest and posttest scores. In the control group, there was 1 negative rank (1 student with a decreased score), 11 positive ranks (11 students with increased scores), and 4 ties (4 students whose scores remained the same between pretest and posttest).

The p-value for the experimental group was 0.000 ($p < 0.05$), and for the control group, it was 0.009 ($p < 0.05$). This indicates that the health education intervention had a significant effect on students' knowledge about HIV/AIDS in both groups. Although both groups showed an increase in knowledge, the experimental group had a more significant improvement in their knowledge scores after the intervention compared to the control group.

Table 6. Mann-Whitney U Test Results

Difference Value	N	Mean Rank	P Value
Experiment Group	16	21.22	0.004
Control Group	16	11.78	
Total	**32**		

Finally, Table 6 shows that the average difference in scores in the experimental group was 21.22, while in the control group it was 11.78. With a p-value of 0.004 ($p < 0.05$), it can be concluded that HIV/AIDS health education had a significant impact on the level of knowledge about HIV/AIDS among 11th-grade students at *SMA Negeri* 1 Pundong.

3.2.Discussion

3.2.1.Knowledge Before Receiving HIV/AIDS Health Education among 11th-Grade Students at *SMA Negeri* 1 Pundong

The analysis found that the average knowledge score before the health education intervention in the experimental group was 60.69, with scores ranging from 32 to 73. In the control group, the average was 63.75, with scores between 45 and 95. Most respondents answered questions incorrectly about the definition, transmission, and prevention of HIV/AIDS.

This aligns with Miswanto (2014), who explained that many adolescents have not received sufficient information about reproductive and sexual health. Samsir et al., (2020) also noted that the information these adolescents usually receive comes from friends or various media sources that are often inaccurate or misleading, which can lead to risky behaviors and potential HIV/AIDS infection.

Similarly, Wahyuni et al. (2021) found that many students only had a basic understanding of HIV/AIDS, its definition, symptoms, classifications, and prevention, based on what they had heard or personally experienced before any health education was provided.

3.2.2. Knowledge After Receiving HIV/AIDS Health Education Among 11th-Grade Students at *SMA Negeri* 1 Pundong

The analysis revealed that after the intervention, the average knowledge score in the experimental group rose to 83.00, with scores ranging from 59 to 100. In the control group, the average was 73.00, with scores between 55 and 86. These results show that knowledge in the experimental group increased after the HIV/AIDS health education.

Other studies have also reported an increase in average knowledge scores after health education interventions. Nuryawati (2021) stated that providing health education to students helps them gain new information, supports HIV/AIDS prevention efforts, and enhances their understanding and awareness of the disease.

These findings are supported by Fajar (2021), who found a significant change after health education, with the number of students who had good knowledge about HIV/AIDS increasing from 4 to 39 students (97.5%). Şentürk & Yıldırım Keskin (2020) also found that students' knowledge about AIDS increased after participating in infectious disease nursing classes. Similarly, Sutjiato (2022) reported that respondents' knowledge improved significantly after receiving health education. These studies align with the findings here, confirming that HIV/AIDS health education increased knowledge among the experimental group

3.2.3. Differences in Average Knowledge Among 11th-Grade Students at *SMA Negeri* 1 Pundong Before and After Receiving HIV/AIDS Health Education

The Wilcoxon matched pairs test, a non-parametric analysis, showed that all students in the experimental group experienced an increase in knowledge after the intervention, with no decrease in scores (p-value 0.000, <0.05). In the control group, one student's score decreased, four had no change, and eleven saw an increase (p-value 0.009, <0.05). These findings show that there was a significant difference in knowledge before and after the intervention in both groups. However, the difference in the experimental group was more significant, indicating that the health education had a greater impact there.

These results are consistent with Rahmayanti & Susilowati (2021), who found increases in pretest and posttest scores in both the experimental and control groups, even though the control group did not receive health education. Samsir et al. (2020) also found that health education about HIV/AIDS in teenagers significantly increased knowledge, with average scores rising from 11.36 (range 8–22) to 16.89 (range 11–22).

Similarly, Wulandari & Syarifah (2019) found that before a lecture method was introduced, the average knowledge score was 62.08 (range 53–75). After the intervention, the average rose to 78.71

(range 71–86). Statistical testing yielded a p-value of 0.00, indicating a significant difference in knowledge and attitudes before and after the intervention.

Ariani (2014) explained that a person's knowledge is influenced by several factors, including internal factors (such as age, gender, education, and occupation) and external factors (such as environment, socio-cultural influences, economic status, and information sources). Fasil et al. (2022) similarly stated that exposure to health promotion can come from various sources, and some adolescents may answer questions based on their perceptions or assumptions. These findings align with Privetera & Rokhanawati (2019), who reported that most 11th-grade students, as many as 33 students, at SMK X had good knowledge of HIV/AIDS (64%).

3.2.4. Differences in Knowledge Between the Experimental and Control Groups

The Mann-Whitney U test, conducted at a 5% significance level (α=0.05), found that the average difference in scores was 21.22 for the experimental group and 11.78 for the control group. The p-value was 0.004 (<0.05), so it can be concluded that Ha is accepted and Ho is rejected. This means there was a significant difference in knowledge between the experimental and control groups after the HIV/AIDS health education. The experimental group showed a higher level of knowledge, demonstrating the positive impact of the health education intervention on the knowledge of 11th grade students of *SMA Negeri* 1 Pundong.

Other studies support this finding. Nurlindawati et al. (2023) noted that health education significantly influences students' knowledge, helping them develop better health behaviors. Samsir et al. (2020) reported a p-value of 0.000, indicating a meaningful impact of health education on knowledge among students at *Akademi Keperawatan Pelamonia Kesdam* VII/*Wirabuana* Year 2020. Rahmayanti & Susilowati (2021) dengan hasil nilai p value pada kelas eksperimen sebesar 0.045 dan kelas kontrol 0.034 < 0.05 also found significant effects, with p-values of 0.045 (experimental group) and 0.034 (control group), showing that Ha is accepted and Ho is rejected which means health education improved students' understanding of HIV/AIDS.

Fajar (2021) emphasized that health education influences students' knowledge and attitudes in preventing HIV/AIDS at *SMA Negeri* 22 Maluku Tengah, with students who received counseling having better knowledge and attitudes than those who did not. Fasil et al. (2022) also found that health education improved comprehensive HIV knowledge among rural youth in eastern Ethiopia. These findings are in line with Fajar (2021), who noted that students who received health education counseling had better knowledge than those who did not.

4. Conclusion

This study shows that HIV/AIDS health education positively affects the knowledge of 11th-grade students at *SMA Negeri* 1 Pundong. The group that received the intervention had higher average knowledge scores about HIV/AIDS than the group that did not.

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References

Ariani, Ayu Putri. (2014). Aplikasi Metodelogi Penelitian Kebidanan dan Kesehatan Reproduksi. Nuha Medika.

Berek, P. a. L., Be, M. F., Rua, Y. M., & Anugrahini, C. (2019). Hubungan Jenis Kelamin Dan Umur

Dengan Tingkat Pengetahuan Remaja Tentang HIV/AIDS di SMAN 3 ATAMBUA Nusa Tenggara Timur 2018. *Jurnal Sahabat Keperawatan*, *1*(01), 4–13. https://doi.org/10.32938/jsk.v1i01.85

Dinas Kesehatan DIY. (2022). Profil Kesehatan D.I. Yogyakarta. http://www.dinkes.jogjaprov.go.id/download/download/27

Dinas Kesehatan Kabupaten Bantul. (2022). Profil Kesehatan Kabupaten Bantul 2022. https://dinkes.bantulkab.go.id/e-magazine/3/download

Fajar, H., & Losoiyo, S. R. (2021). Pengaruh Pendidikan Kesehatan terhadap Pengetahuan dan Sikap dalam Pencegahan HIV/AIDS di SMA. *Jurnal Penelitian Kesehatan "SUARA FORIKES" (Journal of Health Research "Forikes Voice")*, *12*, 182–186. https://doi.org/10.33846/sf12nk134

Fasil, N., Worku, A., Oljira, L., Tadesse, A. W., & Berhane, Y. (2022). Association between sexual and reproductive health education in peer group and comprehensive knowledge of HIV among adolescent girls in rural eastern Ethiopia: a community-based cross-sectional study. *BMJ Open*, *12*(10), e063292. https://doi.org/10.1136/bmjopen-2022-063292

Husaini, H., Panghiyangani, R., & Saputra, M. (2017). Pengaruh Penyuluhan HIV/AIDS terhadap Pengetahuan dan Sikap Tentang HIV/ AIDS Mahasiswi Akademi Kebidanan Banjarbaru Tahun 2016. *Buletin Penelitian Kesehatan*, *45*(1). https://doi.org/10.22435/bpk.v45i1.5787.11-16

Ismail, Irfan Ananda., Febriyanti, Agnes., Alif, Damas., Namira, Anggie., Wicaksono, Shafa., Nadeak, Rian Sanjaya., Ramadhan, Tangguh Damar., Yusral, Afdal., & Ardhana, Wira. (2022). Hubungan Pengetahuan Dan Sikap Terhadap Pencegahan HIV /AIDS pada Remaja. *International Journal of Academic Health and Medical Research (IJAHMR)*, 6(5), 46–51. http://ijeais.org/wp-content/uploads/2022/5/IJAHMR220513.pdf

Kementrian Kesehatan RI. (2022). Laporan Eksekutif Perkembangan Hiv Aids Dan Penyakit Infeksi Menular Seksual (PIMS) Triwulan I Tahun 2022. https://siha.kemkes.go.id/portal/files_upload/Laporan_TW_1_2022.pdf

Miswanto. (2014). Pentingnya Pendidikan dan Seksualitas pada Remaja. Jurnal Studi Pemuda, 3(2), 111–122. https://journal.ugm.ac.id/jurnalpemuda/article/view/32027/19351

Noviana, Nana. (2021). Konsep HIV/AIDS, Seksualitas dan Kesehatan Reproduksi. CV. Trans Info Media.

Nurlindawati, Anggereni Kustia., Babo, Ddjimmy Heru Purnomo., & Yunita, Tri. (2023). Pengaruh Pendidikan Kesehatan Terhadap Peningkatan Pengetahuan Remaja Tentang Penyakit HIV/AIDS Di SMKS X Jakarta. *Jurnal Vokasi Kesehatan (JUVOKES)*, 2(2), 91–96. https://journal.bengkuluinstitute.com/index.php/juvokes/article/view/250/198

Nuryawati, Lina Siti. (2021). Pengaruh Pendidikan Kesehatan Tentang HIV/AIDS Terhadap Pengetahuan Siswa Tentang HIV/AIDS Kelas XII Di Madrasah Aliyah Al-Ittihad Cipeundeuy Kecamatan Bantarujeg Kabupaten Majalengka Tahun 2020. *Jurnal Keperawatan Dan Kesehatan, VII*, 39–46. https://www.jurnal.akperypib.ac.id/index.php/medisina/article/view/17/16

Permenkes RI. (2017). Peraturan Menteri Kesehatan Nomor 28 Tahun 2017 tentang Izin Dan Penyelenggaraan Praktik Bidan. Kementerian Kesehatan RI. https://peraturan.bpk.go.id/Details/112080/permenkes-no-28-tahun-2017

Privetera, Hainas Sani., & Rokhanawati, Dewi. (2019). Hubungan Tingkat Pengetahuan Remaja Tentang HIV/AIDS Dengan Sikap Seks Bebas Pada Siswa Kelas X Kabupaten Magelang. *Journal of Borneo Holistic Care,* 2(2)(2), 158–165. file:///C:/Users/HP/Downloads/Hubungan_Tingkat_Pengetahuan_Remaja_Tent.pdf

Rahmayanti, Fina., & Susilowati, Yuni. (2021). Pengaruh Pendidikan Kesehatan tentang HIV/AIDS terhadap Persepsi Siswa tentang HIV/AIDS Se-Tangerang Raya. *Nusantara Hasana Journal*, 1(1), 1–10. https://nusantarahasanajournal.com/index.php/nhj/article/view/109.

Samsir, Sulasri, & Masahuddin, La. (2020). Pengaruh Pendidikan Kesehatan Tentang Hiv/Aids Terhadap Peningkatan Pengetahuan Remaja. *Media Keperawatan: Politeknik Kesehatan Makassar*, 11(2), 147. https://doi.org/10.32382/jmk.v11i2.1779

Şentürk, Sibel., & Keskin, Alev Yıldırım. (2020). The Effect of the Infectious Disease Nursing Course on Turkish Students' Knowledge and Attitudes Towards AIDS: A Quasi-Experimental Study. *Galician Medical Journal*, 27(4), E202045–E202045. https://doi.org/10.21802/gmj.2020.4.5

Sutjiato, Margareth. (2022). Pengaruh Pendidikan Kesehatan Reproduksi Terhadap Pengetahuan Remaja di SMA Negeri 7 Manado. *Jurnal Kedokteran Komunitas Dan Tropik (JKKT)*, 10(2), 403–408.

UNAIDS. (2020). UNAIDS Globlal AIDS Update 2022. https://www.unaids.org/en/resources/documents/2022/in-danger-global-aids-update.

Wahyuni, Sri., Niu, Flora., & Marlindah. (2021). Perbandingan Penyuluhan Dan Buku Saku Terhadap Pengetahuan Remaja Tentang HIV/AIDS. *Jurnal Kebidanan Malahayati*, 7(1), 116–122. https://doi.org/10.33024/jkm.v7i1.3177

Wulandari, Dewi Ariyani., & Syarifah, Nur Yeti. (2019). The Effect of the Peer Education for Adolescent in Improving Knowledge on HIV AIDS Prevention in Sleman Regency. *Advances in Health Sciences Research*, 13(Ichs 2018), 76–80. https://doi.org/10.2991/ichs-18.2019.9