Journal of High Institute of Public Health 2024;54(2):84-90.

Original Article

Knowledge and Attitudes towards HIV/AIDS among Students of the Faculty of Nursing, Damanhur University, Egypt

Doaa A. ElSayed [1¥], Shaimaa R. Abd Alaal [2], Hala K. Ibrahim [1]

1 Department of Family Health, High Institute of Public Health, Alexandria University, Egypt
2 Fellow of Department of Family Health, High Institute of Public Health, Alexandria University, Egypt

Abstract

Background: Egypt has the fastest-growing HIV epidemic in the Middle East and North Africa (MENA) region. Nursing students need adequate knowledge and a positive attitude toward HIV/AIDS for effective patient care.
Objective(s): This study assessed nursing students' knowledge and attitudes toward HIV/AIDS.
Methods: A cross-sectional study among 400 randomly selected nursing students at Damanhur University used a self-administered questionnaire. Knowledge and attitude scores were analyzed using SPSS.
Results: Knowledge and attitude scores were significantly better among females (p=0.023, p=0.038, respectively). Areas of knowledge deficiency included misconceptions about HIV transmission through mosquito bites and sharing personal items. Additionally, only 19.0% correctly identified that no recent vaccine exists. Negative attitudes were prevalent, with 53.3% believing AIDS hinders education and employment, and 61.5% were uncomfortable working with HIV-positive colleagues. Academic year influenced both knowledge and attitudes, with second-year students scoring highest (p<0.001, p=0.004). A weak but significant correlation was found between knowledge and attitude scores (r=0.138, p=0.006).
Conclusion: Misconceptions and negative attitudes toward HIV/AIDS persist among nursing students, highlighting the need for targeted educational interventions. Gender and academic year significantly influenced knowledge and attitudes, emphasizing the role of curriculum development in addressing gaps. Strengthening HIV/AIDS education and stigma-reduction initiatives is crucial to preparing future nurses for competent and compassionate care.

Keywords: Attitudes; HIV/ AIDS; Knowledge; Nursing students

Available online at:
jhiphalexu.journals.ekb.eg

Print ISSN: 2357-0601
Online ISSN: 2357-061X

¥*Correspondence*:
Email:
hiph.doaamohamed@alexu.edu.eg

Suggested Citations: ElSayed DA, Abd Alaal SR, Ibrahim HK. Knowledge and Attitudes towards HIV/AIDS among Students of the Faculty of Nursing, Damanhur University, Egypt. JHIPH. 2024;54(2):84-90.

INTRODUCTION

The HIV epidemic in the Middle East and North Africa (MENA) region continues to grow, with the disease being highly concentrated among key populations. Globally, HIV remains a significant public health challenge. HIV transmission is ongoing worldwide, and by the end of 2023, an estimated 39.9 million people were living with HIV, with 65% of them residing in the WHO African Region. In 2023, approximately 630,000 people died from HIV-related causes, and an estimated 1.3 million people acquired HIV. WHO, the Global Fund, and UNAIDS are all working with global HIV strategies that align with the Sustainable Development Goal (SDG) target 3.3, aiming to end the HIV epidemic by 2030. In 2023, 86% of people living with HIV knew their status, 77% were receiving antiretroviral therapy, and 72% had achieved suppressed viral loads. [(1)]

Ending the AIDS epidemic by 2030 in the region requires renewed political leadership, addressing gender equality, securing sustainable and sufficient funding, and scaling up the implementation of innovative programs. [(2)] Egypt discovered its first AIDS case in 1986, and since then, the number of infections has been steadily increasing. [(3)] By the end of 2023, approximately 42,000 people were living with HIV in Egypt, with 19,384 of them receiving antiretroviral therapy (ART). [(4)] Despite maintaining a relatively low HIV/AIDS prevalence, Egypt faces numerous challenges, including a weak surveillance system, health inequalities with limited access to reproductive health services, an unexpected influx of refugees, the inferior women status, and widespread

fear, stigmatization, and criminalization. [2] To combat the spread of HIV, the Egyptian government established the National AIDS Program (NAP) in 1987, which leads the national response to the epidemic with the goal of halting its growth, preventing new infections particularly among key populations—and improving the overall health outcomes of people living with HIV. [3]

Unfortunately, nursing students still shows limited basic knowledge and information, which may stem from nurses' beliefs and attitudes toward HIV, affecting their ability to implement effective testing and care strategies. [5] Knowledge, skills, and attitudes are crucial competencies for healthcare professionals caring for people living with HIV/AIDS. [6] Nurses, who play a key role in providing care to individuals with HIV/AIDS, need to be equipped with comprehensive knowledge about HIV/AIDS to foster comfort and develop a positive attitude toward these patients. [7] Nurses must be competent in four key areas related to HIV: understanding the etiology and medical aspects of HIV, possessing ethical, legal, psychosocial, and spiritual competence, developing psycho-motor skills for HIV nursing care, and demonstrating professionalism. [8]

The aim of the present study was to assess the knowledge and attitudes towards HIV/AIDS among students of the Faculty of Nursing, Damanhur University, Egypt.

METHODS

The study was conducted using a cross-sectional study design. The sample size was calculated using Epi info 7 software based on an expected frequency of 50%, a margin of error 5%, alpha error of 0.05, the minimum required sample size was estimated to be 384 students and was rounded to 400. The sample was selected randomly from all academic years, using the equal allocation. The sample included 100 students of both sexes from each academic year, who accepted to participate in the study. The sample was selected form the name list of students in each academic year, and every other name of students was included in the study until fulfilling the total sample size.

Data collection methods and tools

A self-administered questionnaire

was used for collecting data about socio-demographic characteristics: including age, sex, marital status, academic year and residence.

Knowledge scale regarding HIV/AIDS

An Arabic questionnaire was developed by making some modifications to the questionnaires of Ali and Hassan [6, 8]. It included 53 questions of knowledge about definition of AIDS, causes, nature, modes of transmission, treatment and control of AIDS and high-risk groups. A scoring system was prepared and applied by the researcher. The correct answer was scored "one" and the incorrect answer and do not know were scored “zero”. The total knowledge score was calculated by summing scores of all questions. It ranged between 0 – 53. The level of knowledge was classified to; good ≥ 75%, fair 50- < 75%, and poor < 50% of the maximum score.

Attitudes scale toward HIV/AIDS

Attitudes were evaluated using a four points Likert scale ranging from strongly negative (0) to strongly positive (3). Eighteen statements were used to assess the following items:

- Attitudes toward patients with AIDS.
- Attitudes toward care of HIV/AIDS infected persons.
- Attitudes toward precautions that must be followed by healthcare workers (HCWs).

The total attitude score was calculated by summing the score of all questions yielding a total score ranging from 0- 54 then classified into: strongly negative 0 - <30%, negative 30 - < 60%; positive 60 -< 85%; and strongly positive ≥85% of maximum score.

Statistical analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp, released 2011). Categorical data were represented as numbers and percentages. For continuous data, they were tested for normality by the Kolmogorov-Smirnov test. Quantitative data were expressed as range (minimum and maximum), mean, standard deviation, median. For normally distributed quantitative variables Student t-test was used to compare two groups and F-test (ANOVA) was used to compare more than two groups. Significance of the obtained results was judged at the 5% level.

Ethical considerations

Approval of the Ethics Committee of the High Institute of Public Health was obtained before conducting the study. The study was conducted in compliance with the International Guidelines for Research Ethics. Informed written consent was taken from all study participants after explanation of the purpose and benefits of the research. Anonymity and confidentiality were assured and maintained, and there was no conflict of interest.

RESULTS

The study sample included 400 students, 108 males (27.0%) and 292 females (73.0%). Table (1) revealed that 55.3% of students were below 20 years, with a mean age of 20.28±1.38 years. As regards marital status, most of the students (92.3%) were single. Concerning residence, 88.7% were living with their families, while 11.3% were living in a student hostel.

Table (1): Distribution of Damanhour University nursing students according to socio-demographic characteristics

Socio-demographic characteristics	Nursing students (n=400)	
	No.	%
Age (in years)		
<20	221	55.3
≥20	179	44.7
Mean ± SD	20.28±1.38	
Sex		
Male	108	27.0
Female	292	73.0
Marital status		
Single	369	92.3
Married	31	7.7
Residence		
With family	355	88.7
Students hostel	45	11.3

Table (2) presents the knowledge of Damanhour nursing students about HIV/AIDS, highlighting areas of knowledge deficiency. Less than half of the students (47.7%) answered correctly that some people have immunity against AIDS, with no statistically significant difference between males and females (p=0.747). Notably, 46.8% of students correctly answered that HIV cannot be transmitted through sharing personal belongings, with no significant difference between sexes (p=0.574). Only 35.5% of students correctly identified that married people are not necessarily less likely to contract AIDS, with a higher percentage of correct responses among females compared to males, with a statistically significant difference (p=0.000). Furthermore, 32.2% of students acknowledged that women are more susceptible to HIV during menstruation, with no statistically significant difference between sexes (p=0.100).

Moreover, only 34.0% of students correctly recognized that HIV is not spread through mosquito bites, with a statistically significant difference between both sexes (p=0.038). Awareness regarding mother-to-child transmission was also insufficient, as only 48.7% of students correctly identified breast milk as a possible transmission route, with a statistically significant difference between sexes (p=0.009). Additionally, only 19.0% correctly recognized that a new vaccine for AIDS has not been recently developed, with no statistically significant difference between sexes (p=0.312).

Table (2): Distribution of Damanhour University nursing students by sex according to their knowledge about AIDS

Knowledge items	Correct answer						X^2	P value
	Male (n=108)		Female (n=292)		Total (n=400)			
	No.	%	No.	%	No.	%		
Some persons have immunity against AIDS	53	49.1	138	47.3	191	47.7	0.104	0.747
Married people are less likely to get AIDS	23	21.3	119	40.8	142	35.5	13.035	0.000*
Women are more likely to get AIDS during menstruation	28	25.9	101	34.6	129	32.2	2.708	0.100
HIV can be found in:								
Breast milk	41	38.0	154	52.7	195	48.7	6.890	0.009*
Sweat	49	45.4	165	56.5	214	53.5	3.930	0.047*
Tears	54	50.0	160	54.8	214	53.5	0.729	0.393
Coughing or sneezing of an AIDS patient	68	63.0	202	69.2	270	67.5	1.388	0.239
Food	63	58.3	206	70.5	269	67.3	5.341	0.021*
Using the toilet after an AIDS patient	51	47.2	157	53.8	208	52.0	1.353	0.245
Sharing personal belongings with others (comb, hairbrush, clothes, plates and cups)	48	44.4	139	47.6	187	46.8	0.316	0.574
Bite of mosquitos	28	25.9	108	37.0	136	34.0	4.298	0.038*
New vaccine has recently been developed against AIDS	17	15.7	59	20.2	76	19.0	1.021	0.312

*Significant at $p \leq 0.05$

Table (3) presents the distribution of nursing students by sex in relation to their attitudes towards AIDS patients. More than half (53.3%) believed that being an AIDS patient is an obstacle to receiving education and employment. The difference between both sexes was statistically insignificant (p=0.091). 57.5% agreed that AIDS patients should be considered as victims of the social system. The difference between both sexes was statistically significant (p=0.043). Most of the students (90.1%) strongly agreed that gloves should be worn when touching AIDS patients. The difference between both sexes was statistically significant (p=0.007). Furthermore, 61.5% of students expressed discomfort working with a colleague who has AIDS,

these differences were not statistically significant (p=0.893).

Table (3) Distribution of Damanhour University nursing students by sex according to their attitudes towards AIDS patients

Attitudes items	Negative attitude				Total (n=400)		Test of significance
	Male (n=108)		Female (n=292)				
	No.	%	No.	%	No.	%	
AIDS patients deserve what happened to them	51	47.2	86	29.4	137	34.3	χ^2=11.055* p<0.001*
Fetuses infected with AIDS should be aborted	51	47.2	141	48.3	192	48.0	χ^2=0.036 p=0.850
Being an AIDS patient is an obstacle to receive education and employment	65	60.2	148	50.7	213	53.3	χ^2=2.858 p=0.091
AIDS patients should not be considered as victims of the social system	71	65.8	159	54.4	230	57.5	χ^2=4.111* p=0.043*
We should wear gloves when touching AIDS patients	90	83.4	270	92.5	360	90.1	χ^2=7.306* p=0.007*
Healthcare workers are obligated to treat all patients regardless of their HIV status.	11	10.2	29	9.9	40	10.0	χ^2=0.006 p=0.940
I would not be comfortable working with a colleague who is an AIDS patient	67	62.1	179	61.3	246	61.5	χ^2=0.018 p=0.893
AIDS patients do not the same right to receive care as other patients	44	40.8	88	30.1	132	33.0	χ^2=4.009* p=0.045*

*Significant at $p \leq 0.05$

Relationships between students' socio-demographic characteristics and their knowledge and attitude scores.

In terms of knowledge scores (Table 4), age appears to have a significant impact, with students aged 20 years and above scoring higher than those below 20 years ($p < 0.001$). However, sex differences in knowledge scores are not statistically significant ($p = 0.055$), although females tend to score slightly higher. Marital status and residence type do not show a significant effect on knowledge score, but academic year plays a crucial role, with second-year students achieving the highest scores ($p < 0.001$).

Table (4): Relation between total knowledge score of Damanhour University nursing students with socio demographic characteristics (n = 400)

Socio-demographic characteristics	N	Total knowledge score of students		Test of Sig.	p
		Min. – Max.	Mean ± SD.		
Age (in years)					
<20	221	7 – 52	34.63 ± 8.60	t= 3.716*	<0.001*
≥20	179	1 – 51	37.60 ± 7.37		
Sex					
Male	108	14 – 50	34.67 ± 7.38	t= 1.922	0.055
Female	292	1 – 52	36.43 ± 8.44		
Marital status					
Single	369	1 – 52	35.75 ± 8.20	t= 1.791	0.074
Married	31	10 – 48	38.48 ± 7.86		
Residence					
Students hostel	45	21 – 50	37.02 ± 7.43	t= 0.925	0.356
With family	355	1 – 52	35.82 ± 8.29		
Academic year					
First year	100	14 – 44	30.35 ± 6.97	F= 31.214*	<0.001*
Second year	100	11 – 52	40.11 ± 8.09		
Third year	100	1 – 47	35.81 ± 7.96		
Fourth year	100	10 – 50	37.56 ± 6.45		

SD: Standard deviation t: Student t-test F: F for One way ANOVA test
p: p value for Relation between Total knowledge score of students with socio demographic characteristics
*: Statistically significant at $p \leq 0.05$

Regarding attitudes, Table (5) shows the relation between attitudes score of students and their socio-demographic characteristics. Age does not significantly affect attitude scores ($p = 0.330$), while sex differences are statistically significant ($p = 0.013$), with females displaying more positive attitudes than

males. Marital status and residence type do not show any significant relationship with attitudes, whereas academic year has a notable effect (p = 0.004), with second-year students showing the highest scores.

Table (5): Relation between total attitudes score of Damanhour University nursing students with socio demographic characteristics (n = 400)

Socio-demographic characteristics	Total attitudes score of students			Test of Sig.	p
	N	Min. – Max.	Mean ± SD.		
Age (in years)					
<20	221	6 – 51	23.24 ± 7.95	t= 0.975	0.330
≥20	179	4 – 41	22.45 ± 8.22		
Sex					
Male	108	4 – 51	21.25 ± 8.30	t= 2.487*	0.013*
Female	292	6 – 47	23.50 ± 7.91		
Marital status					
Single	369	4 – 51	22.93 ± 8.02	t= 0.361	0.718
Married	31	6 – 47	22.39 ± 8.83		
Residence					
Students hostel	45	4 – 35	22.64 ± 7.33	t= 0.216	0.829
With family	355	4 – 51	22.92 ± 8.17		
Academic year					
First year	100	6 – 36	21.81 ± 6.49	F= 4.563*	0.004*
Second year	100	6 – 41	25.42 ± 7.27		
Third year	100	4 – 51	22.35 ± 8.67		
Fourth year	100	6 – 47	21.98 ± 9.16		

SD: Standard deviation t: Student t-test F: F for One way ANOVA test
p: p value for Relation between Total attitudes score of students with socio demographic characteristics
*: Statistically significant at $p \leq 0.05$

Figure (1) illustrates the correlation between students' knowledge and their attitudes, based on a sample of 400 participants. The Pearson correlation coefficient (r = 0.138, p = 0.006) indicates a weak but statistically significant positive relationship between the two variables. As students' knowledge increases, their attitudes tend to improve slightly.

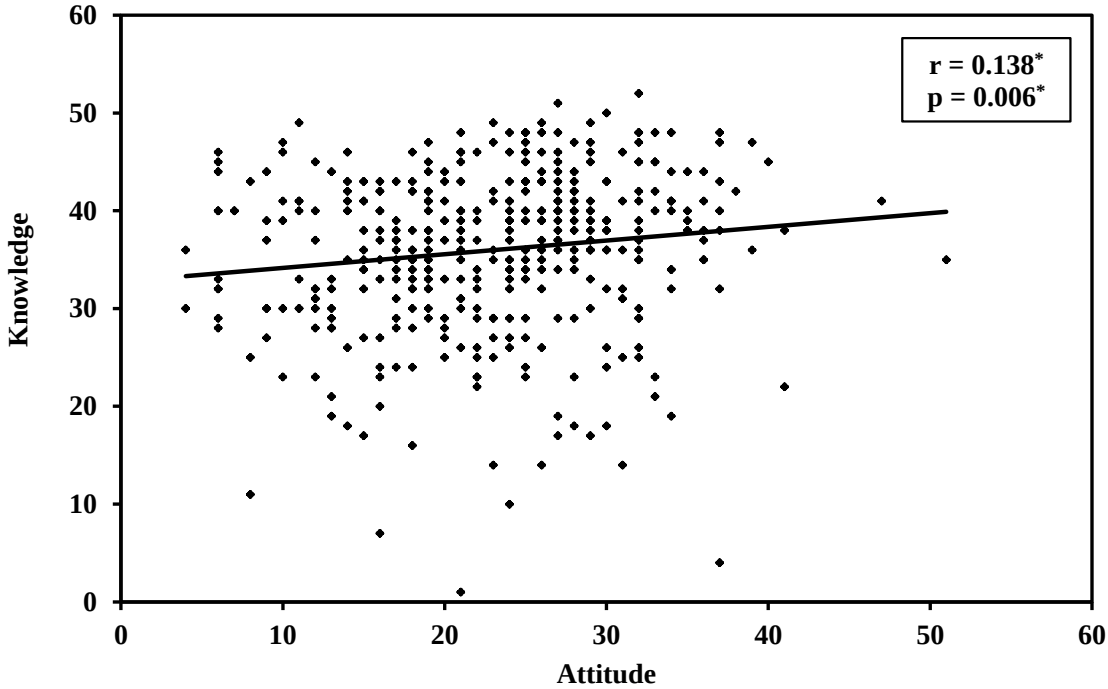

Figure (1):Correlation between Knowledge and Attitude scores of Damanhour University nursing students about HIV/ AIDS (n = 400)

r: Pearson coefficient *: Statistically significant at $p \leq 0.05$

DISCUSSION

AIDS is one of the major global health challenges, impacting both the physical and mental health of those infected [9,10] Health care systems cannot perform appropriately without sufficient numbers of supported, skilled, and motivated HCWs. Nurses and midwives comprise about 50% of the world's health labor force, providing health care in all reaches of the world. [5] Nursing students are the future of practicing nurses hence; their knowledge and attitudes are of vital importance. HIV/AIDS remains a global health problem affecting the overall quality of life. [10,11] Concerning transmission of HIV infection, approximately half of the students answered correctly about breast milk, sweat and tears (48.7%,53.5% and 53.5%) respectively (Table 3). In contrast another study done in India (2021) illustrated that one-third (35.0%) of students had a good knowledge that HIV can be transmitted through breastfeeding. [12,13] About two thirds of the students stated that coughing and sneezing and sharing foods with AIDS patients can transmit the infection. Also, some misconceptions were detected as 46.8% of them stated that HIV can be transmitted through sharing personal belongings. 34.0% and 52.0% of students mentioned that HIV can be transmitted through mosquito bites and using toilets after patients, respectively. 19.0% of the students answered correctly regarding developing new vaccine recently against AIDS (Table 3). These findings are consistent with a study conducted in Turkey (2018), which found that 57.5% of students had good knowledge that HIV cannot be transmitted through using the toilet after an AIDS patient. [14] However, these findings also differ from a study conducted in Sana'a, Yemen (2012), which revealed that 57.0% of students had satisfactory knowledge that HIV cannot be transmitted through mosquito bites and other insect bites. [15]

Discrimination and negative attitudes alter both the emotional well-being and mental health of people living with HIV/AIDS. In the present work, approximately one third of the students agreed with the notion that AIDS patients deserve what happened to them, while nearly half agreed that fetuses of infected patients should be aborted. More than half of them believed that being an AIDS patient poses a barrier to receiving education and employment. Also 57.5% of the respondents agreed with the idea that AIDS patients should not be viewed as victims of the social system. It also illustrated form the present study that 61.5% of the students agreed that they would not be comfortable working with a colleague who is an AIDS patient. Negatively, about one-third of the study participants agreed that AIDS patients have not the same right to receive care as other patients. This finding goes with a study conducted in Egypt (2011) which showed that 47.3% of the students had negative attitudes about those AIDS patients deserved their illness. [8] Also, these findings are in constant with a study conducted in Riyadh, Saudi Arabia (2013) [16] which revealed that 25.7% of students had strongly negative attitudes regarding that HCWs are obligated to treat all patients regardless of their HIV status. Contradictory findings were documented by a study done in Ghana (2019) which showed that 64.8% of students had strongly positive attitudes regarding the right of AIDS patients to receive care as others. [12] Most of the students had strongly negative attitude regarding that gloves should be worn when touching AIDS patients. This agrees with a study done in Riyadh, Saudi Arabia (2013) which revealed that 55.1% of students had strongly negative attitudes regarding wearing gloves when touching AIDS patients. [16] Improving the quality of care provided to people living with HIV/AIDS depends on enhancing nursing students' knowledge and fostering positive attitudes toward people living with HIV/AIDS. [17]

The current study revealed that age does not have a statistically significant impact with students on attitude score. Contradictory findings were reported in study done in India (2015) which showed that positive attitudes towards AIDS were more prevalent among students above 20 years old than younger students ($p = 0.019$). [17] This may be due to the socio-cultural background of the students. Marital status and residence type do not show any significant relationship with attitudes, whereas academic year has a notable effect ($p = 0.004$), with second-year students showing the highest scores. This could indicate that students in their second-year experience more engagement or exposure to attitude-shaping experiences. This finding goes with the study done in Alexandria, Egypt which found that the attitude score did not increase with the progress of the students' academic year ($p= 0.031$). [15] The present work displayed that age appears to have a significant impact on knowledge score, where students aged 20 years and above scoring higher than those below 20 years ($p < 0.001$). This finding is in agreement with a study done in Alexandria, Egypt (2011) which revealed that students who were above 20 years old had higher scores of knowledge than younger students. [8] However, sex differences are not statistically significant ($p = 0.055$), although females tend to score slightly higher. The academic year plays a crucial role, with second-year students achieving the highest scores ($p < 0.001$). This trend may be influenced by curriculum variations or exposure to more advanced coursework.

CONCLUSION AND RECOMMENDATIONS

The academic year had a statistically significant impact on both knowledge and attitude scores.

Knowledge and attitude were significantly better among females. A weak positive correlation existed between knowledge and attitudes, highlighting the need for targeted interventions. Enhancing education, practical training, awareness campaigns, and counseling can improve nursing students' knowledge and attitudes toward HIV/AIDS. Standardized training and further research will ensure effective interventions and compassionate care.

CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

FUNDING

No funding sources

REFERENCES

1- World Health Organization (WHO). HIV and AIDS. Geneva: WHO; 2024

2- Amin T. Sexually Transmitted Infections: The Egyptian situation with special emphasis on HIV/AIDS. International Public Health Forum. 2014;1(3):6-13.

3- United Nations Programme on HIV/AIDS (UNAIDS). Laws and Policies Analytics: Explore Data. 2018. Available from: https://lawsandpolicies.unaids.org/. [Accessed in: May, 2024].

4- United Nations Programme on HIV/AIDS (UNAIDS). Country factsheets [Egypt], HIV and AIDS Estimates. Geneva: UNAIDS; 2023.

5- Relf MV, Harmon JL. Entry-level competencies required of primary care nurse practitioners providing HIV specialty care: A national practice validation study. J Assoc Nurses AIDS Care. 2016;27(3):203-13. https://doi.org/10.1016/j.jana.2015.12.004.

6- Ali RA. Knowledge and attitude of nursing students about HIV/AIDS in Sohag, Egypt. JHIPH. 2020;50(2):80-6. https://doi: 10.21608/jhiph.2020.106798.

7- Gitachu I. Key competences essential for nurses in HIV/AIDS care. Master Thesis. Finland: Centria University of Applied Sciences; 2017.

8- Hassan A. Knowledge, beliefs and attitudes on AIDS among students of faculty of nursing. Master Thesis. Egypt: Alexandria University; 2011.

9- Gázquez LM, García G I, González GA, Martín SA, Pérez MÁ, Martínez GE, et.al. Validation of the attitudes towards people living with HIV/AIDS scale in nursing students. BMC Nurs. 2023 Jul 27;22(1):245. doi: 10.1186/s12912-023-01414-6. PMID: 37496059; PMCID: PMC10373256.

10- Lestari R, Carsita WN. Pain and suffering: The reality of being positive with HIV/AIDS. Int J Public Health. 2016;5(4):479-83. https://doi.org/10.11591/ijphs.v5i4.4854.

11- Fouad, H. Knowledge and attitudes of nursing technical secondary schools' students toward acquired immune deficiency syndrome (AIDS) in El-Mansoura City. Port Said Scientific Journal of Nursing, 2016;3(1), 138-160. https:// doi: 10.21608/pssjn.2019.32323

12- Boakye DS, Mavhandu-Mudzusi AH. Nurses' knowledge, attitudes and practices towards patients with HIV and AIDS in Kumasi, Ghana. Int J Afr Nurs Sci. 2019;11:100147. https://doi.org/10.1016/j.ijans.2019.05.001

13- Agarwal S, Ahmad N, Singh SP, Varma A. A study to assess the level of awareness, knowledge and attitude in medical, nursing and paramedical students about HIV and AIDS in tertiary care hospital of Uttarakhand. India. Int. J. Heal. Clin. Res. [Internet]. 2021 Jan 27 [cited 2025Jan.4];4(2):120-3. Available from: https://www.ijhcr.com/index.php/ijhcr/article/view/788

14- Kok G, Guvenc G, Kaplan Z. Nursing students' knowledge, attitudes, and willingness to care toward people with HIV/AIDS. Int J Caring Sci. 2018;11(3):1697-1706. Available from: http://www.internationaljournalofcaringsciences.org/docs/41_koc_original_11_3.pdf

15- Al-Rabeei NA, Dallak AM, Al-Awadi FG. Knowledge, attitude and beliefs towards HIV/AIDS among students of health institutes in Sana'a city, Yemen. East Mediterr Health J. 2012;18(3):221-226. Available from: https://apps.who.int/iris/handle/10665/118299).

16- Abolfotouh MA, Al Saleh SA, Mahfouz AA, Abolfotouh SM, Al Fozan HM. Attitudes of Saudi nursing students on AIDS and predictors of willingness to provide care for patients in central Saudi Arabia. SAGE Open. 2013;3(3):1-11. https://doi.org/10.1177/2158244013499163.

17- Dharmalingam M, Poreddi V, Gandhi S, Chandra R. Undergraduate nursing students' knowledge and attitude toward people living with human immunodeficiency virus/acquired immunodeficiency syndrome. Int J Adv Med Health Res. 2015;2(1): 22-7. https://doi.org/10.4103/2349-4220.159124.