Retraction Notice

Abolfotouh, M. A., Al Saleh, S. A., Mahfouz, A. A., Abolfotouh, S. M., & Al Fozan, H. M. (2013). Attitudes of Saudi Nursing Students on AIDS and Predictors of Willingness to Provide Care for Patients in Central Saudi Arabia. *SAGE Open*, 3, 1-11. doi:10.1177/2158244013499163

At the request of the Editor and SAGE Publishing, the above mentioned article has been retracted:

Following investigation, it has been determined that this article shares major similarities with a previously published article by the same authors:

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The authors confirmed that they had simultaneously submitted similar versions of the manuscript to both journals. As a result of these findings, this article is being retracted for redundant publication.
RETRACTED: Attitudes of Saudi Nursing Students on AIDS and Predictors of Willingness to Provide Care for Patients in Central Saudi Arabia

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Abstract
This study aimed to assess acquired immune deficiency syndrome (AIDS)-related knowledge, attitudes, and risk perception among Saudi nursing students, and to identify predictors of their willingness to provide care for patients with AIDS. A cross-sectional study of 260 baccalaureate nursing students at King Saud bin-Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia, was done using a previously validated instrument. Students' knowledge percentage mean score (PMS) on AIDS was 72.93 ± 10.67 reflecting an average level of knowledge. There were many misconceptions about how AIDS is transmitted, for example, use of same toilets and bathrooms and washing clothes together (24.9%), swimming (53.7%), and coughing and sneezing (49.6%). Nursing students reported an overall negative attitude toward AIDS, with a PMS of 43.48 ± 9.21. The majority of students agreed that AIDS patients should be isolated from other patients (83%), and should not share the room with other noninfected patients (81.8%), and some reported that people living with AIDS deserve what has happened to them (24.7%). After controlling for confounders, students' poor knowledge and negative attitude were associated only with having never been given nursing education as their primary university education “Stream 2 students” (p = .012 and p = .01, respectively). These findings have implications for development of teaching strategies and curricular approaches for nursing to address this health care issue.

Keywords
AIDS, nursing students, Saudi, knowledge, attitude

Introduction
Human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (AIDS) are among the most complex health problems of the 21st century (Ungan & Yaman, 2003). It affects all body systems as well as the mental health and social relationships of carriers and asymptomatic patients (Tavossi, Zaferani, Enzavei, & Tajik, 2004). HIV/AIDS is transmitted through sexual transmission, parenteral, perinatal transmission, and contaminated blood products (Joint United Nations Programme on HIV/AIDS and World Health Organization [UNAIDS/WHO], 2006).

As of 2009, it is estimated that there are 33.3 million people worldwide infected with HIV (Worldwide AIDS & HIV Statistics, 2009). Although HIV/AIDS prevalence rates in the Eastern Mediterranean Region (EMR) are low, the region has one of the fastest-growing HIV infection rates in the world (United Nations Joint Programme on HIV/AIDS, 2007). Djibouti and Sudan have the highest prevalence rates in the Arab world and are facing a generalized epidemic (WHO, 2006). As of January 5, 2011, the prevalence rate of AIDS among Saudi adults 15 to 49 years was 0.04%, with 10,000 people with AIDS and 300 deaths (UNAIDS/WHO, 2008). The route of infection in the Arab world is unprotected heterosexual intercourse. However, in some countries, injecting drugs is the major cause of HIV infection (Badahdah & Sayem, 2010).
Health education and prevention remain the main health care priorities in HIV/AIDS prevention, because of HIV/AIDS is still a noncurable disease and developing an AIDS vaccine has proven extremely complex due to virus’s ability to mutate (Buskin, Lin, Houyuan, Tianii, & Mcgough, 2002; Pita-frenandez, Rodriguez, & Pertega, 2004; Preston, Forti, & Kassab, 2002; Watkins & Gray, 2006). Studies were conducted in Turkey (2003) and Saudi Arabia (2005) revealed that health education intervention has a positive impact on students’ knowledge and attitudes toward HIV/AIDS (Al-Mazrou, Abouzeid, & Al-Jeffri, 2005). Several studies revealed the importance of health education to reduce stigma related to HIV/AIDS (Earl & Penney, 2003; Martin & Bedimo, 2000). Another study in Nigeria (2005) showed that although students were knowledgeable about HIV/AIDS, many do not practice what they know (Ogbuji, 2005). Study in Iran (2004) showed that there were misconceptions about the route of transmission such as Mosquito bites (33%), public swimming pools (21%), and public toilets (20%). It also concluded that although the knowledge level seems to be moderately high, there was intolerant attitude toward HIV/AIDS patients (Tavossi et al., 2004).

Nursing students are being identified as a potential risk group for the HIV/AIDS infection, for that reason awareness regarding HIV/AIDS in this group is very important for its prevention (Rondahal, Innala, & Carlsson, 2003). Literature indicated the lack of accurate information about HIV infection is associated with lack of confidence in caring for clients with HIV/AIDS patients. Researches indicated that nursing students are frightened of AIDS patients and often unwilling to care for them (Petro-Nustas, Kulwic, & Zambou, 2002). Nursing attitudes toward HIV/AIDS patients will heavily influence their willingness to learn about and provide health care for this population (Lohrmann, Valimaki, Suominen, Muinonen, & Dassan, 2000; O’Sullivan, Preston, & Forti, 2000). Unwakwe (2000) reported that students with sufficient education and more knowledge about HIV/AIDS had more positive attitudes and were more willing to provide care for HIV/AIDS patients.

In countries such as Saudi Arabia, which Islam is the official religion, compliance to Islamic rules is thought to offer the best protection for Muslims from AIDS. Traditional Muslim approaches have tended to be conservative, and it is difficult to break the silence around issues of sexual behaviors, especially those that deviate from religious norms (Ersilia, 2002). Yet, the most recent estimate of the number of people living with HIV/AIDS in the Middle East and North Africa is about half a million (Joint United Nations Programme on HIV/AIDS and World Health Organization UNAIDS/WHO, 2008). Nursing plays major role in the care for HIV/AIDS patients. Therefore, it is very important to assess the knowledge, attitudes, and beliefs of this group. This will provide a basis for a much-needed AIDS education for the students in Saudi Arabia. Few previous studies were conducted in the Middle East region to investigate this issue on nursing (Hassan & Wahsheh, 2011). Thus, this study aimed (a) to assess AIDS-related knowledge, attitudes, and risk perception among Saudi female students of college of nursing, King Saud bin-Abdulaziz University for Health Sciences, and (b) to identify predictors of willingness to provide care for patients with AIDS.

Study Design
A cross-sectional design was applied.

Study Area/Setting
The study was conducted in College of Nursing, King Saud bin-Abdulaziz University for Health Sciences, National Guard Health Affairs, Riyadh, Saudi Arabia.

Study Participants
The target population of the study was the students of College of Nursing (CON-R), King Abdulaziz Medical City, National Guard Health Affairs, Riyadh, Saudi Arabia. CON-R admits female Saudi nationals mainly and awards a bachelor of science in nursing (BSN) to two educational streams. Stream 1 has, as its intake, secondary school graduates and follows what is known as the conventional program. Stream 2 admits holders of bachelor of science degrees. These students follow what is known as the Graduate Entry Accelerated Program. This program is the first of its kind in the kingdom of Saudi Arabia and is designed to expedite the process of graduation by recognizing these students’ previous learning, thus, helping increase market supply of nurses faster. The target sample of the study was all female students registered in CON-R, and willing to participate during the academic year 2009-2010 (around 340 students). Those who responded to the study constituted 260 students with a response rate of 76.5%.

Data Collection Methods
All students were subjected to a self-administered questionnaire, previously administered to both San Franciscoan (Diclemente, Zorn, & Temoshok, 1986) and Irish (Doyle & Conroy, 1991) adolescents, as well as the health care providers in Nigeria (Adebap, Bangbala, & Oyedirn, 2003). A previously validated Arabic version (Abolfotouh, 1995) of this questionnaire with nursing-related modifications was used. This questionnaire was composed of four parts:

1. Students’ personal data such as age, origin, academic level, previous information on AIDS, and source of this information.
2. AIDS-related knowledge: This part consisted of a total 51 statements. These statements addressed five basic categories: cause of AIDS (5 statements),
nature (16 statements), mode of transmission (15 statements), treatment/control (7 statements), and groups at high risk (8 statements). The correct response was scored as “1,” and the incorrect and “Don’t know” responses as “0.” An overall knowledge score was calculated by summing the scores for statements, thus the highest possible score was 51 points. Percentage mean score (PMS) was estimated for each category and for the overall knowledge score.

3. Attitude of nursing students toward AIDS: This part consisted of a total 19 statements, these statements addressed three basic categories (Abolfotouh, 1995; Adelabap et al., 2003; Diclemente et al., 1986; Doyle & Conroy, 1991): (a) attitudes toward people living with AIDS (PLWA; 10 statements), (b) attitudes toward care (4 statements), and (c) attitudes toward precautionary measures (5 statements). Attitude toward AIDS was measured on a 4-point Likert-type scale, with 4 indicating strongly agree and 1 indicating strongly disagree. The 4-point scale, rather than a 5-point scale, was used to motivate respondents to indicate either a positive or a negative attitude. Approximately one half of the statements were worded negatively to avoid a response set and were reverse coded for data analysis. For analysis, points “1” and “2” were combined to form the category “positive attitude,” while points “3” and “4” were combined to form the category “negative attitude.”

The instrument was piloted with 20 students for clarity and comprehensiveness. Reliability measures for internal consistency were not established prior to administration of the instrument; however, Cronbach’s alpha was conducted following data collection for the attitude scale. Obtained alpha coefficients were as follows: overall instrument (α = .88), attitude to AIDS patients (α = .83), attitude to provision of care (α = .65), and attitude to precautionary measures (α = .76).

Ethical Issues

The study was described, and the surveys were distributed during the recess, with an attached letter giving further information including an explanation of rights and assurance of anonymity. The students were informed that their decision regarding participation would not affect their course grades or their relationships with the faculty members. Only students who were willing to participate in the study, after being fully informed of the aim of the study and methodology, were included in the target sample of the study. Returned completed instruments constituted consent to participate. Students were asked not to write their names on the questionnaire form so as to be anonymous. Data were treated confidentially by the primary investigator and co-investigators. The study protocol received ethical approval from the Saudi National Guard Health Affairs, Riyadh, Saudi Arabia (Ref # RC09/007).

Data Analysis

Data analysis was conducted using SPSS (Windows, version 17.0; SPSS Inc., Chicago, IL, USA). Descriptive statistics such as mean, mode, median, and standard deviation were applied to summarize the data. To compare between categorical data, chi-square test was used. In the case of variables having more than two categories, degrees of freedom are given with the chi-square statistic. For comparison between numerical data, Student’s t test, and analysis of variance (ANOVA) were applied. To identify the significant predictors for knowledge and attitudes (dependent variables) of students toward AIDS and PLWA, multiple linear regression models were applied. With age (in years), origin (urban, rural groups), academic year, stream group (SI and SII), and previous information (yes, no) about AIDS as independent variables, a p value of <.05 was considered as the level of significance.

Results

Part I: Demographic Data

The study included 280 nursing students, all of whom were females (200 from Stream 1 and 60 from Stream 2). Their mean age was 21.55 ± 2.56 years (minimum 17 years and maximum 30 years). The distribution of their academic years was as follows—1st year 65 (25%), 2nd year 51 (19.6%), 3rd year 36 (13.8%), and 4th year 108 (41.5%)—the majority of whom were of urban origin (92.7%). Students from Stream 2 were significantly older than those of Stream 1 (24.45 ± 2.07 years vs. 20.68 ± 2.00 years, t = 12.73, p < .001), and showed higher proportion of students of rural origin (18.3% vs. 4.0%, Fisher-exact [FET], p < .001; Table 1).

Almost all students reported previous information about AIDS (97.6%). The primary source of information for students was the media, constituting television and radio (64.2%), the second most common source was their university education (46.2%), followed by public lectures (31.1%).

Part II: Knowledge of AIDS

The students’ knowledge PMS on AIDS was 72.93 ± 10.67 reflecting an average level of knowledge. However, it varied with the different aspects of AIDS as follows: knowledge related to cause (85.0 ± 18.18), nature (75.0 ± 12.46), mode of transmission (70.0 ± 12.46), risk groups (68.50 ± 16.74), and treatment (65.53 ± 22.42; Figure 1).

With regard to nature of AIDS, it was interesting that about one half of students considered health team, patients in hospitals, adolescents, and married women as groups of high risk to contract AIDS. The question on the human fluids
implicated in the transmission of HIV also attracted a range of responses: blood and blood products (99.2%), semen (93.1%), vaginal secretions (90.7%), saliva (63.2%), tears (20.2%), and sweat (19%). The following incorrect options attracted responses from the students about the mode of transmission: use of same toilets and bathrooms and washing clothes together (24.9%), swimming (53.7%), and coughing and sneezing (49.6%). Meanwhile, about one fourth of students reported mosquito bite as a mode of transmission for HIV.

The students’ knowledge was the lowest in treatment and control of AIDS. One half of the students did not know that there is at present no cure for this disease condition, and the majority (73%) did not know that there is no vaccine yet for prevention of AIDS contraction (Table 2).

Part III: Attitudes to AIDS

Nursing students reported an overall negative attitude toward AIDS, as reflected by the PMS of 40.5 ± 17.04. This attitude was the least favorable for precautionary measures (PMS = 29.29 ± 20.38), followed by attitude to patients living with AIDS-PLWA (PMS = 40.5 ± 17.04), while it was the most favorable for attitude to care of AIDS patients (PMS = 67.62 ± 17.04; Figure 1).

With regard to attitude to PLWA, only one third of students (32.3%) positively considered AIDS patients as victims of the society, one third (39.2%) considered HIV carriers as unable to rear children, and 25.4% who agreed on their right to have their diagnosis kept as a medical secret. On the other hand, the majority of students (82.7%) negatively agreed not to allow seropositive women get pregnant (Table 3).

With regard to attitude to care of AIDS patients, more than one half of students (55.1%) negatively agreed that treating PLWAs puts health workers at high risk. Another half (46.7%) negatively reported that they would not be happy to work with a colleague who was an HIV carrier.

With regard to attitude to precautionary measures, the majority of students negatively agreed that AIDS patients and/or carriers be isolated from other patients (83.0%), have their care in specialized hospitals (89.6%), and not allowed to share a room with noninfected patients (81.8%). Meanwhile, those who positively disagreed to wear gloves when touching a patient with AIDS were only 15.7% of all students. Higher PMS of attitude to precautionary measures was signiﬁcantly associated with Stream 1 before (p = .019) and after adjustment (p = .038; Tables 4 and 5).

The present study showed that knowledge score of the students had no signiﬁcant association with any of the attitude categories, PLWA (t = 1.27, p = .21), care (t = 1.79, p = .075), precautionary measures (t = 9.92, p = .36), and overall attitude (t = .22, p = .82).

Part IV: Predictors of Knowledge on and Attitude Toward AIDS and Patients

As the grades of the students increased, the total mean percentage score of knowledge rose signiﬁcantly (F = 4.64, p = .004). Students with previous knowledge showed signiﬁcantly higher PMS of knowledge than those without (t = 2.62, p = .01; Table 4). However, after adjustment for potential confounders, higher knowledge PMS was signiﬁcantly associated with Stream 1 (p = .012), older age (p < .001), and having previous information on AIDS (p = .006; Table 5).

With regard to attitude, PMS of attitude to PLWA was signiﬁcantly higher in younger age (p = .015), but this association disappeared after adjustment for other confounders (p = .18). Higher PMS of attitude to provide care to patients was signiﬁcantly associated with Stream 1 (p = .012), older age (p < .001), and younger age (p = .007). However, association with Stream 1 was the only signiﬁcant association that remained after adjusting for other confounders (p = .004). Higher PMS of attitude to precautionary measures was signiﬁcantly associated with Stream 1 before (p = .019) and after adjustment (p = .038; Table 4). Higher PMS of overall attitude to AIDS was signiﬁcantly associated with Stream 1 (p < .001) and younger age (p = .009). However, after adjusting for age, origin, academic year, and previous information, Stream 1 was the only signiﬁcant predictor of higher score of overall attitude (p = .011; Table 5).

Discussion

Early in the HIV/AIDS health crises, several studies revealed patterns of reluctance to care for persons with AIDS among nursing students (Earl & Penney, 2003). These findings were of great concern, because it is very likely at some time nurses will be caring for people with AIDS. Students in the present study were quite knowledgeable about the basic facts regarding AIDS such as: its cause and nature and the ways in which HIV is transmitted. This finding was consistent with the studies of Lohrmann et al. (2000), Peate et al. (Abolfotouh,
However, there were many misconceptions about how HIV is transmitted, for example, shaking hands, using the same toilet or bathroom, and so on. This problem was also addressed by previous investigators such as Tavocas, Zaferani, Enzevaei, and Tajik (2004); Bektas and Kulakac; and Badahdah and Sayem (2010). Some of the Saudi nursing students were not aware that there was no cure for AIDS with medication or vaccine. However, this finding was in agreement with that of Turkish nursing students (Bektas & Kulakac, 2007). Perhaps the students were not educated enough about AIDS to be able to distinguish between antiretroviral therapy and a cure for AIDS (Badahdah & Sayem, 2010).

Negative attitudes toward PLWA can interfere with the quality of nursing care and can cause stress to nurses and patients alike (Earl & Penney, 2003; Martin & Bedimo, 2000). In the present study, there was a substantial negative attitude toward AIDS and HIV-positive patients. This finding was in agreement with the U.K. (Earl & Penney, 2003) and Turkish studies (Bektas & Kulakac, 2007). Yet, this finding was not consistent with the findings of Halpern, Rodrigue, Boggs, and Greene’s (1993) study, where nursing students did not have fears of AIDS, and did not judge individuals with AIDS in a negative way as stated by Lohrmann et al. (2000). In the present study, despite relatively high levels of knowledge about AIDS and its modes of transmission, levels of fear about the disease and prejudicial attitudes toward AIDS and AIDS patients remain. Levels of fear were very high as shown by the students’ desire to identify and quarantine AIDS patients in clinical and societal settings. The majority of students agreed that AIDS patients should be isolated from other patients, and should not share the room with other noninfected patients. This tendency may be motivated by the students’ perception that AIDS is a punishment from God. Studies from around the world and from the EMR region have shown similar attitudes (Ayranci, 2005; Kopelman, 2002; Montazeri, 2004; Tebourski & Ben Alaya, 2004).

One of the structural factors that has been the target of AIDS prevention efforts is stigma (Heijnders & Van Der Meij, 2006). The findings of previous studies reported that the stigmatization from nursing students was the mode of transmission of AIDS virus, where students were most stigmatizing toward those who contracted the disease through injecting drugs and sexual transmission, and least
Table 2. AIDS-Related Knowledge of Saudi Nursing Students in Central Saudi Arabia.

| AIDS-related knowledge | True | False | Don’t know |
|------------------------|------|-------|------------|
|                        | No.  | %     | No.  | %     | No.  | %     |
| **Causes of AIDS**     |      |       |       |       |       |       |
| 1. AIDS is caused by a virus | 204* | 96.2  | 3    | 1.4   | 5    | 2.4   |
| 2. AIDS is condition you are born with | 72   | 27.7  | 185  | 71.2* | 3    | 1.2   |
| 3. Stress causes AIDS  | 9    | 3.5   | 235  | 91.1* | 14   | 5.4   |
| 4. AIDS is caused by the same virus that cause (VD)/(STD) | 26   | 10.1  | 185  | 72.0* | 46   | 17.9  |
| 5. The cause of AIDS is unknown | 29   | 11.2  | 211  | 81.5* | 19   | 7.3   |
| **Nature of AIDS**     |      |       |       |       |       |       |
| 1. AIDS is a medical condition in which your body cannot fight off disease | 245  | 94.6* | 3    | 1.2   | 11   | 4.2   |
| 2. Gay men are more likely to have AIDS | 125  | 48.1  | 111  | 42.7  | 24   | 9.2   |
| 3. Some persons are immune to AIDS | 18   | 7.0   | 201  | 78.2* | 38   | 14.8  |
| 4. Women are more likely to have during their period | 20   | 7.8   | 136  | 50.4* | 108  | 41.9  |
| 5. AIDS is not at all serious, it is like having a cold | 16   | 6.2   | 212  | 82.2* | 30   | 11.6  |
| 6. Most people who get AIDS usually die from the disease | 207  | 81.0* | 22  | 8.5   | 13   | 5.1   |
| 7. AIDS is a life threatening disease | 182  | 71.3* | 5    | 1.9   | 2    | 0.8   |
| 8. People with AIDS usually have a lot of other diseases as a result of AIDS | 248  | 95.9* | 3    | 1.2   | 8    | 3.1   |
| **HIV can be found in any infected person on** |      |       |       |       |       |       |
| 11. Blood | 258  | 99.2* | 4    | 0.8   | 0    | 0.0   |
| 12. Vaginal secretion | 235  | 90.7* | 12   | 4.6   | 12   | 4.6   |
| 13. Semen | 242  | 93.1* | 7    | 2.7   | 11   | 4.2   |
| 14. Saliva | 160  | 63.2* | 69   | 27.3* | 12   | 4.6   |
| 15. Tears | 50   | 20.2  | 159  | 64.1* | 39   | 15.7  |
| 16. Sweat | 47   | 19.0  | 159  | 64.1* | 42   | 16.9  |
| **Mode of transmission of AIDS** |      |       |       |       |       |       |
| 1. If you kiss someone with AIDS you will get the disease | 116  | 45.5  | 114  | 44.7* | 25   | 9.8   |
| 2. If you touch someone with AIDS you will get the disease | 29   | 11.2  | 208  | 80.6* | 21   | 8.1   |
| 3. What you eat can give you AIDS | 50   | 19.5  | 169  | 66.0* | 37   | 14.5  |
| 4. AIDS can be spread by using someone’s personal belongings like a comb or hair brush, clothes, plates and cups | 167  | 65.0  | 46   | 24.9* | 26   | 10.1  |
| 5. Just being around someone with AIDS can give you the disease | 19   | 7.3   | 225  | 86.9* | 11   | 4.2   |
| 6. Having sex with someone who has AIDS is a way of getting it | 253  | 98.1* | 5    | 1.9   | 0    | 0.0   |
| 7. If a pregnant woman has AIDS, there is a chance it may harm her unborn baby | 237  | 91.5* | 11   | 4.2   | 11   | 4.2   |
| 8. You can get AIDS by shaking hands with someone who has it | 22   | 8.5   | 225  | 86.9* | 12   | 4.6   |
| 9. Receiving a blood transfusion with infected blood can give a person AIDS | 254  | 98.4* | 4    | 1.6   | 0    | 0.0   |
| 10. You can get AIDS by sharing needle with a drug user who has a disease | 240  | 93.4* | 2    | 0.8   | 15   | 5.8   |
| 11. If you donated blood you can get AIDS | 79   | 30.5  | 168  | 64.9* | 12   | 4.6   |
| 12. If you swim in the same place where an infected person swims in you can get AIDS | 67   | 26.1  | 138  | 53.7* | 52   | 20.2  |
| 13. Being exposed to an infected person who coughs or spits can give you the disease | 82   | 31.8  | 128  | 49.6* | 48   | 18.6  |
| 14. Bite of mosquito can cause AIDS | 118  | 45.7  | 89   | 34.5* | 51   | 19.8  |
| 15. If you work with an infected person with AIDS you can get the disease | 27   | 10.6  | 211  | 82.7* | 17   | 6.7   |

(continued)
### Table 2. (continued)

| AIDs-related knowledge                                                                 | Response |             | False | Don’t know |
|--------------------------------------------------------------------------------------|----------|-------------|--------|------------|
|                                                                                      |          |             |        |            |
| **Treatment/control of AIDS**                                                        |          |             |        |            |
| 1. AIDS can be cured                                                                  | 26       | 10.2%       | 190    | 74.8%*     | 38       | 15.0%    |
| 2. There is no cure for AIDS                                                          | 162      | 63.0%       | 52     | 20.2%      | 43       | 16.7%    |
| 3. You can avoid getting AIDS by exercising regularly                                 | 25       | 9.7%        | 174    | 67.4%*     | 59       | 22.9%    |
| 4. A new vaccine has recently been developed for the treatment of AIDS                | 55       | 21.5%       | 69     | 27.0%*     | 132      | 51.6%    |
| 5. You can avoid getting AIDS by following universal precautions                       | 213      | 83.2%*      | 22     | 8.6%       | 21       | 8.2%     |
| **Groups at high risk to AIDs**                                                       |          |             |        |            |
| 1. Prostitutes                                                                        | 246      | 96.1%*      | 2      | 0.8%       | 8        | 3.1%     |
| 2. Drug addicts                                                                        | 225      | 87.5%*      | 20     | 7.8%       | 12       | 4.7%     |
| 3. Homosexuals                                                                        | 229      | 89.8%       | 13     | 5.1%       | 13       | 5.1%     |
| 4. Health care provider                                                                | 113      | 44.8%       | 113    | 44.4%*     | 27       | 10.7%    |
| 5. Patients in hospitals                                                               | 99       | 39.1%       | 119    | 47.0%*     | 35       | 13.8%    |
| 6. Adolescents                                                                        | 99       | 39.3%       | 106    | 41.4%*     | 47       | 18.7%    |
| 7. Married women                                                                       | 92       | 36.2%       | 123    | 48.4%*     | 39       | 15.4%    |
| 8. People with multiple sexual partners                                                | 248      | 96.5%*      | 5      | 1.9%       | 4        | 1.6%     |
| *denotes correct answer                                                                |          |             |        |            |

### Table 3. AIDs-Related Attitudes of Saudi Nursing Students.

| AIDs-related attitude                                                                 | Strongly agree | Agree | Disagree | Strongly disagree |
|--------------------------------------------------------------------------------------|----------------|-------|----------|-------------------|
|                                                                                      |                |       |          |                   |
| **Attitudes toward patients with AIDS**                                              |                |       |          |                   |
| 1. HIV/AIDS is a threat to health workers                                           | 78             | 30.4% | 117      | 45.5%             | 55     | 21.4%* | 7       | 2.7%*  |
| 2. PLWAs are responsible for their illness                                           | 57             | 22.2% | 78       | 30.4%             | 103    | 40.1%* | 19      | 1.1%*  |
| 3. PLWAs are dangerous to others                                                    | 79             | 31.0% | 115      | 45.1%             | 51     | 20.0%* | 10      | 3.9%*  |
| 4. PLWAs deserve what has happen to them                                             | 20             | 7.8%  | 43       | 16.9%             | 118    | 46.3%* | 74      | 29.0%* |
| 5. Fetuses infected with AIDs virus should be aborted                               | 56             | 22.0% | 67       | 26.4%             | 94     | 37.0%* | 37      | 14.6%* |
| 6. Seropositive women should not be allowed to get pregnant                         | 134            | 52.5% | 77       | 30.2%             | 31     | 12.2%* | 13      | 5.1%*  |
| 7. AIDS virus carriers have the right for their diagnosis to be kept a medical secret| 18             | 7.0%* | 47       | 18.4%*            | 83     | 32.4% | 108     | 42.2%  |
| 8. Being carrier of the AIDS virus should not be an obstacle to receiving education and employment | 43             | 16.7%*| 79       | 30.7%*            | 82     | 31.9% | 53      | 20.6%  |
| 9. AIDS sufferers should be considered as victims of the social system               | 29             | 11.3%*| 54       | 21.0%*            | 110    | 42.8% | 64      | 24.9%  |
| 10. Being an AIDS virus carrier should not get in the way of being able to rear children | 36             | 14.0%*| 65       | 25.2%*            | 98     | 38.0% | 58      | 22.9%  |
| **Attitudes of respondents toward care of PLWAs**                                    |                |       |          |                   |
| 1. Health workers are duty bound to treat all patients irrespective of their HIV status | 191            | 74.3%*| 53       | 20.6%*            | 8      | 3.1%  | 5       | 1.9%   |
| 2. I would not be happy to work with a colleague who was a carrier of the AIDS virus | 40             | 15.7% | 79       | 31.0%             | 91     | 35.7%* | 45      | 17.7%* |
| 3. Patients with AIDS don’t have right to receive care as other diseases             | 11             | 4.3%  | 15       | 5.9%              | 80     | 31.4%* | 149     | 58.4%* |
| 4. Treating PLWAs puts health workers at high risk                                   | 29             | 11.4% | 111      | 43.7%             | 87     | 34.3%* | 27      | 10.6%* |
Table 3. (continued)

| Attitudes toward precautionary measures toward PLWAs | Strongly agree | Agree | Disagree | Strongly disagree |
|---------------------------------------------------|----------------|-------|----------|------------------|
| 1. AIDS patients should be isolated from other patients | 147 (57.0) | 67 (26.0) | 29 (11.2)* | 15 (5.8)* |
| 2. Special hospitals should be created for AIDS carriers and suffers | 149 (57.8) | 82 (31.8) | 22 (8.5)* | 5 (1.9)* |
| 3. In a hospital, AIDS virus carriers should not share a room with noninfected patients | 129 (51.2) | 77 (30.6) | 33 (13.1)* | 13 (5.2)* |
| 4. As a safety measure, we should avoid contact with AIDS sufferers and carriers | 31 (12.2) | 43 (16.9) | 123 (48.4) | 57 (22.4)* |
| 5. We should wear gloves when touching a patient with AIDS | 140 (55.1) | 74 (29.1) | 125 (48.4) | 57 (22.4)* |

Note. PLWA = people living with AIDS.
*denotes positive attitude

Table 4. AIDS-Related Knowledge and Attitude Scores of Saudi Nursing Students According to Some Characteristics.

| Attitude | Overall knowledge | PLWA | CARE | PM | Overall |
|----------|-------------------|------|------|----|---------|
|          | M ± SD            | M ± SD | M ± SD | M ± SD | M ± SD |
| S        |                  |      |      |    |         |
| S1       | 72.9 (10.6)       | 40.8 (9.1) | 70.2 (16.7) | 30.9 (20.8) | 44.7 (9.4) |
| S2       | 73.0 (11.0)       | 39.5 (9.8) | 59.3 (15.5) | 23.6 (17.8) | 39.4 (7.3) |
| t, p value | t = 0.08, p = .94 | t = 0.99, p = .37 | t = 4.39, p < .001* | t = 2.36, p = .019* | t = 3.69, p < .001* |
| Age group |                  |      |      |    |         |
| 18-21    | 71.8 (9.4)        | 41.8 (8.8) | 70.2 (16.1) | 29.9 (20.3) | 45.0 (9.0) |
| 22+      | 74.4 (11.5)       | 38.9 (9.6) | 64.4 (17.7) | 28.5 (20.5) | 41.7 (9.2) |
| t, p value | t = 1.50, p = .12 | t = 2.46, p = .015* | t = 2.70, p = .007* | t = 0.53, p = .60 | t = 2.64, p = .009* |
| Origin   |                  |      |      |    |         |
| Rural    | 73.6 (10.8)       | 41.9 (9.4) | 65.7 (21.4) | 31.2 (18.7) | 44.7 (8.1) |
| Urban    | 72.9 (10.7)       | 40.4 (9.3) | 67.8 (16.7) | 29.1 (20.5) | 43.4 (9.3) |
| t, p value | t = 0.24, p = .81 | t = 0.64, p = .52 | t = 0.48, p = .63 | t = 0.43, p = .67 | t = 0.56, p = .58 |
| Academic year |                  |      |      |    |         |
| 1st      | 67.9 (10.1)       | 41.0 (9.5) | 69.0 (14.6) | 29.0 (18.9) | 43.6 (8.8) |
| 2nd      | 75.7 (8.1)        | 40.7 (8.8) | 62.2 (18.2) | 23.9 (18.8) | 40.9 (9.4) |
| 3rd      | 73.8 (13.1)       | 39.4 (10.5) | 71.2 (17.7) | 32.5 (21.4) | 44.4 (10.5) |
| 4th      | 74.3 (10.6)       | 40.5 (9.1) | 68.1 (17.3) | 31.0 (21.3) | 44.2 (8.9) |
| t, p value | F = 4.64, p = .004* | F = 0.23, p = .88 | F = 2.25, p = .08 | F = 1.66, p = .18 | F = 1.33, p = .26 |
| Previous information |                  |      |      |    |         |
| Yes      | 73.5 (10.1)       | 40.3 (9.3) | 67.8 (1.1) | 29.0 (20.1) | 43.4 (9.2) |
| No       | 64.5 (16.2)       | 42.2 (8.7) | 66.7 (20.2) | 34.5 (23.8) | 45.4 (9.1) |
| t, p value | t = 2.62, p = .01* | t = 0.79, p = .43 | t = 0.27, p = .79 | t = 1.07, p = .28 | t = 0.85, p = .40 |

Note. S = stream; PLWA = people living with AIDS; PM = precautionary measures.
*Statistically significant difference.
stigmatizing toward those who contracted the virus through maternal and blood transmission (Earl & Penney, 2003). Saudi Arabia is a Muslim country with conservative cultural values where premarital sex is prohibited and female virginity is the rule. Students in the present study saw AIDS as a punitive consequence of a promiscuous sex life. This explains the finding of a low overall attitude toward PLWA. The majority of students reported that AIDS is a threat to health workers and that AIDS sufferers should be considered as victims of the society. Moreover, some of students reported that PLWA deserve what has happened to them.

The matter of choice in treating AIDS patients remains a knotty and sensitive issue; caregivers are often portrayed as fearful, ill-informed, and discriminatory in their treatment of AIDS patients (Uwakwe, 2000). In the present study, almost all students agreed that all patients should be treated irrespective of their HIV status; although one half of all students agreed that treating PLWA puts health workers at high risk.

It is clear that many rural nursing students have had limited experience with HIV/AIDS patients, and have rarely had opportunities to discuss their feelings about the disease. In addition, students’ attitudes about caring for AIDS patients have not changed over the past decade (Earl & Penney, 2003). In the present study, no significant difference was detected between students of rural and those of urban origin, in terms of knowledge on and attitude toward the disease. In a Turkish study, nursing students who were sexually active had a significantly higher knowledge level compared with those who were sexually inactive (Bektas & Kulakac, 2007). However, the Saudi population is generally known as a conservative community that observes Islamic rules, irrespective of the origin of the individual. However, previous information was a significant predictor of the overall knowledge, even after adjusting for the possible confounders. However, this was not the case for the attitude. The primary source of information about AIDS was their university education. The second most common source was the media, constituting TV and radio. This finding was similar to that reported on Turkish nursing students (Bektas & Kulakac, 2007).

It would be a safe assumption to assert that the relationship between knowledge and attitude among students would appear to have followed a similar pattern to that observed within the general public (Uwakwe, 2000). In Turkish study, as the knowledge score increased, willingness to care for PLWA also increased significantly (Bektas & Kulakac, 2007). However, in the present study, knowledge score showed no significant association with any of the attitude categories.

It is important to examine whether nursing education has an impact on the willingness of students to care for AIDS patients and on potential determinants of such willingness (Jemmott, Jemmott III, & Cruz-Collins, 1992). While Uwakwe (2000) reported that willingness to provide care was greater among students with greater nursing education, others showed that students with more undergraduate nursing education were higher in homophobia (Jemmott et al., 1992). In the present study, there was a significant association between academic year and overall knowledge score, with the 1st year students showing significantly lower score, a finding that was in agreement with the findings on Turkish students (Bektas & Kulakac, 2007), where the total knowledge score rose significantly with increasing grade. However, after adjustment for all potential variables, the association did not remain significant.

The educational preparation of nurses providing care to persons with AIDS has been known to affect the attitude of the nurses and the effectiveness of the care provided to people with AIDS (Earl & Penney, 2003). In the present study, Stream 1 students, who received nursing education as their main and only college education, showed significantly higher score of attitude to care of patients with AIDS and attitude to precautionary measures as well as significantly higher overall

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**Table 5.** Multiple Regression Analysis of AIDS-Related Knowledge and Attitude Scores of Saudi Nursing Students with Some Independent Variables.

| Independent variables | Overall knowledge | ATTITUDE | CARE | PM | Overall knowledge |
|------------------------|-------------------|----------|------|----|-------------------|
| Stream (Stream 1 = 1)  | B(SE)             | t        | p    |    |                   |
| Age (in years) (Rural = 0.80 (0.51)  | 1.24 .22 | 1.009 .32 | 2.08 .04 | 4.78 (1.85) 2.58 .01 |
| Origin (Rural = 1.58 (3.08) 0.51 | 6.27 (2.48) 2.53 .012 | 0.26 (1.88) 0.14 .89 | 9.39 (3.24) 2.90 .004 | 8.31 (3.99) 2.08 .04 | 4.78 (1.85) 2.58 .01 |
| Academic year 0.80 (0.51) 1.24 .22 | 1.009 .32 | 2.08 .04 | 4.78 (1.85) 2.58 .01 |
| Previous information 9.29 (3.31) 2.80 .006 | 1.63 (2.36) 0.69 .49 | 1.01 (4.33) 0.23 .82 | -5.72 (5.13) -1.12 .27 | -2.15 (2.36) -0.91 .36 |

Note: PLWA = people living with AIDS; PM = precautionary measures; B = beta coefficient; SE = standard error; t = Student’s t-test.

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attitude to AIDS. Moreover, after adjusting for potential confounders, the unwillingness to care for patients with AIDS was associated only with having never been taught nursing education as their primary university education.

Study Limitations

Our study had some limitations. First, the study was limited by the relatively small sample size, especially those of Stream 2 students, for which the primary university education was not nursing education. Thus, it would be important to increase this in the future. Second, the study used a cross-sectional design that did not allow for the assessment of the temporality of the relationship between the levels of attitude and knowledge on AIDS and other predictors such as age, academic year, origin, and previous information. Third, the background of Stream 2 students whose primary university education was not nursing education has not been investigated in terms of the reason for enrolment in nursing college and experience with their previous university education before enrollment in nursing college. Further studies may highlight all of these issues.

In conclusion, and considering the sample as a whole, nursing students in the present study were quite knowledgeable about the basic facts regarding AIDS and the ways in which HIV is transmitted. The chief areas of weakness concerned misconceptions about the transmission of HIV through casual contact and exposure to saliva of infected persons. AIDS education efforts aimed at nursing students should place greater emphasis on correcting these kinds of misconceptions.

General attitudes toward PLWA were negative and the students’ homophobia level was high. The best weapon against fear and ignorance is education. The entire curriculum must be examined to clarify how the care of individuals with any infectious disease is addressed. It has been reported that nursing students taking an AIDS training course about AIDS significantly increased knowledge and developed more positive beliefs about individuals with AIDS (Carney, Werth, & Martin, 1999). Special emphasis should be on the value that such patients be treated humanely.

Unwillingness to care for patients with AIDS was associated only with having never been taught nursing education as the primary university education. Selection of students of Stream 2 for whom nursing education is not the primary university education should be looked at. The balance between the desire to increase market supply of nurses faster, to compensate for shortage of nurses, and the quality of nursing practice in Saudi Arabia must be investigated.

Authors’ Note

This study received ethical approval from the Institutional Review Board of the Saudi National Guard Health Affairs, Riyadh, Saudi Arabia (Ref # RC09/007).

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