

Impact of health education on knowledge and attitudes of Saudi paramedical students toward HIV/AIDS

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ABSTRACT

Objectives: To assess the impact of health education on the knowledge and attitudes of paramedical students in Saudi Arabia toward HIV/AIDS.

Methods: We carried out an interventional study on a sample selected from students of health institutes and health colleges in Saudi Arabia during the calendar year 2002-2003.

Results: The intervention shows a positive effect on students' knowledge regarding means of transmission of HIV and means of protection from HIV/AIDS. Furthermore, it has a positive impact on students'

attitudes toward accepting discussion of AIDS topics with others, acceptance of home care for HIV infected family member and acceptance of HIV-infected individual's right at work. Preference of confidentiality was also significantly increased after intervention.

Conclusion: Health education intervention has a positive impact on students' knowledge and attitudes towards HIV/AIDS and we recommend a nationwide health education program on HIV/AIDS.

Saudi Med J 2005; Vol. 26 (11): 1788-1795

Some 2 decades after the first case was reported, human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) has become the most devastating disease the world has ever faced. HIV/AIDS is now the leading cause of death in sub-Saharan Africa and the fourth-biggest killer worldwide.¹ The projected cumulative total of adult AIDS cases in 1996 was close to 10 million and the predicted cumulative number of HIV-related deaths in adults was more than 8 million individuals. In addition, the predicted orphan as a result of AIDS-related deaths are 5 - 10 million children under 10 years.² In 2003, an estimated 4.8 million people (range: 4.2 - 6.3 million) became newly infected with HIV, which was more than in any one year before. Approximately, 37.8 million

(range: 34.6 - 42.3 million) are living with HIV, which killed 2.9 million (range: 2.6 - 3.3 million) in 2003 and over 20 million since the first case of AIDS was identified in 1981. In North Africa and Middle East the available data suggest that approximately 480000 people (range: 200000 - 1.4 million) are living with HIV in the region and 75000 people (range: 21000 - 310000) are believed to be newly infected in 2003.³

Education is the key to change knowledge, attitudes, and behavior. We can correct much of the misinformation, myths and folklore surrounding HIV/AIDS with ongoing education. Such education will reduce the fear, stigma, isolation and denial of care for patients living with HIV/AIDS (PLWHA).⁴

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Received 12th July 2005. Accepted for publication in final form 30th August 2005.

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Our study aimed to prepare a health education package on HIV/AIDS and to assess the effect of its implementation on Saudi paramedical students' knowledge and attitudes toward HIV/AIDS.

Methods. Health institutes and health colleges in the Kingdom of Saudi Arabia are the educational establishments graduating paramedical personnel working in health care facilities. Health colleges and health institutes students were chosen for being young and good candidates for health education. In addition, these establishments are ministry of health establishments where cooperation is assured. The study was an interventional one conducted in 4 phases:

Phase one. A cross-sectional survey was conducted to assess the basic knowledge and attitudes of the students regarding some variables related to HIV/AIDS. The study sample included 653 students, 400 (61.3%) were males and 253 (38.7%) were females with a mean age of 21.13 ± 2.1 years during the calendar year 2002/2003. The sampling method and results of the survey were published earlier.⁵

Phase 2. Based on the findings extracted from phase one, a package of health education materials was prepared.

Phase 3. Students included in phase one were exposed to the educational package. A lecture was first presented then video messages were previewed and lastly a booklet was distributed. The 3 tools covered the basic information related to HIV/AIDS including magnitude of the problem, suspected manifestations, modes of transmission and misunderstood issues related to HIV/AIDS in addition to a message aimed at changing students' attitudes toward PLWHA.

Phase 4. Students were retested after intervention by the same questionnaire used in phase one. The study sample was selected by multistage cluster sampling technique. The institutes and colleges (total number = 37) were divided according to geographical parts of the kingdom into 5 clusters; East, West, North, South and Central. Health institutes and colleges located in each region were listed and one was chosen randomly, except for the Western region (the biggest region) where 2 establishments were chosen. The selected establishments included Riyadh Health College for boys, Jeddah Health College for boys, Dammam Health College for girls, Al-Madeenah Al-Monawwarh Health Institute for boys, Al-Joof Health Institute for girls and Jazan Health Institute for girls. The first and second year students of these establishments were chosen to represent the target sample of the study.

A pre-designed questionnaire was prepared in Arabic language to collect the required data. Students were divided into groups according to their

educational grade and the questionnaire was distributed. Before filling the questionnaire, the purpose of the study was explained and instructions for filling-in the questionnaire were elaborated. The questionnaire included data related to personal information, risky behaviors, symptoms related to HIV/AIDS, modes of transmission, means of protection, attitudes toward some issues related the HIV/AIDS and sources of HIV/AIDS information.

In another setting after intervention, the questionnaire used to collect the basic knowledge in phase one was re-distributed, filled-in by students and collected in the same setting. After completion of data collection, it was reviewed, organized, tabulated and statistically analyzed using the SPSS statistical package version 10. Only students responded in both before and after settings and questions answered in both settings were analyzed. Students contributed in only one session and questions answered in one setting were omitted from analysis. McNemar test was used to detect changes in responses due to intervention and in case where McNemar test was not appropriate, binomial distribution test was used instead. The statistical significance level was set at 0.05.

Results. Table 1 shows the number and percentage distribution of male students according to their knowledge on the modes of HIV transmission. The percentages of correct answers significantly increased for all modes of transmission. The correct answer for transmission by insect bites (No) increased from 81.2 - 96.1%, by food handled by an infected individual (No) from 92.1 - 97.9%, by shaving tools shared with an infected person (Yes) from 72.7 - 88.8%, by tooth brushes shared with an infected person (Yes) from 60.6 - 76.4%, for fetal transmission for infected mother (Yes) from 89.4 - 97.6% and by breast feeding from infected mother (Yes) from 25.9 - 84.6%.

Table 2 shows the number and percentage distribution of female students according to their knowledge on the modes of HIV transmission before and after intervention. The percentage of correct answers significantly increased for transmission by insect bites, transmission by food handled by an infected person, transmission by shaving tools shared with an infected person, transmission by tooth brushes shared with an infected person, fetal transmission for infected mother and transmission by breast feeding for infected mother.

Table 3 shows the number and percentage distribution of male students according to their knowledge on the means of individual protection before and after intervention. The differences before and after intervention were found to be statistically not significant except for avoidance of unsafe injections.

Table 1 - Number and percentage distribution of male students according to their knowledge on the modes of HIV transmission before and after intervention.

Mode of transmission	Before		After		$\chi^2_1^*$	p
	n	%	n	%		
<i>Insect bite (n=330)</i>						
No	268	(81.2)	317	(96.1)	32.5	0
Yes	62	(18.8)	13	(3.9)		
<i>Food handled with an infected person (n=330)</i>						
No	304	(92.1)	323	(97.9)	9.8	0.003
Yes	26	(7.9)	7	(2.1)		
<i>Shaving tools shared with an infected person (n=330)</i>						
No	90	(27.3)	37	(11.2)	26.8	0
Yes	240	(72.7)	293	(88.8)		
<i>Tooth brush shared with an infected person (n=330)</i>						
No	130	(39.4)	78	(23.6)	19.7	0
Yes	200	(60.6)	252	(76.4)		
<i>Fetal transmission from an infected mother (n=329)</i>						
No	35	(10.6)	8	(2.4)	15.8	0
Yes	294	(89.4)	321	(97.6)		
<i>Breast-feeding from an infected mother (n=286)</i>						
No	212	(74.1)	44	(15.4)	143.8	0
Yes	74	(25.9)	242	(84.6)		
*MacNemar test						

Table 2 - Number and percentage distribution of female students according to their knowledge on the modes of HIV transmission before and after intervention.

Mode of transmission	Before		After		$\chi^2_1^*$	p
	n	(%)	n	(%)		
<i>Insect bite (n=220)</i>						
No	175	(79.5)	215	(97.7)	30.4	0
Yes	45	(20.5)	5	(2.3)		
<i>Food handled with an infected person (n=220)</i>						
No	192	(87.3)	216	(98.2)	16.5	0
Yes	28	(12.7)	4	(1.8)		
<i>Shaving tools shared with an infected person (n=220)</i>						
No	47	(21.4)	1	(0.5)	69.1	0
Yes	146	(66.4)	219	(99.5)		
<i>Tooth brush shared with an infected person (n=220)</i>						
No	96	(43.6)	12	(5.5)	74.9	0
Yes	124	(56.4)	208	(94.5)		
<i>Fetal transmission from an infected mother (n=220)</i>						
No	58	(26.4)	1	(0.5)	55	0
Yes	162	(73.6)	219	(99.5)		
<i>Breast-feeding from an infected mother (n=162)</i>						
No	105	(64.8)	3	(1.9)	98.1	0
Yes	57	(35.2)	159	(98.1)		
*MacNemar test						

Table 3 - Number and percentage distribution of male students according to their knowledge on means of individual protection before and after intervention.

Mean of protection	Before (n=235)				After (n=235)				$\chi^2_{1^*}$	p
	No		Yes		No		Yes			
	n	(%)	n	(%)	n	(%)	n	(%)		
Condom	218	(93)	17	(7)	222	(94)	13	(6)	0.6	0.439
Legal sex	191	(81)	44	(19)	180	(77)	55	(23)	1.5	0.221
No transfusion	138	(59)	97	(41)	153	(65)	82	(35)	1.8	0.179
No injection	162	(69)	73	(31)	135	(57)	100	(43)	6.4	0.011
Sex abstinence	231	(98)	4	(2)	230	(98)	5	(2)	**	1

*MacNemar test, ** Binomial distribution test used.

Table 4 - Number and percentage distribution of female students according to their knowledge on means of individual protection before and after intervention.

Mean of protection	Before (n=167)				After (n=167)				$\chi^2_{1^*}$	p
	No		Yes		No		Yes			
	n	(%)	n	(%)	n	(%)	n	(%)		
Condom	162	(97)	5	(3)	158	(95)	9	(5)	0.67	0.413
Legal sex	141	(84)	26	(16)	129	(77)	38	(22.8)	2.8	0.094
No transfusion	93	(56)	74	(44)	117	(70)	50	(30)	6.5	0.011
No injection	106	(63)	61	(37)	81	(49)	86	(51)	6.8	0.009
Sex abstinence	166	(99)	1	(1)	167	(100)	0	(0)	**	1

*MacNemar test, ** Binomial distribution test used.

Table 5 - Number and percentage distribution of students according to their knowledge about means of fetal protection before and after intervention.

Mean of protection	Before (n=42)				After (n=42)				$\chi^2_{1^*}$	p
	No		Yes		No		Yes			
	n	(%)	n	(%)	n	(%)	n	(%)		
Drugs	34	(81)	8	(19)	42	(100)	0	(0)	**	0.005
No breast feeding for infected mothers	31	(74)	11	(26)	9	(21)	33	(79)	17	0
Cesarian section for pregnant infected women	25	(60)	17	(40)	35	(83)	7	(17)	4.72	0.029

*MacNemar test, ** Binomial distribution test used.

Table 4 shows the number and percentage distribution of female students according to their knowledge on the means of individual protection before and after intervention. Only avoidance of unsafe blood transfusion and avoidance of unsafe injections significantly differed before and after intervention.

Table 5 shows the number and percentage distribution of all students according to their knowledge on the means of fetal protection. The percentage of students considered the use of drugs to protect HIV-infected mothers' fetus and those considered delivery by elective section decreased significantly, while the percentage of those considered avoidance of breast-feeding was found to be significantly increased.

Table 6 shows the number and percentage distribution of male students according to their knowledge on the means of wife protection before and after intervention. The percentage of male students considered use of condom significantly increased while the percentage of students considered abstinence from sex was significantly decreased.

Table 7 shows the number and percentage distribution of female students according to their knowledge on the means of wife protection before and after intervention. The percentage of female students considered the use of condom increased significantly while the percentage of those considered abstinence from sex significantly decreased.

Table 8 shows the number and percentage distribution of students according to their gender and attitudes towards some issues related to HIV/AIDS before and after intervention. The percentage of students accepted to discuss AIDS topics with others increased significantly among males while among females the differences were found to statistically not significant. The percentage of those who accepted home-care for HIV-infected individuals and HIV-infected individuals' right at work significantly increased among both males and females. Also, the percentage of students preferred confidentiality was significantly increased among both males and females. On the other hand, the differences regarding willingness to be tested for HIV were statistically not significant.

Discussion. The first case of AIDS in Saudi Arabia was reported in 1984 and the cumulative number until the end of 2003 was 1743 cases.^{6,7} All modes of transmission were registered but the main mode was heterosexual. Ten cases of mother to child transmission and 6 cases of drug addiction were reported.⁶

There are 4 commonly cited behavior change theories found in HIV/AIDS prevention literature: The Health Belief Model, Stages of Change, theory

of Reasoned Action and AIDS Risk Reduction Model (ARRM). These 4 models provide information as to how individual behavior change occurs.⁸⁻¹² The present intervention had a statistically significant positive effect on the students' knowledge regarding modes of transmission of HIV. Misconceptions were mostly corrected among all groups. These findings agreed with that of St. Lawrence *et al*¹³ in the United States, who reported that successful efforts to educate the population could result in an increased knowledge on the disease as well as lowered misconceptions. Furthermore, Selah *et al*¹⁴ conducted a study in Buraidah city, Saudi Arabia to assess the impact of a health education program on secondary school students' knowledge on AIDS and HIV transmission and reported that students' knowledge greatly improved after health education intervention.

Although parenteral transmission including blood transfusion and intravenous drug usage (IDU) is a serious problem not only for developed but also for developing countries, seroprevalence rates among IDUs vary widely and may be as high as 60-70% in some regions,¹⁵ substantial HIV/AIDS prevention programs targeting IDUs have achieved a stabilization in infection rates and in some cases a decline.¹⁶ The present intervention positively affects the students' knowledge regarding means for individual protection by avoidance of IDUs and avoidance of unsafe blood transfusion.

During the early phases of the HIV/AIDS epidemic, homosexual transmission was the predominant mode in developed countries. However, during the last years, there has been evidence of increasing trends for heterosexual transmission.¹⁷ The present intervention had no significant impact regarding the use of condom and restricted legal sex as means for individual protection. These findings may reflect the moral effect of religious Islamic instructions, which are prevailing in Saudi community and prohibit sex practice outside the legal family as defined in Islam. Moreover, this may explain the lower percentage of students who considered the use of condom as a mean for individual protection which could be attributed to the fact that extra-marital sex is prohibited and if occurred, it is a shameful and stigmatizing act in the community. As HIV is transmitted through personal risky behaviors that could be modified, religious persons like Imams and Islamic scholars may be very helpful in the process of health education and behavior change in Islamic communities.

The present intervention had a significant positive effect on the students' knowledge regarding avoidance of breast feeding from HIV-infected mothers to protect their infants. Previous studies demonstrated the presence of HIV in the breast milk

Table 6 - Number and percentage distribution of male students according to their knowledge on means of wife protection before and after intervention

Mean of protection	Before (n=117)				After (n=117)				χ^2_{1*}	p
	No		Yes		No		Yes			
	n	(%)	n	(%)	n	(%)	n	(%)		
Condom	73	(62)	44	(38)	46	(39)	71	(61)	13.8	0
Drugs	106	(91)	11	(9)	102	(87)	15	(13)	0.39	0.533
Sex abstinence	62	(53)	45	(38)	90	(77)	27	(23)	15.2	0
*MacNemar test										

Table 7 - Number and percentage distribution of female students according to their knowledge on the means of wife protection before and after intervention.

Mean of protection	Before (N=123)				After (N=123)				χ^2_{1*}	p
	No		Yes		No		Yes			
	n	(%)	n	(%)	n	(%)	n	(%)		
Condom	93	(76)	30	(24)	49	(40)	74	(60)	28.9	0
Drugs	94	(76)	29	(24)	106	(86)	17	(14)	3.6	0.058
Sex abstinence	71	(58)	52	(42)	96	(78)	27	(22)	10.7	0.001
*MacNemar test										

Table 8 - Number and percentage distribution of students according to their acceptance to discuss AIDS topics with others by sex.

Variable	Before				After				χ^2_{1*}	p
	No		Yes		No		Yes			
	n	(%)	n	(%)	n	(%)	n	(%)		
Discussing AIDS topics										
Male (n=329)	236	(72)	93	(28)	181	(55)	148	(45)	17.5	0
Female (n=219)	178	(81)	41	(19)	161	(74)	58	(26)	3.2	0.051
Home-care										
Male (n=330)	286	(87)	44	(13)	187	(57)	143	(43)	64.5	0
Female (n=220)	193	(88)	27	(12)	126	(57)	94	(43)	48.9	0
Right at work										
Male (n=330)	276	(84)	54	(16)	166	(50)	164	(50)	69.1	0
Female (n=220)	178	(81)	42	(19)	93	(42)	127	(58)	60.3	0
Confidentiality										
Male (n=327)	140	(43)	187	(57)	88	(27)	239	(73)	16.9	0
Female (n=220)	120	(55)	100	(45)	92	(42)	128	(58)	6.1	0.004
Willingness to be tested for HIV										
Male (n=324)	103	(32)	221	(68)	123	(38)	201	(62)	2.4	0.121
Female (n=219)	76	(35)	143	(65)	76	(35)	143	(65)	0.0	1
*MacNemar test										

of infected women¹⁸ and it was documented that in the absence of any intervention, rates of mother-to-child transmission of HIV can vary from 15-30% without breast feeding and can reach 30-45% with prolonged breast feeding.¹⁹

Regarding means of wife protection, there was a significant positive effect on students' knowledge. The proportion of students considered use of condom, in case of husband infection among all groups significantly increased while those considered sex abstinence among all groups significantly decreased. Although a meta-analysis on condom effectiveness suggested that condoms are only 60-70% effective when used for HIV prophylaxis, re-examination of HIV seroconversion studies suggested that condoms are 90-95% effective when used consistently and its promotion therefore remains an important international priority in the fight against HIV/AIDS.²⁰

The current findings indicated that the present intervention had a significant positive effect on students knowledge regarding modes of transmission and most of the available means of protection in agreement with Barth et al,²¹ and DiClemente et al,²² in North America.

Regarding acceptance of students to discuss topics related to HIV/AIDS, the percentage significantly increased among males but not among females. This may reflect the difference between males and females in the degree of shyness, which is more prominent among females.²³ Furthermore, it may reflect the high degree of stigmatization prevailing in the community regarding PLWHA.²⁴

Home-based care is already expanding rapidly in all countries. This expansion is due to increasing needs and to a shift from hospital-based care to home and community-based care for economic reasons. In all countries, families have always been, and remain, the major providers for long-term care for elderly and those with chronic conditions, such as HIV/AIDS, tuberculosis and malaria. The percentages of those accepted home-based care for PLWHA in the present study significantly increased after intervention. Well managed and adequately supported home care can improve both the quality of life of people of all ages requiring care and that of their caregivers. However, family caregivers need information, support and skills required if they are to succeed in providing the often complex care.²⁵

As students' knowledge regarding HIV/AIDS improved after intervention, the percentage of students who accepted PLWHA in the community as employees consequently increased. Negative attitude towards PLWHA is associated with lack of information on HIV/AIDS as proved with Agrawal et al²³ and Brown et al²⁶ who reported a positive correlation between knowledge and attitudes. In

addition, DiClemente et al²² reported that students exposed to an educational course on HIV/AIDS were more accepting their classmates with HIV/AIDS. As a result of social stigma related to PLWHA and as students were informed that most cases of HIV/AIDS are transmitted through sexual activities, which are shameful and prohibited in Islamic communities outside the legal family as defined in Islam, there was a significant increase in the percentage of students preferred confidentiality of HIV-infection serostatus of family members.

The present intervention had no effect on the percentage of students willing to be tested for HIV/AIDS which could be attributed to the fear from being discovered as seropositive and consequently stigmatized in the community or because they had not practice any risky behaviors which may expose them to sources of infection.

The current study shows that health education has a positive effect on students' knowledge regarding transmission of and protection from HIV, attitudes toward some issues related to HIV/AIDS and attitudes toward PLWHA. We recommend implementing a program for health education on a nationwide-base to improve knowledge and attitudes of the community toward HIV/AIDS.

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