International Journal of Advances in Medicine
Bamboriya BL et al. Int J Adv Med. 2019 Feb;6(1):23-29
http://www.ijmedicine.com
pISSN 2349-3925 | eISSN 2349-3933
DOI: http://dx.doi.org/10.18203/2349-3933.ijam20190105

Original Research Article

Knowledge about HIV infection, transmission, diagnostic methods and its treatment among the students of a nursing and a Physiotherapy Colleges in Ujjain, Madhya Pradesh, India

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Received: 24 October 2018
Accepted: 29 November 2018

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ABSTRACT

Background: Human Immunodeficiency Virus (HIV) impairs the host's immune system until it reaches the terminal stage; Acquired Immune Deficiency Syndrome (AIDS). India has the third largest HIV epidemic in the world. Although healthcare workers (HCWs) can play a crucial role in prevention and control of HIV/AIDS, least attention is given to assess their knowledge and attitude on the topic.
Methods: A prospective, cross sectional study was conducted (January 2014 and April 2015) to assess the knowledge of HIV/AIDS among students of a nursing and a physiotherapy college in Ujjain district of central India. All enrolled students were invited to participate, of those 98% participated voluntarily (nursing-120/120 and physiotherapy-56/60).
Results: More than half of the participants were not aware that HIV is an infection causing virus and AIDS is a spectrum of conditions or a syndrome. The majority of the participants had poor knowledge about the available diagnostic tests and curative treatment of the infection. The study also reflected the participant's belief in common myths and misconceptions. Physical contacts with intact skin during patient care and social interaction with a person living with HIV were considered as risk factors for infection transmission. More than 60% participants admitted for their inadequate knowledge and majority (>90%) were willing to participate in a training workshop on the topic.
Conclusions: Extremely poor knowledge about the infection's epidemiology, mode of transmission, diagnostics among the future HCWs might be a rick for discrimination. Discrimination-free healthcare, a prerequisite to end the epidemic, could be achieved by addressing the myths and misconceptions among the future and present HCWs.

Keywords: Central India, HIV/AIDS epidemiology, Knowledge assessment of healthcare students, Nursing and physiotherapy curriculum, Transmission of HIV infection

INTRODUCTION

The pandemic of Human Immunodeficiency Virus (HIV)/Acquired Immune Deficiency Syndrome (AIDS) has emerged as one of the most important and serious health problems in last two decades, and has reached the pinnacle of the global health agenda.[1] According to a UN report, in the Asia-Pacific region including India, four out of every 10 persons are infected with the deadly HIV.[2] The majority of new infection occurs in young adults and

is spreading rapidly within the population. It is estimated that by 2020 more than 40 million people of age between 15-24 years will be infected by HIV globally.[3]

India has the third largest HIV epidemic in the world with 2.117 million people living with HIV (PLHIV).[3] The adult HIV prevalence among Indians has declined at national level from 0.38% in 2001-03 to 0.26% in 2015. The member countries of United Nations assembly have agreed for fast-track actions to end AIDS till 2030 (2016, UN-2030). Although declining, the goal of ending AIDS by 2030 seems to be unachievable due to poor knowledge, discrimination, lack of treatment facilities, untrained healthcare providers and lack of targeted interventions.[3]

The severe immuno-compromised state of all PLHIVs put them at high risk of opportunistic infections such as tuberculosis (pulmonary and extra pulmonary), candidiasis, fungal skin infections and herpes viral infections.[4] In view of the opportunistic infections, these PLHIV are more likely to visit nearest healthcare facilities and might get admissions without declaring their status in available respective clinical departments of a tertiary level facility. The practice of hiding status places front line HCWs, nurses, and nursing and physiotherapy students at highest risk. These HCWs are in close and constant contact with the blood and other body fluids of the inpatients during patient care. Due to frequent contact, they are being identified as a potential risk group for the HIV/AIDS infection.[5,6]

Poor knowledge and awareness among the healthcare providers will present the fear, misconception and resistance to provide healthcare to PLHIV. This gap might result in apathetic attitude and various types of discriminations during patient care and might result in increased morbidity rates. It is thus important to assess the knowledge of nursing and physiotherapy students regarding HIV/AIDS, to evaluate the prevailing conditions, and to suggest measures for the betterment of healthcare services. Aim of the study is to assess and compare the knowledge of HIV/AIDS among nursing and physiotherapy students of nursing and physiotherapy colleges in Ujjain district of Central India.

METHODS

A prospective cross-sectional study was conducted between January 2014 and April 2015, at colleges of physiotherapy and nursing situated in Ujjain district of Madhya Pradesh state in India.

Data collection tool and data analysis (questionnaire) was locally designed, specifically for the study and was printed both in Hindi and in English. The questions were formulated in English and were translated in Hindi and retranslated to English for its validation. The tool was pilot tested and was modified based on the pilot test results. The questionnaire could be divided into four sections namely- demographic details, knowledge, diagnostic methods used and recommended treatment of HIV/AIDS. Diagnostic methods used for identification of the infection and the treatment based on the National Aids Control Organization (NACO) guidelines were considered as most appropriate in the responses.[7] The questionnaire was mainly structured and took about 15-20 minutes to fill. After receiving the informed consent from the participants, the pretested questionnaire was provided to each participant. The responses were entered in EPI Info 3.1 and analyzed using STATA software version 13.0 (Stata Corp., College Station, Texas, USA). The analysis was performed at group and individual level, anonymously. Frequencies and descriptive analysis were performed for cross tabulation.

RESULTS

All, 180 students were invited to participate in the study of those 98% participated voluntarily (nursing-120/120 and physiotherapy-56/60, Table 1). The mean age of the participants was 20 years, for nursing students the standard deviation (SD) was 2.8 with range 17 to 34 years. For the physiotherapy students standard deviation was 1.8 with range 17-24 years (Table 1).

Television/radio, and school education were selected as the most common sources of information by both categories of the participants. The physiotherapy students also acknowledged internet (48%) as common means of information (Table 1).

The general knowledge of the participants was assessed using twenty closed ended questions. Totally, 53% of the participants considered HIV infection and AIDS as same conditions (Table 2). Most of the participants (nursing students-80% and physiotherapy students-89%) considered blood transfusion as more common mode of transmission of infection than unsafe sexual contact and sharing needles (Table 2).

Thirty three percent of total participants knew about the presence of an Integrated Counselling and Testing (ICTC) and ART center in associated hospital.

The knowledge about the diagnostic methods used for identification and confirmation of HIV infections was assessed by 15 questions (Table 3). Sixty nine percent of the nursing students thought that it is possible to diagnose HIV infection immediately after being exposed to the virus or to an infected person (Table 3).

Most of the participants knew that HIV can be isolated from blood while possibility to isolate the virus from other samples such as vaginal fluids, lymphocytes and breast milk was less recognized by both participant's groups (Table 3). The section to assess the knowledge about treatment, included five closed ended questions as presented in Table 4. The range of correct answers varied between the two groups of the participants (Table 4).

Seventy one percent physiotherapy students and 66% nursing students believed that a complete cure for HIV is possible. Fifty percent nursing students knew about unavailability of vaccine to prevent HIV.

Both categories presented poor knowledge regarding treatment of HIV infection and AIDS (Table 4). Over 60% participants felt that they have inadequate knowledge on the topic (nursing students-61% and physiotherapy students-63%) and majority of the participants (nursing students-93% and physiotherapy students-96%) wanted to attend HIV/AIDS training workshop.

Table 1: Characteristics of the participants pursuing paramedical (nursing and physiotherapy) courses in Ujjain district, India.

Variables	Nursing students 120 n (%)	Physiotherapy students 56 n (%)	Total 176 n (%)
Total participants	120 (100)	56 (100)	176 (100)
Male	64 (53)	20 (36)	84 (48)
Female	56 (47)	36 (64)	92 (52)
Participants age (in years)			
≥17 and <23	109 (91)	50 (89)	159 (90)
23 to 29	8 (6.7)	6 (11)	14 (8)
30 and above	3 (3)	0 (0)	3 (0)
Age range	17-34	17-24	-
Age Mean (SD)	20 (2.8)	20 (1.8)	40 (23)
Mother's Occupation			
House manager	111 (93)	39 (70)	150 (85)
Teacher	2 (2)	7 (13)	9 (5)
Government Job	1 (1)	0 (0)	1 (<1)
Other, not specified	3 (3)	2 (4)	5 (3)
Not responded	3 (3)	8 (14)	11 (6)
Father's Occupation			
Doctor	0 (0)	2 (4)	2
Businessman	4 (3)	14 (25)	12 (7)
Teacher	9 (8)	3 (5)	18 (10)
Government job	11 (9)	11 (20)	22 (13)
Farmer	62 (52)	9 (16)	71 (40)
Advocate	0 (0)	2 (4)	2 (1)
Other, not specified	29 (24)	10 (18)	39 (22)
Not responded	5 (4)	5 (9)	10 (6)
Most common source of information on the topic			
TV/Radio	68 (57)	28 (50)	96 (55)
Print media	22(18)	19 (34)	41 (23)
Parents	16 (13)	18(32)	34 (19)
Friends	37 (31)	13 (23)	50 (28)
Mobile and internet	22 (18)	27 (48)	49 (28)
School education	76 (63)	29 (52)	105 (60)

SD- Standard deviation, TV- Television
House Manager- a woman who manages her family's house and is not employed outside the house

DISCUSSION

Our study presents extremely poor knowledge on the diagnostic methods and management of HIV infection among the future healthcare workers i.e. students of nursing and physiotherapy courses. More than half of the participants did not know that HIV is a virus that may cause an infection, and AIDS is a spectrum of conditions or a syndrome.[8] The results also highlights participant's belief in common myths and misconceptions for the spread of the HIV infection. Majority of the participants had poor knowledge about the available diagnostic tests and available curative treatment of the infection.

Table 2: Participants' knowledge on mode of transmission with regard to the listed activities performed with a PLHIV.

Questions (Correct response)	Nursing students 120 n (%)	Physiotherapy students 56 n (%)	Total participants 176 n (%)
Are HIV and AIDS different conditions of the infection (Yes)	56 (47)	27 (48)	83 (47)
Can HIV infection /AIDS be transmitted from an infected person to a healthy person through			
Hand shaking (No)	100 (83)	48 (86)	148 (84)
Sharing toilet (No)	76 (63)	41 (73)	117 (66)
Sponging (No)	51 (43)	38 (68)	89 (50)
Mosquitoes (No)	65 (54)	32 (57)	97 (55)
Breastfeeding (Yes)	36 (30)	23 (41)	59 (33)
Sharing toothbrush (Yes)	51 (43)	11 (20)	62 (35)
Sneezing (No)	48 (40)	30 (54)	78 (44)
Environment (No)	60 (50)	30 (54)	90 (51)
X-ray, CT, MRI, (No)	72 (60)	30 (54)	102 (58)
Mother-to-child (Yes)	86 (72)	45 (80)	131 (74)
Medical device (Yes)	29 (24)	14(25)	43 (24)
Tattooing (Yes)	26 (22)	11 (20)	37 (21)
Dentistry (Yes)	27 (23)	8 (14)	35 (20)
Unsafe sexual contact (Yes)	96 (80)	50 (89)	146 (83)
Blood transfusion (Yes)	108 (90)	48 (86)	156 (89)
Swimming pool (No)	91 (76)	37 (66)	128 (73)
Sharing needles (Yes)	96 (80)	46 (82)	142 (81)
Closed mouth kissing (No)	69 (58)	34 (61)	103 (58)
Is an ICTC and ART centre present in your setting? (yes)	33 (28)	25(45)	58 (33)
Mean correct answers out of 20 questions	10	10	

AIDS-Acquired Immune Deficiency Syndrome, ART-Anti retroviral therapy, CT- Computed Tomography, HIV- Human immunodeficiency virus, ICTC-Integrated Counselling and Testing, MRI-Magnetic resonance imaging, PLHIV-People living with HIV.

Table 3: Participants' knowledge on diagnostic methods used for detection and monitoring HIV /AIDS.

Questions (Correct response)	Nursing students 120	Physiotherapy students 56	Total participants 176
Diagnostic tests used to detect or monitor HIV infection-			
ELISA (yes)	9 (8)	9 (16)	18 (10)
CD4 count (yes)	1 (1)	0 (0)	1 (<1)
PCR (Yes)	44 (37)	15 (27)	59 (84)
Western blot (yes)	43 (36)	15 (27)	58 (33)
Rapid test (yes)	44 (37)	15 (27)	59 (34)
Is it possible to conduct any diagnostic tests to confirm HIV infection in your setting? (Yes, it is possible)	87 (73)	37 (66)	124 (70)
HIV can be detected immediately after the exposure? (no)	37 (31)	18 (32)	55 (31)
Can human immunodeficiency virus be isolated from-			
Blood (yes)	96 (80)	643 (85)	144 (82)
Vaginal fluid (yes)	25 (21)	27 (48)	52 (30)
Lymphocytes (yes)	22 (18)	19 (34)	41 (23)
Tears (no)	104 (87)	52 (93)	156 (89)
Saliva (no)	99 (83)	41 (73)	140 (80)
Breastmilk (yes)	12 (10)	15 (27)	27 (15)
Urine (no)	79 (66)	34 (61)	113 (64)
Can human immune deficiency virus be isolated from all the above body fluids? (no)	87 (73)	51 (91)	138 (78)
Mean correct answers of 15 questions on diagnostic methods knowledge	7	7	

Abbreviations: AIDS-Acquired Immune Deficiency Syndrome, CD4- Cluster of differentiation 4, ELISA- Enzyme-Linked Immunosorbent Assay, HIV- Human immunodeficiency virus, PCR- Polymerase chain reaction, CT- Computed tomography

Table 4: Participants' knowledge on treatment guidelines of HIV/AIDS.

Questions (Correct response)	Nursing students 120	Physiotherapy students 56	Total participants 176
1. Is Complete cure of HIV possible? (no)	53 (44)	16 (29)	69 (39)
2. Is there any vaccine available that could act against HIV? (no)	60 (50)	16 (29)	76 (43)
3. ART represents a combination of (Three drugs)	48 (40)	16 (29)	64 (36)
4. If a person is infected with HIV then, according to NACO the decision of ART depends on (CD4 count)	34 (28)	11 (20)	45 (26)
5. In my opinion the anti-retroviral drugs are given only when the patient's CD4 Count is (250)*	44 (37)	10 (18)	54 (31)
Mean correct answers of 5 questions	2	2	

*Refers to the guidelines available at the time of data collection.[7] Abbreviations: AIDS- Acquired Immune Deficiency Syndrome, ART- Anti retroviral therapy, CD4- Cluster of Differentiation 4, HIV- Human Immunodeficiency Virus, NACO- National AIDS Control Organization.

The presence of an ICTC and ART centre in the institution was noticed by 33% participants. More than 60% participants admitted that their knowledge on the topic is inadequate and majority (>90%) were willing to participate in a training workshop on the topic.

More than half of the participants in both categories selected school education as most effective source of information about the HIV infections and AIDS. This result was similar to a study from Greece, where 81% students acknowledged school education for their knowledge about HIV/AIDS.[9] Television was considered as another effective means of information by more than half of the nursing students (57%) in our study similarly majority of nursing students (93%) in Uttarakhand acknowledged television as a source of information.[10]

In modern world, mobile phones and internet are considered as strongest tools to spread the information worldwide. In the same context taking an account of more than 3 million mobile users in the country, Indian Government has launched a number of mobile applications to improve the health and healthcare services.[11] Moreover, WHO and Indian government are jointly working on an ambitious 'm-health' strategy (mobile-health).

The mobile applications namely; NACO AIDS and 'HIV Education and Linkage to Prevention' (HELP) were launched by the Indian government to increase awareness and risk perception. These applications contains HIV risk evaluator, service center locator, information about myths, misconceptions and facts, helpline number, free audio training courses and other useful information to expand and refresh the knowledge base of the users.[12,13] However, only 18% nursing students considered mobile and internet as an effective tool of information reflecting that internet was not utilized by the majority of the nursing students (Table 1). Thus, it could be said that the majority of the nursing students will not be benefited by the ambitious and much advocated 'm-health' strategy.[11,14]

Knowledge about mode of transmission of HIV infection while providing healthcare services to PLHIV was moderate among both participant groups. Contact with intact skin of an infected person was considered as a risk factor for spread of infection by 40-60% of participants in both groups (Table 2). For example, performing X-ray, Computed Tomography (CT) scan or Magnetic resonance imaging (MRI) was considered as a risk factor by nearly 40% participants. Sharing the class room, mosquito bite and sneezing in same room was considered as a risk factor by 50 to 60% participants (Table 2). In our setting, unexpectedly higher proportion of participants (42%) had misconception that closed mouth-social kissing is a risk factor for spreading HIV infection compared to other two Indian studies, conducted in Haryana (30%) and in Karnataka (13%).[15,16]

The proportion of the participants who considered hand shaking and sponging as a risk factor for infection transmission was higher at our setting as compared with studies conducted at Haryana (92%) and Karnataka (89%).[15,16]

More than 30% participants in a Greek and Russian study also believed that HIV infection can be transmitted through mosquito bites and casual contacts with PLHIV, indicating similar situation of misconceptions worldwide.[9,17] The gap between knowledge and awareness presented in our study, and participants' belief in common myths and misconceptions about infection transmission could be considered as prominent factors to trigger discrimination in future.[10]

On the other hand, use of same tattooing devices and use of dentistry tools of a PLHIV was not considered as a risk factor by majority of the participants (80%) while breastfeeding by an infected mother, sharing toothbrush was not considered as risk factors by more than 65% participants. Extremely poor knowledge of the participants about the factors which are most focused in the Indian government HIV/AIDS awareness campaigns, is worrisome.

Thirty six percent participants knew the correct treatment of HIV infection as per NACO recommendation, i.e. combination of three drugs.[7] In our study, less than half of the participants (43%) knew about the unavailability of vaccine to prevent HIV infection comparable to 46% nursing students in Karnataka.[16] According to 61% participants, complete cure of AIDS is available.[7] This could be compared with the result of studies conducted in Russia, Haryana and Karnataka, where 50%, 60% and 28% participants respectively believed that AIDS is curable.[15-17] This indicates that the knowledge gap about treatment of HIV infection is universal and need immediate attention.

The participants not only had poor knowledge about the mode of transmission and treatment of HIV infection and AIDS but also presented poor knowledge about the diagnostic tests used for identification of HIV. Unawareness about surrounding infrastructures and available facilities in the institutions was reflected by most of the participants such as 67% participants do not know about the presence of an ICTC and ART center in the campus. Almost all but one participant has not heard about cluster of differentiation 4 (CD4) count ever. Only thirty seven percent of the nursing students and 20% of the physiotherapy students could recall that according to NACO the decision of ART depends on the CD4 count of the patient.[6] This could be due to low urge to explore the surroundings and thus indicate towards possible ignorant behavior of the participant population. Although few numbers of students confessed that they have inadequate knowledge on the topic, majority wanted to participate in a HIV training workshop (>90%).

CONCLUSION

Poor knowledge among participants about the infection, epidemiology, mode of transmission, diagnostic methods and infection prevention are highlights of present study. Poor knowledge give rise to fear and belief in misconceptions and common myths, this trigger change in attitude and lead to stigma and discrimination. Physical contacts with intact skin during patient care and having PLHIV student in class room were considered as infection transmission risk factors by some of the participants. Discrimination free healthcare is a prerequisite to achieve the WHO sustainable development goals to end the epidemic by 2030. This could be achieved when myths, misconception and fear among the future and present HCWs are identified and addressed to improve the situation.

Recommendations

Based on the results of our study, we suggest to bridge the HIV infection and AIDS knowledge gap and various myths among the paramedical students. Similar situation could be expected with the students of other courses as well, however, need actual surveillance. We also suggest reconsidering the curriculum of the nursing and physiotherapy courses and to reformulate it with emphasis on HIV epidemiology, mode of transmission, ART drugs, preventive measures and post exposure prophylaxis. We suggest to the governmental and non-governmental bodies to modify the approach and contents of the healthcare campaigns related to HIV/AIDS. Digitalization is demand of present world. Thus, the education should focus on prudent use of mobile phones and internet. Each student educational institutions including medical and paramedical institutions should have access to personal computers, laptops or digital tablets with free Wi-Fi zones. The students should be encouraged to use mobile applications related to healthcare such as HELP for HIV infection. Further studies are suggested to assess the stigma or discrimination among the working and future (students) HCWs at the facilities.

ACKNOWLEDGEMENTS

Authors would like to acknowledge all participants for giving their valuable time during data collection. The authors express thanks to Mr. Amit Pawar for the assistance provided during data collection and data entry.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee (Number-249/ 23.01.2013)

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Cite this article as: Bamboriya BL, Marothi Y, Rawat M, Sharma M. Knowledge about HIV infection, transmission, diagnostic methods and its treatment among the students of a nursing and a Physiotherapy Colleges in Ujjain, Madhya Pradesh, India. Int J Adv Med 2019;6:23-9.