ORIGINAL RESEARCH

Standard Precautions are for everyone: The role of HIV stigma and implications for nursing education in India

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ABSTRACT

Background and objective: Standard Precautions (SP) are infection control procedures universally applicable to every patient. Though SP reduces disease transmission, their implementation is dependent on the knowledge and skills of healthcare workers (HCWs). Poor knowledge regarding the appropriate use of SP can cause fear among HCWs, leading to stigma and discrimination while treating people living with HIV (PLWH). Stigma and discrimination are known barriers for PLWH to access HIV care services. The aim of the study was to assess nursing student knowledge of SP, SP self-efficacy and SP perceived efficacy of nursing students, and (2) to assess the association between SP knowledge, perceived efficacy, and intention to utilize unwarranted precautions, like using double gloves while treating PLWH.
Methods: This paper analyzes baseline (non-randomized) data of a cluster randomized controlled trial amongst 1868 Indian nursing students. Data was collected using computer-administered structured questionnaire. The associations between the measures were done using multiple, logistic and poisson regression models.
Results: Although 97% nursing students could identify SP, only 35.5% understood that they need to be used with all patients. Awareness of the importance of using SP with all patients was positively associated with self-efficacy. Students performing high-risk tasks frequently were significantly more likely to be confident in their ability to correctly use SP, but also had higher intention to use unwarranted precautions.
Conclusions: Existing teaching and training programs for HCWs need to provide clear guidelines and emphasize on the correct use of SP with all patients. This will increase both skills and confidence in their abilities (self-efficacy).

Key Words: HIV, Nursing students, Standard precautions, Self-efficacy

1. INTRODUCTION

Background

Standard precautions (SP), also known as 'universal precautions', are evidence-based interventions developed to reduce the incidence of infections in health care settings.[1,2] The knowledge and implementation of SP is crucial for protecting health care worker (HCW) and patients from acquiring hospital borne infections.

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Studies with HCWs conducted in low- and middle- income countries (LMICs) have shown that lack of knowledge of SP was associated with anxiety and fear of infection while treating people living with HIV (PLWH).[3–5] Lack of knowledge about SP and misconceptions regarding HIV transmission can result in stigma among HCWs and make them use unnecessary (unwarranted) precautions,[6] thereby resulting in discriminatory care.[7]

Though SPs are widely promoted in high-income countries,[8] there are challenges in implementing SP in low-middle income countries due to supply shortages, poor training and/or poor awareness.[9,10] Absence of SP measures in medical settings can contribute to HIV-related stigma,[11,12] while the fear and bias towards HIV continue to influence how health care providers deliver care.[4,13] In India, studies have shown that HIV stigma is a major known barrier to HIV prevention and its treatment efforts.[12,14] Nursing staff have been found to be an important source of stigma against PLWH[13,15,16] in Indian healthcare settings, making it crucial to identify its drivers.

Self-efficacy in SP refers to the self-confidence in one's own capability towards the proper use of SP with all patients, while response efficacy refers to the perception that when these SP strategies are used properly and correctly, they can prevent in the transmission of HIV. Self-efficacy is important for bringing about a behavioral change.[17] Social cognitive theory states that people need to believe that the behavior is efficacious, and it is necessary to have confidence in their own ability to perform it, in order to change their behaviors.[17,18]

There is limited published research in India over the last decade to identify gaps in awareness of SP among nursing students and their ability to correctly use SP universally with all patients. The focus of this research is (1) to assess the knowledge of SP, perceived efficacy as well as self-efficacy of nursing students regarding the SP, and (2) to examine the association between SP knowledge, perceived efficacy, and the intention to use unwarranted precautions while treating PLWH. This can help to develop training programs to enable nursing students to use appropriate SP with all patients to reduce stigma and prevent transmission.

2. METHOD

2.1 Study design and participants

The participants in the current study were part of a cluster randomized controlled trial of a stigma-reduction intervention, and included 1,868 nursing students, from 32 institutions across four cities in two different states in India where HIV is more prevalent in the population than the national average.[19] Participants were in their second or third year of their undergraduate nursing program, so they were already exposed to clinical rotations, trained in SP, and have significant amounts of patient contact. Details about study methodology are described in previous publications.[20–22] Briefly, participating nursing schools and hospitals were randomized a priori to either intervention or a wait-list control condition. Students interested in enrolling in the study were given written detailed information regarding the project and, if interested, requested to sign the informed consent. After enrolment and consent, all participants completed a baseline interview. Participants from the institutions in the intervention then received two tablet-based and one live session aimed at increasing knowledge and reducing stigma towards PLWH during the next month. Follow-up assessments were conducted at one, six, and 12 months post baseline. Control arm participants only completed assessment interviews during the 12 months from baseline to final follow-up. They were offered the intervention after the final follow-up assessment. This paper used the baseline interview data, collected before any intervention activities took place. To be included in the baseline sample study, the student had to be 18-29 years old.

2.2 Ethical considerations

Regulatory and Institutional Review Board (IRB) approvals for the research study were obtained in advance from the respective institutional ethics committees (IEC) and conducted in accordance with accepted national and international standards. Ethical clearance for the main NIH study was obtained from Clinicaltrials.gov. IEC was obtained from India, and also from the US counterpart Committee on Human Research. The Indian Council of Medical Research's Health Ministry Screening Committee also approved the main study. Among participating institutions, permissions were obtained from Hospital administration. The consenting subjects were recruited between September 2014 and March 2018 from a few hospitals in cities of India. All the participants have provided written informed consent and it is in accordance with the Declaration of Helsinki.

2.3 Procedures and measures

After obtaining the consent, face-to-face personal interviews (45 mins) were conducted by trained interviewers with each of the 1,868 consenting nursing students in the language of their choice (English, Kannada or Hindi), using a tablet computer. Information collected included the following:

2.3.1 *Demographic information*

Age, gender, religion, marital status, nursing program, and household income were assessed, as well as perceived avail-

ability of post-exposure prophylaxis (PEP) in their respective hospitals ('0' if "No", '1' if "Yes", and '2' if "I don't know what PEP is").

2.3.2 *Routine nurse specific activities*

The participants were then queried specifically about the rate of daily routine nursing tasks such as assisting with invasive procedures, coming in direct contact with medical or biohazardous waste, or with bodily fluids. The responses were captured on a 4-point scale ranging from '0' for "Never" to '3' for "Often".

2.3.3 *Knowledge of SP*

The participants were then queried if they are familiar (heard) with SP and if they answered "No" or "declined" to answer, they were asked if they had to follow any procedures to prevent spreading of infections between patient and staff. Subsequently, participants were asked to check and identify various SP measures from a specific list of seven of the most common SP procedures. This included SP measures being performed during routine nursing tasks such as: (1) Washing hands before and after treating a patient, (2) Minimizing contact with bodily fluids by wearing Personal Protective Equipment, (3) Wearing single gloves for procedures that require contact with bodily fluids, (4) Sterilizing instruments after use, etc. Responses were scored as '0' if "No" or '1' if "Yes". A dichotomous variable was created and was scored '1' if the participant identified all of the SPs correctly and scored '0' otherwise. The participants' responses for the open-ended question of listing "other" SP were also noted.

2.3.4 *Importance of using SP with all types of patients*

The respondents were then enquired "how important it is to use the SP with about five different types of patients", with response options ranging from '1' for "Not at all important" to '4' for "Very important". A summary variable (dichotomous) was created and recorded as '1' if a participant indicated that SP was "Very important" universally (for all the five types of patients) and recorded as '0' otherwise.

2.3.5 *Perceived response efficacy (person's beliefs that following recommended action will actually prevent infection)*

The respondents were then enquired "how certain" they were if the following seven specific SP measures would prevent them from getting HIV when caring for PLWH ('1' for "Very uncertain" to '5' for "Very certain"). From the responses, the number of "Very certain" answers was summed over all seven items.

2.3.6 *Perceived self-efficacy (having self-confidence in one's capability to perform a given task in a specific context)*

The participants were asked how confident they were in their ability to carry out three professional tasks (such as touching a patient, drawing blood or dressing a wound) when working with PLWH, without worrying about becoming infected. Response options range was from '0' for "I definitely cannot" to '4' for "I definitely can". A summary measure was designed that recorded '1' if the respondent answered "Definitely can" to all 3 items, and '0' otherwise.

2.3.7 *Intent to use unwarranted precautions*

The participants were then enquired what they will do when asked to perform four high-risk tasks of bodily fluids exposure (such as drawing blood, starting an IV, dressing a wound or assisting in an operation/ delivery) and five low-risk routine tasks (such as assisting in personal hygiene, transporting them, taking blood pressure, giving medications, or transporting lab samples) when caring for PLWH individuals. The number of these activities where the participants would do them with unwarranted precautions (such as double gloving, etc.,) were totalled for low- and high-risk task separately.

2.4 Statistical analyses

Descriptive statistics consisted of analysis in frequencies and percentages for all categorical variables, means and standard deviations (SD) for the count/continuous variables. Multiple regression analysis method was used for assessing the specific associations between knowledge about SP, belief in the SP response efficacy and the frequency of performing the tasks with high and low risk of exposure to the bodily fluids, and the following three outcomes: SP self-efficacy and the intention to the use unwarranted precautions in high and low risk tasks, respectively. Logistic regression was used for determining the dichotomous outcome of SP self-efficacy. Poisson regression was performed for the other two continuous variable outcomes. We controlled for the gender in all three models, and included the first outcome, self-efficacy, as a predictor in the two Poisson models. The model assumptions were thoroughly checked and found that there was no evidence of multicollinearity or any overdispersion of the count outcomes.

All the significance tests reported are two-sided and $p < .05$ were considered significant. The descriptive analyses were performed in SPSS (version 25), regressions in Stata (version 15).

3. RESULTS

3.1 Baseline data

Table 1 shows that the nursing students were 95% (n = 1,775) female. The majority of the nursing students were in the age group of 18-21 years (89.2%, n = 1,666) and unmarried (99.4%, n = 1,857). In terms of religion, there was almost an equal distribution of Christian (47.2%, n = 882) and Hindu (45.8%, n = 856) participants. The household income had a fairly even distribution with 35.9% (n = 670) earning more than 20 thousand Indian rupees per month, 34.1% (n = 637) earning between 10 to 20 thousand rupees and 29.8% (n = 556) earning 10 thousand rupees or less per month. The majority (53.7%, n = 1,003) of the nursing students were recruited in Bengaluru, the remaining from Mangaluru, Mysuru and Delhi. Most (42.9%, n = 802) attended private, for-profit institutions, with the rest being from private non-profit institutions (34.3%, n = 641) and government institutions (22.8%, n = 425). As part of their routine nurse-specific activities, about three-quarters (77.8%, n = 1,453) of the students indicated that they sometimes/often assisted in invasive procedures, 70.9% (n = 1,325) had sometimes/often been in contact with medical/bio-hazardous waste, and 67.7% (n = 1,265) with bodily fluids.

Table 1. Demographics of nursing students (sample size = 1,868)

Variable	Percentage (%)	Frequency (n)
Site		
Bengaluru	53.7	1,003
Mangaluru	16.2	302
Delhi	13.3	248
Mysuru	16.9	315
Type of hospital		
Private, Profit	42.9	802
Private, Non-profit (religious)	34.3	641
Government	22.8	425
Gender		
Female	95.0	1,775
Male	5.0	93
Religion		
Christian	47.2	882
Hindu	45.8	856
Buddhist	4.7	87
Muslim	1.9	35
Sikh	0.4	8
Marital status: Single	99.4	1,857
Household income (in Indian rupees)		
> 20,000	35.9	670
10,001-20,000	34.1	637
≤ 10,000	29.8	556
Decline	0.3	5
Age (in years)		
18-21	89.2	1,666
22-25	10.3	192
26-29	0.5	10
Routine activities		
Sometimes/often assisting in invasive procedures	77.8	1,453
Sometimes/often contact medical/bio-hazardous waste	70.9	1,325
Sometimes/often contact bodily fluids	67.7	1,265
Post-exposure prophylaxis (PEP) available in your hospital		
Government	80.7	(343/425)
Private, Non-profit (religious)	67.2	(431/641)
Private, Profit	58.0	(465/802)

3.2 Training in SP and experience

Nearly all (97%, n = 1,812) of the nursing students had heard about SP, and of the remaining (56 participants), 43 nursing students did acknowledge when further probed that they were required to follow procedures to prevent the spread of infections (see Table 2). When presented with a list of seven SP, only 57.8% (n = 1,079) of the participants identified all of them as SP. Only 35.5% (n = 664) were basically aware that it is "very important" for them to perform the SP with "all types" of patients, regardless of the diagnosis.

For most SP, more than 50% of the nursing students were certain that following the precaution will prevent them from getting HIV while caring for PLWH, except when "using single gloves for drawing blood" (38.3%, n = 716) and while "disinfecting bloody linen with bleach" (45.9%, n = 858). On an average, participants endorsed 4.4 (SD 1.9) of the seven SP listed as "Very certain" to prevent getting infected.

Around 2% (n = 40) of nursing students named unwarranted precautions when asked if they could name other SP in addition to the list they just went through (e.g., wearing double gloves, apron, mask, cap, shoes, and goggles) and 1.8% (n = 33) named irrelevant precautions (e.g., immunization, waste segregation, and disinfection of the operating room) when caring for PLWH.

3.3 Response efficacy, self-efficacy and intent to discriminate

Table 2 further shows that the nursing students were not very confident in their ability to interact with PLWH without fear of infection. Forty-three percent (n = 803) felt confident that they "could definitely touch a PLWH" without worrying about getting infected. However, with blood draws and dressing a wound in PLWH, only 28.4% (n = 530) and 27.8% (n = 519), respectively, indicated that they "definitely could" perform the tasks without worrying about getting infected. Only 16.4% (n = 307) of nursing students thought they "definitely could" do all 3 of the above tasks without fear of getting infected.

On average, the nursing students expressed an intention for using unwarranted precautions on 3.1 (SD 1.1) out of 4 high-risk tasks and 2.6 (SD 1.6) out of 5 low-risk tasks.

3.4 Multivariate regression

The results of the multiple regression outcomes of self-efficacy regarding SP and the intention to use unwarranted precautions are presented in the Table 3.

Being aware that SP were "very important" with all patients

was found to be associated with greater self-efficacy. On average, those nursing students who were aware that using SP was important with "all types" of patients regardless of the diagnosis, were 83% (95% confidence interval [1.42, 2.37]) more likely to respond that they "definitely could" perform all the three tasks related to self-efficacy, with all other variables in the model held constant. Nursing students who on average endorsed a greater number of SP items as "very certain" to inhibit transmission of HIV were significantly more likely to show self-efficacy in performing the SP tasks (Adjusted odds ratio 1.22; 95% confidence interval [1.13-1.32]). There was a significant positive association between the frequency of performing high-risk tasks and odds of showing self-efficacy. As the frequency of performing high-risk tasks went up, the likelihood of showing self-efficacy increased (Adjusted odds ratio 2.74; 95% confidence interval [2.16-3.49]).

Table 2. Standard Precautions (SP) knowledge (Sample size = 1,868)

Variable	Percentage (%)	Frequency (n)
Heard of standard precautions (SP)	97.0	1,812
Identified all standard precautions	57.8	1,079
Aware SP 'very important' with "all types" of patients	35.5	664
'Very certain' SP will prevent HIV infection:		
Disposing of sharps into a container	74.9	1,400
Using disposable syringes	73.0	1,363
Sterilizing instruments after use	72.2	1,349
Separating medical/infectious waste	69.7	1,302
Washing hand before & after treating patient	69.2	1,293
Disinfecting bloody linen w/bleach	45.9	858
Single gloves for drawing blood	38.3	716
SP response efficacy: Mean (SD) of 'very certain' responses	4.4	(1.9)
SP misconceptions		
Unnecessary precautions	2.1	40
Irrelevant precautions	1.8	33
Self-efficacy: I can…		
Touch people living with HIV (PLWH) without worrying about infection	43.0	803
Draw blood from PLWH without fear of infection	28.4	530
Dress wound of PLWH without fear of infection	27.8	519
All 3 of the above	16.4	307
	Mean	**(SD)**
Intent to use unnecessary precautions, index		
High-risk tasks (0-4)	3.1	(1.1)
Low-risk tasks (0-5)	2.6	(1.6)

Note. SD = Standard deviation

Table 3. Multiple Regression – Correlates of Standard Precautions (SP), Self-Efficacy & the Intent to use unwarranted precautions (sample size = 1,868)

Variable	SP self-efficacy[#] ("Definitely can" all 3) AOR (95% CI)	Intent unnecessary precautions, high-risk[#] IRR (95% CI)	Intent unnecessary precautions, low-risk[#] IRR (95% CI)
"Heard of" Standard Precautions (SP)	1.40 (0.53-3.69)	1.31 (1.09-1.56)**	1.31 (1.08-1.59)**
Identified all SP	0.90 (0.69-1.18)	1.02 (0.97-1.08)	1.06 (1.00-1.12)†
Aware SP 'very important' with all patients	1.83 (1.42-2.37)***	1.04 (0.98-1.10)	1.13 (1.07-1.20)***
Higher response efficacy	1.22 (1.13-1.32)***	1.02 (1.01-1.03)*	1.01 (0.99-1.03)
Frequency to perform high-risk tasks	2.74 (2.16-3.49)***	1.09 (1.05-1.14)***	-
Frequency to perform low-risk tasks	1.07 (0.80-1.42)	-	1.03 (0.97-1.09)
Higher self-efficacy of SP	-	1.03 (0.96-1.11)	0.98 (0.91-1.06)

$^{*}p$ <.05; $^{**}p$ < .01; $^{***}p$ < .001; $^{\dagger}p$ < .10; $^{\#}$ = These models are controlled for gender; AOR = adjusted odds ratio; CI = confidence interval; IRR = incidence rate ratio.

Nursing students who had heard about SP were on average intending to use unwarranted precautions on 31% (95% confidence interval [1.09-1.56]) more high-risk tasks than students who had not heard of SP. Similarly, a higher mean score for SP response efficacy (Incidence rate ratio 1.02; 95% confidence interval [1.01-1.03]) and a greater frequency of performing high-risk tasks (Incidence rate ratio 1.09; 95% confidence interval [1.05, 1.14]) were both associated with intent to use unwarranted precautions for a greater number of high-risk tasks.

For those nursing students who had heard of SP, the number of low-risk tasks where they intended to use unwarranted precautions was also, about 31% higher (95% confidence interval [1.08-1.59]) than for those who said they had not heard of SP.

Furthermore, on average, those nursing students aware that it was important to use SP with "all types" of patients regardless of the diagnosis, the estimated number of low-risk tasks on which they intended to use unwarranted precautions was 13% higher than for their less aware counterparts (95% confidence interval [1.07-1.20]).

4. DISCUSSION

The results indicate that although the nursing students had high knowledge of SP measures, only a third were aware of the need to use them with all patients. Many also reported an intention of using unwarranted precautions in a majority of high and low risk situations, especially with people living with HIV which can perhaps be at least partially explained by the low trust in the efficacy of using single gloves as well as HIV stigma attitudes. Such misconceptions in HIV-transmission and effectiveness of standard precautions needs to be addressed through HIV stigma-reduction curricula that includes information not just how to use these precautions, but also the need to use them with all patients. This content needs to include multiple locally relevant examples and be taught by credible sources, preferably in an interactive format that is co-facilitated by a PLWH to encourage discussions.[21]

Virtually all (97%) participants in this study had heard of the SP strategies, which is similar to the findings of previous studies in India.[23,24] However, the study analysis also shows that their awareness of the need to use SP strategies with all types of patients was remarkably low, with only about a third (35.5%) of the participants being aware that they have to be used with all patients, regardless of diagnosis. Though there have been many studies assessing the knowledge of SP with nursing staff in India, most studies do not assess when or with whom the SP have to be used. To our knowledge, ours is the first study examining this awareness among Indian nursing students. We identified only one other study examining this issue among Indian nurses,[24] which found that although almost all (97%) of the participants had heard of SP, 61.2% of the participants knew that SP must be used irrespective of diagnosis. This percentage was higher than in our study, possibly because the nurses were more experienced than the nursing students in the present sample.

Surprisingly, students who reported higher SP response efficacy also had reported a greater tendency to the use of unwarranted precautions during tasks with high and even low risk of exposure to body fluids. This may reflect the fear of infection or the misconception that if the SP measure of wearing one layer of gloves is good, wearing two is even better. As this is not the case and because double gloving uses up scarce resources, there is a need to address this issue during training programs. Not surprisingly, the results showed that those who had more experience in performing high-risk tasks were more likely to be significantly more confident in their abilities to correctly use SP. However, this association did not hold for students who reported frequent use of low-risk tasks, which points to the value of providing sufficient hands-on practice in situations with high risk of fluid exposure during nursing training programs. This is consistent with a study among nursing students in the Philippines which showed that students with greater experience were also more likely to correctly use SP.[25] It is very important to correct the knowledge gaps among nursing students in order to reduce stigmatization of PLWH.[26]

This study being a cross sectional study, the causality can only be hypothesized and cannot be ascertained.[27] Though we did include different types of hospitals, we only sampled in two states, and in mostly (peri-)urban areas, so the findings do not necessarily generalize to other settings. Also, in this paper, behavioral outcomes have not been included, only self-reported intent, which may not always predict behavior.

Offering plenty of hands-on training in situations of high-risk for fluid exposure is likely to not only improve skill level, but also improve student confidence. Apart from routine monitoring of the nursing activities to ensure that they follow SP guidelines,[28] it is also important to teach the students the relationship between their behaviors, perceived discrimination, and the impact on their patients' health behaviors. Previous research has shown that patients who feel stigmatized are less likely to seek out and remain in care.[14] Participatory stigma-reduction training activities and education programs for HCWs on the benefits of SP could thus help reduce stigma towards PLWH. Earlier studies have shown a relation between prior contact with PLWH and a more accepting attitude of vulnerable populations,[29] which reinforces the

need for the involvement of PLWH in awareness and future nursing education and training programs.

5. Conclusion

Having heard of SP, higher perceived efficacy of SP and an increase in frequency of performing high-risk tasks are related to higher intent to use unwarranted precautions when performing nursing tasks with a higher risk of exposure. In order to target transmission misconceptions, gaps in teaching infection control measures and to increase awareness of protection from accidental exposures, supervised interventions are necessary that stress the use of universal precautions with all types of patients. Knowledge and adherence to SP can be enhanced through training programs and reducing known barriers, such as fear of infection. These programs need to be designed, implemented, and evaluated within existing training frameworks, existing hospitals, clinics and introduced into the curricula of nursing and medical teaching schools for it to be effective and sustainable.

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Conflicts of Interest Disclosure

The authors declare that there is no conflict of interest.

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