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# Knowledge and Compliance with Standard Precautions among DPT Students

# Abstract

**Background:** Standard precautions are the minimum infection prevention practices that apply to all patient care, irrespective of suspected or confirmed infection status of the patient, in any setting where health care is delivered. These precautions are compelling methods for protecting health care workers including physiotherapist, patients as well as the public from acquiring the hospital acquired infections.

**Objective:** To determine the knowledge and compliance of standard precautions among DPT students of Isra University Hyderabad.

**Methodology:** This Study was conducted among 3rd, 4th and 5th year DPT students of Isra University Hyderabad. Convenient sampling technique was used. Data was collected by distributing extracted questionnaire. Data was analyzed using SPSS (Statistical package for social sciences). Version 20. This study was held from July 2020 to December 2020.

**Results:** 150 DPT students filled the questionnaire. The average score of knowledge regarding all components of standard precautions was found to be 65.57% while 83.17% of students reported that they always comply with standard precautions.

**Conclusion:** It is concluded from the study that the degree of knowledge and compliance towards standard precautions among the study population is good.

Keywords: Knowledge; Compliance; Standard precautions

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# Introduction

Standard precautions include the recommendations to protect the patient and the health care worker from acquiring nosocomial infections otherwise known as hospital acquired infections [1]. The Centers for Disease Control and Prevention defines standard precautions as "The minimum infection prevention practices that apply to all patient care, irrespective of suspected or confirmed infection status of the patient, in any setting where health care is delivered". Standard precautions are certain precautionary measures that are utilized to prevent the transmission of infectious diseases from both known and unexpected sources either from patient to patient, from patient to health care worker or from health care worker to the patient in any health care setting [2]. These are the precautionary measures to prevent the transmission of nosocomial infections that can be obtained by contact with blood, body fluids, non-intact skin including rashes and mucous membranes. These precautions are

compelling methods for protecting health care worker including the physiotherapist, patients as well as the public from acquiring the hospital acquired infections and hence lowering burden of nosocomial infections throughout the world [3].

### **Elements of the standard precautions**

According to Centers for Disease Control and Prevention, Health care workers including physiotherapists should presume that every individual in health care setting is possibly infected or colonized with an organism that could pass on to other individuals health care worker/other patients. in the healthcare setting and thereby, should consider these standard precautionary measures while delivering health care to any patient or client regardless of their suspected or confirmed infection status so as to reduce global burden of hospital acquired infections [4].

Hand hygiene: Hand hygiene is one of the main components of standard precautionary measures and has been perceived as

the best methods for lessening the transmission of pathogenic substances in health care settings [5]. Hand cleanliness practice incorporates:

**Personal Protective Equipment (PPE):** Personal Protective Equipment are variety of barriers that are effectively utilized for the prevention and reduction of the possible contact with pathogenic substances and infectious agents in the health care settings. The determination of type of personal protective equipment to be used depends on the nature of patient/client interaction as well as on the likely models of transmission of pathogenic substance [6]. The principles of personal protective equipment incorporate:

**Gloves:** Health care worker should wear gloves before having contact with patient's non intact skin, blood, body fluid, secretions, excretions, mucous membranes and potentially contaminated intact skin and for any procedure where there is a risk of cut or when health care worker have a cutaneous lesion. Gloves should be changed between patient contact when health care worker moves hands from a contaminated or potentially contaminated body site to a clean body site, after contact with any surface or equipment near to patient to prevent possible transmission of infectious agents [7].

**Gowns:** Gowns should be worn by health care workers including physiotherapist so as to prevent contamination of skin and clothing for any patient interaction that involves contact with patient's blood, body fluids, secretions or excretions [8].

Mouth, nose, and eye protection personal protective equipment: Mouth, Nose, and Eye Protection personal protective equipment demands the use of masks, goggles, face shields and their combination so to protect the mucous membranes of the eyes, nose and mouth during any procedure which is likely to generate splashes or sprays of blood, body fluids, secretions and excretions thereby, preventing transmission of infectious agents [9].

Respiratory hygiene/cough etiquette: Respiratory hygiene should be practiced by all health care workers to prevent droplet and fomite transmission of pathogens [10]. Encourage the use of masks and social distancing ideally maintaining 3 feet distance from others and offer masks to the coughing patients, patients with other respiratory symptoms and the individuals who accompany them especially during seasonal outbreaks of viral respiratory tract infections in communities [11]. Centers for Disease Control and Prevention recommend the use of N-95 or higher-level respirators for personnel exposed to patients with suspected or confirmed tuberculosis or COVID-19. These recommendations are intended to be utilized by health care personnel who supervise and monitor respiratory protection programs in healthcare institutions to protect health care workers from work-related risks of exposure to infectious respiratory diseases [12].

**Patient placement:** Patients, who pose a risk for transmission of infectious agents to others, should be isolated in a single-patient room when available. In multi-patient rooms, place together in the same room [cohort]. Patients who are infected or colonized with the same infectious agent and are suitable roommates for

one another [13]. Cohort patients with the same infection can be placed in a same room with the separation of patients by > 3 feet and drawing the curtain between patient beds [14].

**Patient care equipment and instruments/devices:** Disinfection and sterilization should be emphasized for transporting, and handling patient care equipment and instruments/devices that may be contaminated with blood or body fluids [15].

**Care of the environment:** Care of environment includes, cleaning and disinfecting potentially contaminated surfaces specially, surfaces that are close to the patient or in immediate vicinity of patient as well as cleaning of the surfaces which are frequently touched by the patient such as door knobs is essential so as to prevent the transmission of infectious agents within the health care setting from one patient to another or from patient to health care worker [16].

**Textiles and Laundry:** Used textiles and fabrics in health care facilities should be handled with great care by the hospital/clinic staff to avoid contamination of air, surfaces and persons [17].

### **Transmission-based precautions**

Transmission-based precautions are additional precautions beyond the standard precautions. These precautions are applied to the patients known or suspected to be infected with infections that are highly transmissible. These precautions are needed to interrupt transmission in hospitals. There are three types of transmission-based precautions: air-borne precautions, droplet precautions, and contact precautions [18].

**Airborne precautions:** Airborne precautions are intended to prevent the transmission of air-borne diseases [19]. Airborne precautions are applied to patients known or suspected to be infected with agents that can be transmitted by air, such as *M. tuberculosis*, measles, chickenpox, and disseminated herpes zoster. These precautions involve patient placement in an air-borne infection isolation room. Patients with a known or suspected air-borne infection should wear a surgical mask and observe respiratory hygiene/cough etiquette. Health care worker or any other person visiting such patients should also wear a mask to protect themselves [20].

**Droplet precautions:** Droplet precautions are intended to reduce the risk of transmission of droplet infections. These precautions are applied to the patients known or suspected to be infected with agents that can be transmitted by droplets speaking, sneezing or coughing for example: Bordet Ella pertussis [21].

**Contact precautions:** Contact precautions are certain precautionary measures to reduce the risk of infections that are transmitted through direct or indirect contact [22].

There are two types of contact transmissions, as follows:

- Direct contact transmission involves direct skin-to-skin contact and physical transfer of microorganisms from infected person to a susceptible host by touch [23].
- Indirect contact transmission involves transfer of microorganism via contact of a susceptible host with a contaminated intermediate object.

## Standard precaution source of information

Knowledge of standard precautions is crucial for its compliance so as to prevent the transmission of infectious agents. In this regard Tavolacci et al. reported that most frequently reported source of information regarding standard precaution information reported by Tavolacci et al. were, during the training period at the bedside and teaching in the hospital ward [24].

### **Nosocomial infection**

Nosocomial infection also known as hospital acquired infections are defined as any disease acquired by patient within a health care setting or during their hospital stay [25]. The sort of infections brought about by long term hospital stay represents a significant risk factor for genuine health issues that can be fatal [26]. Infections acquired by healthcare personnel during patient care are also considered as nosocomial infections/hospital acquired infections [27]. Following are the circumstances in which infections are not considered as nosocomial:

- Infections present at the time of hospital admission
- Trans placental transmission of infections such as toxoplasmosis, rubella, syphilis or cytomegalovirus [28].

#### Compliance

Compliance has been defined by Haynes et al. as "The extent to which a person's behavior coincides with medical or health advice" [29].

**Compliance with standard precautions:** The strict implementation of standard precautions is the fundamental basis for prevention of nosocomial infections in any health care setting [30]. Although Standard Precautions are simple to understand and implement yet there is a marked reluctance among healthcare professionals to comply with them fully. Compliance with Standard Precautions among healthcare professionals including physiotherapist was reported to be inadequate with respect to eye protection, use of gloves, washing hands before and after having contact with patient, use of face mask and the implementation of precautions for all patients [31].

# **Materials and Methods**

### Study design

This study was cross-sectional research survey.

### Participants' recruitment

Participants were recruited from Physical Therapy department of ISRA University, Hyderabad.

### **Duration of study**

Duration of study was 4 months after the acceptance of proposal.

### Sampling techniques

Respondents selected in this study were selected by convenience sampling.

### Sample size

Sample size of 150 physical therapy students was selected.

## Sample selection

### **Inclusion criteria**

- Physical therapy students who were willing to participate in the study.
- Both male and female students.
- Physical therapy students with at least 2 months of clinical exposure were included.
- 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> year DPT students

#### **Exclusion criteria**

- Physical therapy students without any clinical exposure.
- 1<sup>st</sup> year and 2<sup>nd</sup> year DPT students.

#### **Data collection method**

The data was collected by distributing the questionnaires among physical therapy students.

#### **Data collection tools**

The tool for collecting the data was questionnaire extracted from study conducted by Leodoro Labrague in the year 2012 on the Knowledge of and compliance with standard precautions among student nurses [32].

#### Data analysis method

For evaluation of data SPSS, version 20 was used. Frequencies and percentages were used for analyzing the selected demographic data and determining level of knowledge and compliance of DPT students.

### Budget

The amount of budget for this study was around 7000 Rs.

# Discussion

This survey was conducted on physical therapy students regarding knowledge and compliance of standard precautions. 150 students participated in this study and their result was analyzed in SPSS in terms of percentages and frequencies. The findings of this study revealed that the level of compliance was much higher among DPT students as compared to their level of knowledge regrading standard precautions. Alotaibi Maher Mualla M, et al. also reported that the level of practice regarding standard precautions was higher than the knowledge exhibited by the health care students [33]. This result contradicts the findings of Mary Rocha Carneiro Garcia Zapata et al. which says that the knowledge exhibited by medical and nursing students about standard precaution was higher than the compliance of standard precautions (Figures 1-3, Table 1).

This investigation explored that the DPT students were knowledgeable concerning standard precautions; these findings







were similar to research done by Roswati Nordin et al. which showed that majority of respondents had good knowledge of standard precautions and the research conducted by Leodoro J. **Table 1** Responses to questions regarding knowledge on standardprecautions.

Statement	Correct answer	Frequency
1) Nosocomial Infection		
<ul> <li>a) Nosocomial infections are infections acquires in hospital.</li> </ul>	Yes	125
b) Nosocomial infections are infections that occurred at 48 hours after hospital admission	Yes	112
c) The environment is the major source of bacteria responsible for nosocomial infection	No	5
d) Advanced age or very young age increases the risk of nosocomial infections	Yes	85
e) Invasive procedures increase the risk of nosocomial infections	Yes	103
2) Standard Precautions		
a) Do you know what standard precaution is?	Yes	124
b) Standard precaution is only applicable for the patients with confirmed diagnosis of infection or in latent period of infection.	No	55
<li>c) Include the recommendations to protect the patient and the health care worker.</li>	Yes	133
d) Apply for all patients.	Yes	121
e) Apply for only the health care worker who have contact with body fluid	No	66
3) When is hand hygiene recommended?		
<ul> <li>a) Before or after a contact with (or care of) a patient.</li> </ul>	No	17
b) Before and after a contact with (or care of) a patient.	Yes	132
c) Between patient contacts	Yes	115
d) After the removal of gloves	Yes	112
<ol> <li>The standard precautions recommended use of gloves</li> </ol>		
a) For each procedure.	Yes	136
b) When there is a risk of contact with blood or body fluid	Yes	137
c) When there is a risk of a cut.	Yes	119
d) When health care workers have a cutaneous lesion	Yes	121
5) When there is a risk of splashes or spray of blood and body fluids, the health care worker must wear		
a) Only mask.	No	58
b) Only eye protection	No	73
c) Only a gown	No	76
d) Mask, goggles and gown	Yes	139

Labrague which revealed that majority of participants had good knowledge regarding standard precautions. On the other hand, study conducted by Daniela D'Alessandro et al. revealed that the overall knowledge score of participants was fair rather than good **(Table 2).** 

In this study students scored least for knowledge regarding nosocomial infections among the five components of standard precautions. Only few respondents were knowledgeable about the major source of bacteria responsible for nosocomial infections whereas vast majority of them did not know what

#### Table 2 Average score of knowledge regarding standard precautions.

Components of knowledge of standard precautions	Percentage
Average score of correct responses regarding knowledge of nosocomial infection	57.30%
Average score of correct responses regarding knowledge of standard precautions	66.50%
Average score of correct responses regarding knowledge of hand hygiene	62.60%
Average score of correct responses regarding knowledge of use of glove	85.50%
Average score of correct responses regarding knowledge of use of personal protective equipment (mask, eye protection and gown)	57.60%
Overall knowledge score of participants	65.57%

or who exactly were the main sources of bacteria responsible for nosocomial infection as majority of them believed that the environment was the major source of bacteria responsible for nosocomial infections. These findings are consistent with the findings from research conducted by Leodoro J. Labrague et al. according to which knowledge about nosocomial infection was the lowest among the five components of standard precautions.

As far as compliance with standard precautions is concerned, findings of this study revealed that vast majority of participants had high compliance towards standard precautions. The students scored least for adherence to wearing gloves when performing passive exercises/techniques on patients.

Although majority of the students knew that mask, goggles and gown must be worn by the health workers when there is a risk of splashes or spray of blood and body fluids, unexpectedly compliance with the use of protective suit and protective eye patch when performing procedures that might induce spraying of blood, body fluids, excretions and secretions was found to be relatively low. This may be attributed to the unavailability of gloves in physiotherapy clinics and unavailability of protective eye patch and protective gown in hospital wards where they are rotated. Leodoro J. Labrague also reported that knowledge regarding wearing mask, goggles and gown was higher as compared to its compliance among the study participants.

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# Conclusion

This study provided valuable data on knowledge and compliance of standard precautions among DPT students. It could be deduced from this study that the degree of knowledge and adherence to standard precautions among the study population is good with above average overall knowledge of standard precautions and relatively good overall compliance among study population. Nonetheless, instructing must be fortified, especially concerning the knowledge of nosocomial infections and use of protective eye patch and gowns where students scored less. This information will be valuable in arranging suitable measures to improve the knowledge and compliance of standard precautions among DPT students so as to effectively reduce the transmission of nosocomial infections.

# **Ethical Considerations**

Questionnaire was distributed after review of departmental ethical committee of IIRS. Consent form was attached to the questionnaire and participant's privacy was maintained. Data was used for research purpose only and remained confidential.

# **Conflicts of Interest**

There was no author of conflict.

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