Original article

Knowledge, and adherence to standard precautions among health care providers in Beni-Suef University Hospital

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A R T I C L E   I N F O

A B S T R A C T

Background: The study aim was to assess knowledge, and adherence to standard precautions among health care providers in Beni-Suef university hospital. **Methods** A cross-sectional analytical study was conducted in Beni-Suef University Hospital, 428 health care workers agreed to participate in the study. A self-administered structured questionnaire was prepared in Arabic language and was distributed among participants. **Results** A total of 428 health care workers (HCWs) from Beni-Suef University participated in the present study with a mean age of (29.51± 4.91). The mean of knowledge score of the standard precautions knowledge questionnaire (SPKQ) was (14.29 ±2.88) and mean adherence score of the standard precautions adherence questionnaire (SPAQ) was (54.69 ±11.09). There was a significant moderate positive correlation between standard precautions knowledge and adherence with correlation coefficient (r) 0.303. **Conclusion:** Knowledge and adherence of HCWs of Beni-Suef University Hospital to standard precautions is low with a knowledge score of 14.29 out of 20 and adherence score 54.69 out of 80. Strict observation of HCWs during work and through continuous evaluation of their adherence to standard precautions and correction of their poor practices by the infection control team is required.

Introduction

One of the leading causes of morbidity and death linked to clinical, diagnostic, and therapeutic procedures is healthcare-associated infections (HAIs) [1]. Because of their continuous exposure to infections during their clinical practice, health care workers are just as vulnerable to this condition as their patients. Given the ongoing nature of the issue, measures to mitigate and control such exposure, such as the introduction of Traditional precautions, were suggested [2].

All healthcare facilities and patients should adhere to standard precautions while receiving treatment, regardless of whether an illness is suspected or confirmed. These procedures are essential for preventing the spread of diseases [3]. The purpose of standard precautions is twofold: first, to protect health care workers (HCWs) from occupational hazards; and second, to protect patients

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from infectious pathogens that may be on hands of HCWs or equipment they use [4].

Standard precautions comprise aseptic techniques such as safe injection practices, proper respiratory or cough hygiene etiquette, the use of personal protective equipment (PPE) (gloves, gown, mask, protective glasses, and/or face shield), and proper cleaning of surfaces and equipment are all of the standard precautions [5].

It is critical for HCWs to be knowledgeable about these precautions in order to protect themselves and their patients from different illnesses. The majority of infections may be prevented by following these easy procedures [6].

Consequently, healthcare facilities should have staff members who are not only knowledgeable about the infection control measures but also have received training to ensure adherence to scientific and technical principles in the prevention of HAIs and the protection of HCWs from potential risks in the workplace [7].

A total of twenty different blood-borne infections, including human immunodeficiency virus, hepatitis B and C, and others, may be transmitted via sharps injuries caused by various sharp equipment [8]. Standard precaution knowledge and adherence to their performance are significantly associated with the Avoidance of sharp injuries [9].

The study aim was to assess knowledge, and adherence of HCWs to standard precautions among health care providers in Beni-Suef University Hospital.

Methods

Study design.

A cross-sectional analytical study was conducted in Beni-Suef University Hospital to assess knowledge and adherence to standard precautions among health care providers. The survey lasted for nine months. All HCWs of Beni-Suef University Hospital (physicians and nurses from all departments, laboratory and radiology technicians, and waste disposal workers) willing to provide their data participated in the study.

Inclusion criteria

1. All HCWs at the chosen study location.

2. HCWs who agreed to participate in this study.

Data collection methods and tools

A self-administered structured questionnaire was prepared in Arabic language. The questionnaire was distributed on 500 health care workers, they were asked to fill the questionnaire, a pilot study of 30 HCWs was conducted to ensure the clarity and usability of the questionnaire, with no change in questionnaire done after pilot and not included in the sample.

The questionnaire was divided into the following sections:

Section (A): Focused on the sociodemographic and occupational characteristics of the studied population. It included 6 questions about participant's age, gender, occupation, education, department, and years of experience.

Section (B): The validated Standard Precautions Knowledge Questionnaire (SPKQ [4]. It included 20 questions

There were three possible responses for each question (True, False and I do not know). Of the twenty questions, fifteen were considered incorrect while the remaining five were considered accurate. One point is given for every right response. A higher rating indicates that the person knows more about the standard precautions, and vice versa; the total score may be as high as 20 points. The score ranged from 0 to 20 points. We classified it into good adherence when above median (15).

Section (C): The validated Standard Precaution Adherence Questionnaire (SPAQ) **[4].** It included 20 questions

The responses were presented using a Likert scale, with five possible choices each assigned a score: Perpetually—4 points, frequently—3 points, infrequently—2 points, very Infrequently—1 point, and never—0 points. Only question 7, which is an inverse item, is an exception (always- 0 point, often- 1 point, sometimes- 2 points, rarely- 3 points, and never- 4 points). The greater the degree to which a person follows standard precautions, the higher their ultimate score. The score ranged from 0 to 80 points. We classified it into good adherence when above median (55).

Analyzing and managing data After triple-checking each survey for accuracy, we imported the data into SPSS, version 26, for statistical analysis. Qualitative factors were described using percentages and frequencies. Mean plus or minus standard deviation (mean ± SD) was used to describe quantitative quantities. A variety of

statistical tests were used, including chi-square (χ2) test, Student t-test, the one-way ANOVA test (analysis of variance), and correlation. The *p*-value was considered significant when it was less than or equal to 0.05.

Ethical considerations

Administrative approval was sought from the head of Beni-Suef University Hospital. Ethical approval was sought from Beni-Suef University Ethics Committee on 1st of February 2022, approval number FMBSUREC01022022 /L/Motawea. Written informed consents were signed by the participants. They were assured that data is confidential and anonymous.

Results

A total of 428 HCWs from Beni-Suef University participated in the present study and completed the questionnaires. 428 participants filled in the questionnaire and 72 refused to complete the questionnaire due to either lack of time or interest. Response rate was 85.6%. Their mean age was (29.51± 4.91), males represented 51.9% of the participants. Nurses represented 59% of participants , 29% physicians, 7.5% technicians, and 3.5% cleaning workers. Nearly half of participants graduated from institute and 30% had a bachelor's degree. Regarding the department, 55% of participants worked in medical or surgical wards, and 21.5% worked in ICUs.

Table 1 showed that the mean of knowledge score about safe injection is (2.80 ± 1.19), the mean knowledge score about hand hygiene is (2.80 ± 1.19), the mean knowledge score

about the use of gloves was 3.64 ± 0.77, and the mean of knowledge score about other personal protective equipment was 4.70 ± 1.39.

Table 2 showed that the mean score of adherences to safe injection is (7.78 ± 2.23), mean score of adherences to hand hygiene is (8.70 ± 2.85). mean score of frequency of gloves use is (31.53 ± 6.70), and the mean score of adherences to other PPEs is (6.68 ± 2.99).

Table 3 clearly demonstrated that there was a significant association between the standard precautions' knowledge score and participants' sex as males had significantly higher knowledge scores than females (*p*-value =0.020). It also showed that knowledge and adherence scores were significantly associated with occupation of participants as workers had the worst knowledge and adherence (*p*-values <0.001). It also showed that there was a significant difference in knowledge score regarding educational level of participants, participants who had a basic education had the least knowledge score (*p*-value=0.005).

Table 4 showed that the mean of knowledge score of the standard precautions knowledge questionnaire (SPKQ) is (14.29 ±2.88) and mean of adherence score of the standard precautions adherence questionnaire (SPAQ) is (54.69 ±11.09)

Scatter plot represents the moderate positive correlation between knowledge and adherence total scores with a *p*-value <0.001 and correlation coefficient (r) 0.303 **(Figure 1)**

Table 1. Participants' standard precautions' knowledge scores.

Knowledge scores	Mean ±SD	Median (IQR)
Score of knowledge about safe injection	2.80 ± 1.19	3(1)
Score of knowledge about hand hygiene	2.60 ± 0 .68	3(1)
Score of knowledge about use of gloves	3.64 ± 0.77	4(0)
Score of knowledge about other personal protective equipment	4.70 ± 1.39	5(0)

Table 2. Participants' standard precautions' adherence scores.

| Adherence scores	Mean ±SD	Median (IQR)
Score of Adherence to safe injection	7.78 ± 2.23	8(2)
Score of Adherence to hand hygiene	8.70 ± 2.85	9(4)
Score of Adherence to frequency of gloves use in different situations.	31.53 ± 6.70	32(9)
Score of Adherence to other personal protective equipment	6.68 ± 2.99	7(4)

Table 3. Association between standard precautions' total knowledge and adherence score and sociodemographic characteristics of participants.

sociodemographic Item	Knowledge score (mean ±SD)	*p*-value	adherence score (mean ±SD)	*p*-value
Sex Males Females	14.60 ±2.56 13.95 ±3.15	0.020*	55.33 ±12.26 54 ±9.68	0.215
Occupation Physician Nurse Technician Workers	14.99 ±2.01 a 14.33 ±2.72 a 13.88 ±3.19 a 8.4 ±4.15 b	<0.001*	52.45 ±10.66 a 57.13 ±9.93 a 51.31 ±11.93 a 39.13 ±14.31 b	<0.001*
Education Post-graduate University Institute Basic	15.37 ±1.61 a 14.62 ±2.13 a 14.32 ±2.97 a 10.56 ±3.90 b	0.005*	54.11 ±9.77 54.79 ±11.66 56.15 ±10.18 46.19 ±13.19	0.322

* *p*-value is significant

Table 4. Correlation between the standard precautions' total knowledge and adherence scores.

Score	Value	*p*-value	Correlation (r)
Total knowledge score Mean ±SD Median (IQR)	14.29 ±2.88 15 (3)	<0.001*	0.303
Total adherence score Mean ±SD Median (IQR)	54.69 ±11.09 55 (15)		

* *p*-value is significant

Figure 1. The correlation between the standard precautions' total knowledge and adherence scores.
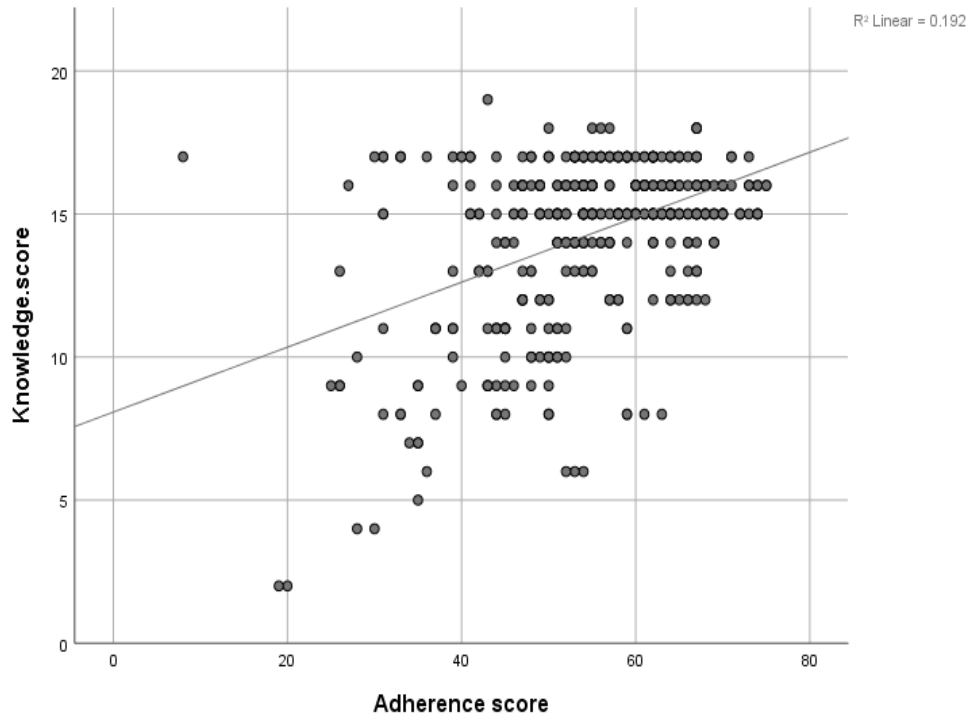
Scatter plot which represents the positive correlation between knowledge and adherence total scores

Discussion

Regardless of whether a patient is known to harbor infection or not, standard precautions are mandatory for every healthcare facility [10]. The purpose of these protocols is to prevent HAIs and optimize the patients, workers and environmental safety as well as improve the patient outcome [11].

This study revealed a relatively low knowledge, this finding is in line with other studies conducted in Egypt [12] and in Saudi Arabia [13]. This score was less than the score revealed by **Faria et al.** which was 17.7± 1.12 [4]. This deficit of knowledge of personnel of Beni-Suef University Hospital may be due to lack of staff training and less compliance of medical staff to training sessions than expected.

The current study showed that physicians had the highest knowledge scores (mean= 14.99± 2.01), and cleaning workers had the lowest scores (mean= 8.4± 4.15) with a significant difference with the other occupations. These finding were consistent with other similar studies in Egypt [14], The significant shortage of cleaning workers' knowledge is mostly due to the lack of care provided to them from the hospital administrators, as there was no training for these workers on standard precautions or infection control measures.

As regards the educational level, it was found that the higher the level of education, the higher the knowledge score. The highest score was in postgraduate education (mean= 15.37± 1.61) and the lowest was in basic education (mean= 10.56± 3.9). these findings are in line with the findings of a study conducted in Egypt [16] and is consistent with another study [17].

This study found that the (SPAQ) mean of scores was 54.69± 11.09 out of 80, which is consistent with a similar study with a score of 57± 9.52 [18]. This score was less than the score revealed by **Cruz et al**. in Saudi Arabia which was 61± 8.08 [19]. The poor score in the current study was as low score in knowledge reflects on the adherence score and resistance of HCWs to change.

The present study showed that nurses had the highest adherence scores (mean= 57.13± 9.93), and cleaning workers had the lowest scores (mean= 39.13± 14.31) with a significant difference from the other occupations. These finding is in line with a study conducted in Egypt [20] and a study in France [21]. On the other hand, a study found that physicians had higher compliance scores [17]. The higher adherence scores for nurses than physicians despite their lower knowledge score may be due to the physicians' false concept of that their experience

may replace the protection measures indicated for performing the procedures to protect them.

In the current study, it was found that standard precautions knowledge and adherence had a significant positive correlation (r = 0.303) . This agrees with a study conducted in Egypt (r=0.69) [15] and another study conducted in Jordan (r= 0.1) [22]. On the other hand, **Ogoina et al.** found that there is no correlation between knowledge and adherence [23].

Conclusion

The knowledge and adherence of HCWs of Beni-Suef University Hospital towards standard precautions was low. The highest knowledge was among physicians, but the highest adherence was among nurses. Cleaning workers had a very low scores of knowledges and adherence to standard precautions. So strict observation of HCWs during work and through continuous evaluation of their adherence to SP and correction of their poor practices by the infection control team is required.

Acknowledgement

Conflicts of interest

The authors declare that they have no conflict of interest.

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