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# The Relationship between Nurses' Knowledge and Application of Standard Precautions in Hospitals of Babylon Province/Iraq

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## Abstract

**Introduction:** Hospital-acquired infection (HAI) is one of the most frequent issues that hospitals are facing in every country worldwide. Since nurses are an essential part of the medical workforce that they play a special role in preventing the transmission of infections within hospitals. **Objective:** This study aims to determine the relationship between nurses' knowledge and application. **Methodology:** a cross-sectional study that includes 400 nurses from eight hospitals of Babylon governorate. An interview questionnaire used to assess the knowledge and application levels. Data were collected during the period between September 2022 and March 2023 and these data were analyzed by SPSS-27. **Results:** the main results showed that 56.3% of nurses had high level of knowledge about standard precautions. While 51.5% of participants had poor application about standard precautions. a significant positive relationship was found between nurses' level of knowledge and their level of application (P value <0.01; r=0.180). **Conclusion:** standard precautions are the minimum required for infection prevention. In spite of that most of nurses had high level of knowledge, the majority of study participant didn't always follow these precautions. the level of application positively correlate with level of knowledge.

## Keywords:

Standard precautions, infection control, knowledge, application, acute injuries.

## Introduction

Hospitals are not only places where people who are sick receive better treatment; they are also an incubator for germs that can spread to the healthy [1]. A healthcare-associated infections (HAIs) is an infection that a patient gets while receiving medical care at a hospital, clinic, or other healthcare facility. Also, Healthcare workers may get HAIs during their work. These infections are a worldwide issue and are among the leading causes of illness and death related to clinical, diagnostic, and therapeutic procedures. HAIs can have a negative impact on the infected individuals' quality of life and even reduce their life expectancy, in addition to resulting in significant long-term costs [2]. The WHO's statistics show that the worldwide occurrence of HAIs is 15% [3].

In Europe, the frequency of HAIs is lower at 6%, whereas in developing countries and East Mediterranean countries, the range of prevalence is estimated to be between 5.7% and 19.1% [4]. HAIs have been found to have an impact on mental health, leading to various serious disorders such as anxiety, depression, panic attacks, adjustment disorder, and post-traumatic stress disorder [5, 6]. Needle stick injury refers to an unintentional skin puncture caused by an injection needle, while sharp injuries occur when the skin is punctured by a sharp object or instrument [7].

HCWs, particularly nursing staff, are at a higher risk of experiencing needle stick injuries [8]. Such injuries can lead to blood-borne infections with severe consequences, such as long-term illness, disability, and even death. One of the ways to prevent HAIs is by implementing standard precautions. The WHO and the CDC have put forth two strategies for managing infections: standard.

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precautions (SPs) [9]. These precautions are based on the principle that all patients may carry infectious agents, even when they show no symptoms [10].

These are the fundamental principles for managing infections that aim to safeguard healthcare personnel against HAIs [11]. These precautions consist of various measures, such as hand hygiene, using protective barriers like gloves, masks, goggles, and face shields, safe handling of sharp instruments, and proper management of patient care equipment [12]. These precautions are considered the minimum requirements for ensuring healthcare safety in any healthcare setting, regardless of the type and severity of the illness [13]. HAIs are a significant issue globally, including in Iraq, as they lead to numerous patient and nursing staff deaths, illnesses and increase healthcare costs. Fortunately, most of these issues can be prevented or reduced by implementing infection control measures and utilizing simple, cost-effective, and widely available techniques. Assessing the knowledge and application of SPs among HCWs is a crucial step towards establishing and executing an effective infection prevention and control plan in any healthcare setting [14]. It has been suggested by some evidence that the transmission of HAIs could be attributed to a lack of knowledge, inappropriate attitudes, and poor application among HCWs [15]. So this study is anticipated to have a significant impact by emphasizing the significance of nurses' knowledge and application of SPs in their daily work. This study aims to identify the levels to which nurses are knowledgeable about and apply infection prevention measures, and to determine if there is a relationship between the level of knowledge of nurses and their application of infection prevention SPs [16].

## Methods

A descriptive cross-sectional study was used. A simple random method was used to select 50% of hospitals in the governorate, which is equal to eight hospitals: "Al-Musaib General Hospital, Al-Zahraa Hospital, Al-Alexandriay General Hospital, Al-Mahawil General Hospital, Al-Imam Sadiq Teaching Hospital, Al-Hilla Teaching Hospital, Al-Noor Paediatric Hospital, and Al-Qasim General Hospital". These hospitals are geographically distributed in the north, middle, and south of the governorate. The sample size for the present research was calculated using an online web-based software "Raosoft sample size calculator: [http://www.raosoft.com/sample\\_size.html](http://www.raosoft.com/sample_size.html)" and the researcher added 38 samples to assure compensation for the loss or refusal to participate by some respondents, thereby increasing the total sample size to 400 nurses in order to achieve greater precision. The proportional method was used to choose the number of respondents from every hospital. That is, the ratio of nurses working in each hospital to all nurses working in these eight hospitals, multiplied by the sample size, yielded the

number of participants from each hospital. The lists of nursing staff were obtained from each hospital's nursing department head. Participants were selected randomly from these lists. An interview-structured questionnaire was used to find out the research objectives. The questions of the questionnaire are based on the guidelines of the WHO and other previous studies [17]. The questionnaire included three categories of questions: the first was related to the demographic and professional information of the nurses; the second was about the knowledge of SPs; and the third was about the application of SPs.

The study participants were identified using sampling techniques. The researcher then met the selected participants and provided a brief summary. After describing the objective of the research, a nurse's verbal permission was obtained prior to the interview. For each participant, an interview questionnaire was used to collect data, and completing the questionnaires took approximately 13 to 15 minutes. Forty "yes" or "no" questions were used to assess nurses' knowledge of infection prevention. Responses were given either "1" or "0" points depending on whether they were correct or incorrect, respectively. The nurse's overall knowledge score was calculated by summing up each of their knowledge scores. Two categories of responses were determined based on the overall score of knowledge questions ranging from 0 to 40: high knowledge "if above the mean" and low knowledge "if equal to or below the mean". Sixteen questions were used to assess nurses' application of infection prevention, which has three Likert scale options "always, sometimes, never". The procedure was followed to analyze the application, and a score of 3 was given for each "always" application, 2 for "sometimes", and 1 for "never"; hence, Infection prevention application might get a total score between 16 and 48. Accordingly, there was two categories for nurse application: safe "if above the mean" and unsafe "equal to or below the mean" [18]. The collection of data started in September 2022 and ended in March 2023.

## Results

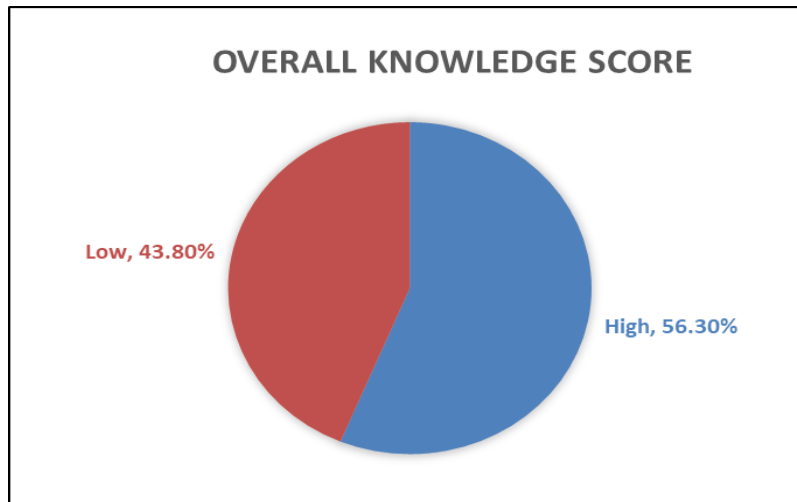
Table (1.1) shows the distribution of nurses according to social and demographic characteristics. The age of the participants ranged from 20 to 60 years, with a mean of  $29.07 \pm 8.95$  years. The highest percentage (28.7%) was for the age group 20–23 years, while the lowest percentage (19%) belonged to the age group (27–30 years). Regarding gender, there was a clear female predominance of 65.3%. As for the educational level, the highest percentage (43.8%) of nurses hold a diploma, followed by 29.5% of secondary degree holders. Most nurses (57.5%) were married. While 75% of nurses reside in urban areas [19]. In addition, the results found that the years of work experience ranged from 1–40 years, with a mean of  $7.19 \pm 4.20$  years. The highest percentage (58%) of nurses have work experience of less than 5 years,

while the lowest percentage (19.5%) of them have a tenure of more than 10 years.

**Table (1.1): The distribution of nurses according to sociodemographic characteristics**

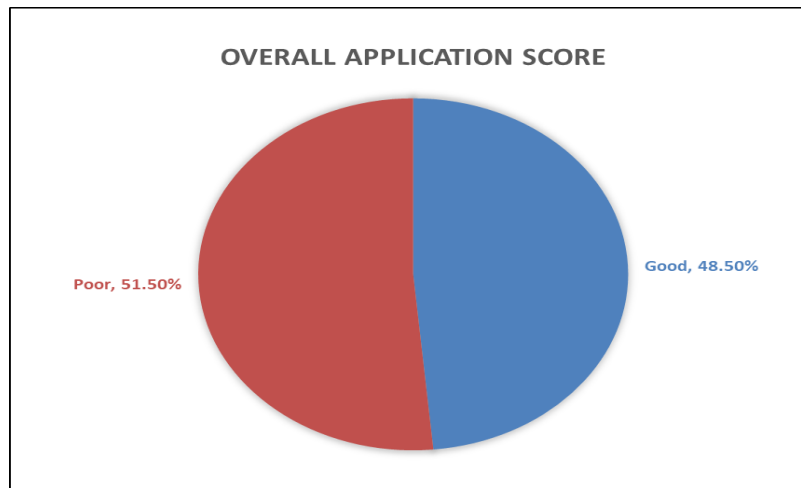
Variables	Category	Frequency	Percentage %
<b>Age</b>	20 - 23	115	28.7
	24 - 26	112	28
	27 - 30	76	19
	31+	97	24.3
	Mean ± SD (Range)	29.07±8.95 (20-60)	
<b>Gender</b>	Male	139	34.8
	Female	261	65.3
<b>Educational level</b>	Secondary graduate	118	29.5
	Diploma graduate	175	43.8
	Bachelor degree or above	107	26.8
<b>Marital Status</b>	Single	152	38
	Married	230	57.5
	Divorced	13	3.3
	Widowed	5	1.3
<b>Residence</b>	Rural	100	25
	Urban	300	75
	<5 year	232	58
<b>Work Experience</b>	5_10 year	90	22.5
	>10 year	78	19.5
	Mean ± SD (Range)	7.19+ 4.20 (1-40)	

Figure (1.1) shows that the highest percentage (56.3%) of nurses have a high level of knowledge. While the lowest percentage (43.8%) of them have a low level of knowledge.



**Figure (1.1):** The overall knowledge score

Figure (1.2) shows that the highest percentage (51.5%) of nurses have a poor application score. While the lowest percentage (48.5%) of them have a good application score.



**Figure (1.2):** The overall application score

Table (1.2) demonstrates the correlation between the overall application score and the overall knowledge score. The results reveal that there is a positive and significant correlation between the level of knowledge

and application of nurses, with a *P value* <0.01; *r*=0.180. This indicated that increasing the level of knowledge would lead to an increase in the level of application of the SPs.

**Table (1.2): The correlation between the overall application score and the overall knowledge score**

Overall application score	r	Overall application score	Overall knowledge score
1		1	.180**

\*\* Correlation is significant at the 0.01 level (2-tailed).

## Discussion

The main goal of current study was to determine the level of knowledge and application regarding standard precautions of infection and acute injuries and determine the association between knowledge level and application level [20, 21].

The knowledge level was 56.3%, this mean that most of nurses had high level of knowledge (Figure 1.1). This result is consistent with a study conducted by [22], which found that the level of knowledge of SPs among HCWs was satisfactory (57.5%). This finding is similar to a study carried out by Jemal et al. [23], which found 55.7% of participants have a good level of knowledge about SPs, while 44.3% of them have a poor level of knowledge. The results of another study by Sarani et al. [24] showed that 43% of nurses had poor knowledge [25].

In Saudi Arabia, [26] reported that 68.4% of participants had a good level of knowledge [27]. Abalkhail et al. [17] found in their study that 67.6% of respondents have a good level of knowledge [16]. In Iraq, a descriptive study conducted among 140 nurses found that 65.8% of respondents answered correctly on knowledge questions of SPs [28]. Another study conducted in Iraq by Omer & Saleh [29] reported that nurses had good levels (95%) of knowledge on infection prevention [30].

The application level was 48.5%, this mean that most of nurses had poor level of application (Figure 1.2). This result is similar to a study carried out by in Cyprus [31], which reported that 69.1% of HCWs had unsatisfactory application of SPs while only 30.9% of them had satisfactory application. This study agrees with another study done by Jemal et al. [23], which revealed that 53.3% of participants have poor practice in infection prevention SPs. Another study contracted in Iran showed that 42% of nurses had average practice Sarani et al., [24].

In Iraq, Omer & Saleh [29] revealed that 66.67% of nurses had a good level of practice in infection prevention. The correlation between the application level and the knowledge level was positive (Table 1.2). This finding was expected and is in agreement with a cross-sectional study conducted in South Korea [32, 33], which reported that there is a correlation between knowledge and compliance of nurses, with a *P value* <0.001; *r*=0.18 [34]. This result is inconsistent with another study done by Chan et al. [35], which showed no significant correlation between knowledge and practice[36].

## Conclusion

The current study found that most nurses have high levels of overall knowledge about standard precautions. While the majority of nurses have a poor level of application for standard precautions. In addition, there is a correlation between knowledge and application of standard precautions.

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## Conflict of interest statement

No conflict of interest is declared.

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