

# Assessment of Nurses' Practice of Standard Precautions in Hospitals of Babil Governorate, Iraq

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#### Abstract

**Background:** Hospital-acquired infection (HAI) is one of the most frequent issues that hospitals are faced with in every country worldwide. Nurses are an essential part of the medical workforce that play a special role in preventing the transmission of infections within hospitals by implementation of infection prevention standard precautions. This study aimed to assess the level of nurses' practice regarding standard precautions.

**Methods:** 400 nurses from eight hospitals in Babil governorate are included in this cross-sectional study. To assess the knowledge and practice levels, was used an interview questionnaire. SPSS-27 was used to analyze the data collected from September 2022 to March 2023.

**Results:** Among 400 nurses, the mean age was 29.07 years and a large number of them (43.8%) had a diploma; while most of nurses had less than 5 years of work experience, the main result revealed that 51.5% of them had poor practice regarding standard precautions.

**Conclusion:** The majority of nurses did not always practice these precautions, so there is a need to hold educational courses and training workshops for nurses to improve their practice of these measures.

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## Introduction

A healthcare-associated infection (HAI) is characterized as "an infection that develops in a patient while receiving care in a healthcare facility and was not present at the time of admission or was incubating prior to admission."<sup>1</sup> These conditions not only impact the patients but also present a substantial occupational hazard for healthcare workers (HCWs).<sup>2</sup> Occupational exposure leading to healthcare-associated infections (HAIs) is described as an occurrence where a healthcare worker (HCW) sustains an injury from a sharp object such as a needle or when their skin or mucous membranes come into contact with blood, saliva, or other potentially contagious substances.<sup>3</sup> HCWs face a heightened risk of contracting HAIs in multiple situations within a healthcare environment. These include direct patient

care, instrument sterilization, surgical procedures, healthcare waste disposal, and handling patient care items. These scenarios present significant challenges for HCWs in their efforts to prevent the transmission of HAIs.<sup>4</sup> One of the ways to prevent HAIs is implementing standard precautions.<sup>5</sup> Two strategies for managing infections, namely standard precautions (SPs) and transmission-based precautions (TBPs), have been introduced by the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC).<sup>6</sup> Implementing SPs is crucial in preventing HAIs and reducing occupational health hazards. These precautions are founded on the principle that all patients, regardless of their apparent symptoms, can potentially harbor infectious agents.<sup>7</sup> These fundamental principles for infection management are designed to protect the healthcare personnel from HAIs.<sup>8</sup> These precautions

encompass a range of measures, including practicing proper hand hygiene; utilizing protective barriers like gloves, masks, goggles, and face shields; safely handling sharp instruments; and appropriately managing patient care equipment. These precautions are regarded as the essential prerequisites for ensuring healthcare safety in any healthcare setting, regardless of the nature or severity of the illness. Transmission-based precautions (TBPs) are implemented when standard precautions alone are inadequate to contain the transmission of infections.<sup>9</sup> Nurses involved in patient care often encounter bodily fluids, blood, and contaminated needles, putting them at an increased risk of exposure to various infectious agents. Consequently, the likelihood of acquiring infections enhances. Therefore, it is crucial for nurses to have knowledge about and actively practice SPs to minimize the occurrence of these infections.<sup>10</sup> Evaluating the knowledge and practice of SPs among HCWs is an essential measure in order to establish and implement an efficient plan for infection prevention and control in any healthcare environment.<sup>11</sup> Certain indications have pointed out that the spread of HAIs might be linked to insufficient knowledge, inappropriate attitudes, and inadequate practice among HCWs.<sup>12</sup> The expected outcome of this study is to bring about a notable influence by highlighting the level of nurses' practice of SPs in their everyday duties. This particular research, being the first of its kind conducted in governmental hospitals in Babil governorate, aimed to address the gap in research on this subject within this specific region, despite the existence of numerous global studies on the topic.

## Methods

### *Study Period*

Data collection commenced in September 2022 and finished in March 2023.

### *Study Design*

A descriptive cross-sectional study was conducted.

### *Study Population*

This study was conducted in Babil Governorate, which is located in the center of Iraq, about 80 kilometers southwest of Baghdad, the capital of Iraq. It is estimated that the area of the governorate is about 5,119 km<sup>2</sup>, and its population in 2022 was about 2,288,456 people. There are fifteen hospitals in the governorate, where 6051 nurses are working.

### *Sample Size and Sampling Techniques*

Using a simple random method to select eight hospitals, we selected 50% of the hospitals in the governorate. They included Al-Musaib General, Al-Zahraa, Al-Alexsandriay General, Al-Mahawil General, Al-Imam Sadiq Teaching, Al-Hilla Teaching,

Al-Noor Paediatric, and Al-Qasim General Hospitals. These hospitals were strategically distributed across the northern, central, and southern regions of the governorate. The current research used an online web-based software called "Raosoft sample size calculator" available at <http://www.raosoft.com/samplesize.html> to determine the sample size, which was determined to be 400 nurses. The proportional method was used to determine the number of respondents from each hospital. We calculated the ratio of nurses working in each hospital to the total number of nurses across the eight selected hospitals, and then multiplied this ratio by the sample size to obtain the specific number of participants from each hospital. The lists of nursing staff were obtained from the nursing department head of each hospital, and the participants were randomly selected from these lists.

### *Data Collection Instrument*

An interview-structured questionnaire was used. The questions were formulated based on the guidelines provided by the World Health Organization (WHO).<sup>13</sup> The questionnaire was presented to 10 university experts in the area of competence to check the validity of the study instrument.

### *Data Collection Method*

The selected participants were personally approached by the researcher, who provided them with a concise overview. Following a description of the research objective, verbal consent was sought from each nurse before conducting the interview. Data collection involved the use of the interview questionnaire for each participant, with the completion of the questionnaires which lasted about 13 to 15 minutes.

### *Statistical Analysis*

To evaluate the nurses' infection prevention practices, a set of sixteen questions was used. These questions used a Likert scale with three response options: "always", "sometimes", and "never." The scoring procedure involved assigning a score of 3 for "always" responses, 2 for "sometimes", and 1 for "never". Thus, the total score for SPs practice could range from 16 to 48. Based on the mean score, two categories were established for nurse practice: "safe" if the score was above the mean, and "unsafe" if it was equal to or below the mean.<sup>15</sup>

### *Ethical Consideration*

Before the study was conducting and the data collecting, approval was obtained from the ethics research committee at the Southern Technical University/Faculty of Graduate Studies/Basra. Furthermore, official permissions were obtained from

the Babil Health Directorate (Training and Human Development Center) to formally access the hospitals in Babil Governorate. In addition, verbal consent was obtained from the nurses, indicating their voluntary participation after a detailed explanation of the objectives of the study. The nurses were assured that their involvement in the study was entirely voluntary.

## Results and Discussion

Table 1 presents the distribution of nurses based on their social and demographic characteristics. The age of the participants varied from 20 to 60 years, with a mean of  $29.07 \pm 8.95$  years. The age group with the highest percentage (28.7%) was between 20 and 23 years, while the age group with the lowest percentage (19%) was between 27 and 30 years. In terms of gender, there was a clear predominance of females, accounting for 65.3% of the participants. Regarding educational levels, the highest percentage (43.8%) of nurses had a diploma, followed by 29.5% who had a secondary degree. The majority of nurses (57.5%) were married, and 75% of them resided in urban areas. Furthermore, the study found that years of work experience ranged from 1 to 40 years, with a mean of  $7.19 \pm 4.20$  years. The highest percentage (58%) of nurses had less than 5 years of work experience, while the lowest percentage (19.5%) had a tenure exceeding 10 years.

In terms of age, the results were in agreement with a cross-sectional study conducted in Hong Kong by, in which a sample of 260 nurses had a mean age of  $30.1 \pm 5.47$  years.<sup>16</sup> Also, this result is consistent with the results of a cross-sectional study of 233 HCWs in Northern Cyprus, which reported that the mean age was  $32.95 \pm 9.70$  years.<sup>17</sup> Regarding gender, the result is consistent with a study done in Jordan, which found

that the proportion of females was higher than that of males.<sup>18</sup> Moreover, this result is similar to that of a study done in Brazil and Hong Kong, which reported that 86.2% of the 560 participants were female nurses.<sup>16</sup> As to the educational level, this result is consistent with a study conducted in Cyprus, which reported that 59.2%, 24.5%, and 16.3% of participants held college or undergraduate degrees, high school or less, and university or above, respectively. Also, most of the participants were married (51.1%).<sup>17</sup> The result of another cross-sectional study is inconsistent with those regarding the educational level, which reported that 70.7% of participants held bachelor's degrees, while the finding of a similar study is consistent regarding marital status, which reported that the highest percentage of participants (63.3%) were married.<sup>19</sup> On the contrary, another study done in Saudi Arabia revealed that a higher percentage of participants (45.3%) held bachelor's degrees.<sup>20</sup> Regarding the years of experience, a cross-sectional study conducted in Hong Kong agreed with our results, which reported that nurses' work experience was  $8.0 \pm 5.85$  years.<sup>16</sup> In Iraq, a study found that the highest percentage (79.4%) of nurses had a work experience less than 5 years.<sup>21</sup>

Table 2 shows the distribution of nurses according to their responses about their practice of SPs. Among the participating nurses, 66.8% reported they always applied SPs during the care of all patients, regardless of their diagnosis and perceived infection status. This finding is consistent with that of a study conducted in Ghana, which found that 50% of HCWs always used the recommended precautions to protect themselves from bodily fluids of all patients.<sup>22</sup> However, only 40.8% reported they always washed their hands before wearing gloves and 84.8% after removing gloves.

**Table 1:** The distribution of nurses according to sociodemographic characteristics

Variables	Category	Frequency	Percentage %
Age	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)	
Gender	Male	139	34.8
	Female	261	65.3
Educational level	Secondary graduate	118	29.5
	Diploma graduate	175	43.8
	Bachelor degree or above	107	26.8
Marital Status	Single	152	38
	Married	230	57.5
	Divorced	13	3.3
	Widowed	5	1.3
Residence	Rural	100	25
	Urban	300	75
Work Experience	<5 year	232	58
	5-10 year	90	22.5
	>10 year	78	19.5
	Mean±SD (Range)	7.19±4.20 (1-40)	

**Table 2:** Distribution of the study population according to their responses about their practice of SPs

Items	Responses	N (%)
Do you apply SPs during the care of all patients, regardless of their diagnosis and perceived infection status?	Always	267 (66.8%)
	Sometimes	128 (32%)
	Never	5 (1.3%)
Do you wash your hands before wearing gloves?	Always	163 (40.8%)
	Sometimes	196 (49%)
	Never	41 (10.3%)
Do you wash your hands after removing gloves?	Always	339 (84.8%)
	Sometimes	50 (12.5%)
	Never	11 (2.8%)
Do you wash hands immediately after contacting any blood or other body fluids?	Always	346 (86.5%)
	Sometimes	46 (11.5%)
	Never	8 (2%)
Do you Wash hands with soap before patient care?	Always	221 (55.3%)
	Sometimes	162 (40.5%)
	Never	17 (4.3%)
Do you Wash hands with soap after patient care?	Always	330 (82.5%)
	Sometimes	55 (13.8%)
	Never	15 (3.8%)
Do you wear gloves when you care for a patient who does not secrete blood or other body fluids?	Always	262 (65.5%)
	Sometimes	105 (26.3%)
	Never	33 (8.3%)
Do you wear protective goggles when caring for a patient to avoid getting blood and other body fluids on your face?	Always	166 (41.5%)
	Sometimes	109 (27.3%)
	Never	125 (31.3%)
Do you wear gown when caring for a patient who poses a risk of blood and other body fluids splashing on your clothes?	Always	226 (56.5%)
	Sometimes	131 (32.8%)
	Never	43 (10.8%)
Do you wear masks when caring for a patient who sneezes or coughs?	Always	320 (80%)
	Sometimes	71 (17.8%)
	Never	9 (2.3%)
Do you recap the used needle before disposal?	Always	310 (77.5%)
	Sometimes	63 (15.8%)
	Never	27 (6.8%)
Do you bend needles before disposal?	Always	155 (38.8%)
	Sometimes	118 (29.5%)
	Never	127 (31.8%)
Do you dispose the used needle and blades in the special sharps' container?	Always	337 (84.3%)
	Sometimes	42 (10.5%)
	Never	21 (5.3%)
Do you close the sharps container and replace it when it is half full?	Always	241 (60.3%)
	Sometimes	118 (29.5%)
	Never	41 (10.3%)
Do you wear gloves when disposing of needle/blades and infectious materials?	Always	264 (66%)
	Sometimes	101 (25.3%)
	Never	35 (8.8%)
Do you wear gloves when you perform injection or drawing blood for patients?	Always	294 (73.5%)
	Sometimes	82 (20.5%)
	Never	24 (6%)

This result is inconsistent with those of a study conducted in Nigeria, which reported that only 2.6% of HCWs washed their hands before wearing gloves and 10.7% did so after removing gloves.<sup>23</sup> The highest percentage of nurses (86.5%) always washed their hands immediately after contacting any blood or other body fluids. This result is slightly higher than that of a study conducted in Ethiopia, which reported that 60% of HCWs often washed their hands after exposure to body fluids.<sup>24</sup> Moreover, the percentage

of nurses who always washed their hands with soap before patient care (55.3%) was less than that of the nurses who always washed their hands with soap after patient care (82.5%). This result is consistent with that of a study conducted in Saudi Arabia, which revealed that 59.9% of HCWs washed their hands before patient care.<sup>20</sup> Most nurses wore gloves when they cared for a patient who did not secrete blood or other body fluids (65.5%). This in agreement with the findings of the study conducted in Hong Kong, which found

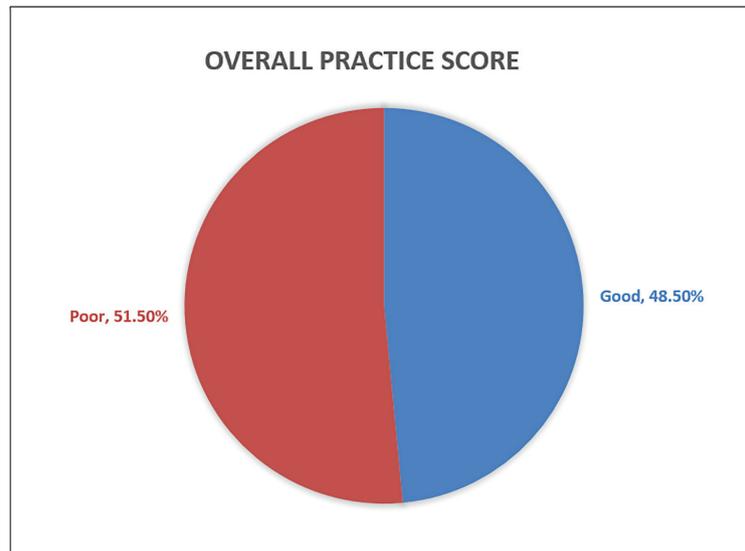


Figure 1: The overall practice score

that 80% of nursing staff wore gloves when exposed to any excretion of patients.<sup>16</sup> However, only 41.5% of nurses wore protective goggles when caring for a patient to avoid getting blood and other body fluids on their faces. Another inconsistent study done in Saudi Arabia found that 19.3% of HCWs always wore goggles while doing procedures.<sup>20</sup> Regarding gowns, 56.5% of nurses always wore a gown when caring for a patient who posed a risk of blood and other body fluids splashing on their clothes. This result is in the same line with one from a study, which discovered that 49.7% of Brazilian nurses wore a gown or apron when they were around body excretions.<sup>16</sup> Most nurses wore masks when they cared for a patient who sneezed or coughed (80%). On the contrary, this result is inconsistent with that of a study that revealed that only 20.2% of HCWs were wearing face masks.<sup>23</sup> Another finding indicates a lower percentage, reporting that 54.8% of HCWs often wore face masks when necessary.<sup>24</sup> As to injection safety and sharp injuries, only 6.8% of nurses never recapped the used needle before disposal, 31.8% never bent needles before disposal, and 84.3% always disposed of the used needle and blades in the special sharp utensils container. However, only 10.3% never closed the sharps container and replaced it when it was half full. Similarities can be found with a cross-sectional study conducted in Brazil and Hong Kong; 33% of Brazilian nurses never recapped the used needle, 93.8% of Hong Kong nurses put used sharps into a sharps container, and 16% of Brazilian nurses disposed of the sharps container when it was full.<sup>16</sup> Most nurses always wore gloves when disposing of needles and other infectious materials (66%), and the highest percentage of them wore gloves when they performed injections or took blood for patients (73.5%). This result is consistent with that of a cross-sectional study, indicating that 73.4% of HCWs wore gloves when performing injections on patients.<sup>17</sup>

Figure 1 shows that the highest percentage (51.5%) of nurses have a poor practice score, while the lowest percentage (48.5%) of them have a good practice score. This result is similar to that of a study carried out in Cyprus, which reported that 69.1% of HCWs had unsatisfactory practice of SPs, while only 30.9% of them had satisfactory practice.<sup>17</sup> This study is in the same line with another study which revealed that 53.3% of participants had poor practice in infection prevention SPs.<sup>19</sup> Another study conducted in Iran showed that 42% of nurses had average practice.<sup>25</sup> In Iraq, a study revealed that 66.67% of nurses had a good level of practice in infection prevention.<sup>21</sup>

### Conclusion and Recommendation

According to the results, most nurses have a poor level of practice for standard precautions; we recommend that educational courses and training workshops should be held for nurses to improve their practice of these measures. Also, there is a need to enhance behavioral modifications to reduce exposure to nosocomial infections and acute injuries (e.g., not recapping or bending needles after use). Developing a program for tracking HAIs in different wards according to standard protocols, introducing monthly reporting, and rewarding wards with the lowest HAI cases may all contribute to improving the practice of standard precaution measures.

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**Conflict of Interest:** None declared.

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