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Evaluation of needle stick injury management and prevention in Sulaimani city hospitals

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Abstract

Background and objective: Needle stick injuries (NSIs) pose a significant occupational hazard for healthcare workers, leading to risks of bloodborne infections. Despite established prevention and control guidelines, the incidence of needle stick injuries remains high, particularly in developing countries. The study aims to assess needle stick prevention and control management in the governmental and non-governmental hospitals inside Sulaimani city-Iraq.

Method: A descriptive cross-sectional study was conducted across 18 hospitals (11 governmental and 7 non-governmental) in Sulaimani City from January to March 2023. Using a pre-designed questionnaire, data was collected through structured interviews with infection control units or hospital administrators. Descriptive statistics were used for data analysis.

Result: The data collected showed that most hospitals have infection control units 14 (77.8%) while 4 (22.2%) did not. The majority of hospitals 17 (94.4%) have a needle stick injury prevention program, including 11 (64.7%) governmental and 6 (35.3%) non-governmental hospitals and also most of these hospitals12 (80%) monitor it is application. Regarding training, 11 (68.8%) of governmental and 5 (31.3%) of non-governmental hospitals offer training, making up a total of 16 (88.9%). Finally, for recording incidences, 8 (88.9%) of governmental and 1 (11.1%) of non-governmental hospitals recorded it, with an overall recording rate of 9 (50%). Conversely, 3 (33.3%) of governmental and 6 (66.7%) of non-governmental hospitals do not record these incidences.

Conclusion: The study concluded that while most Sulaimani city hospitals have needle stick prevention programs, governmental hospitals generally implement and monitor them more effectively than non-governmental ones. Key gaps include inconsistent reporting, follow-up practices, and training.

Keywords: Needle stick injuries; Infection prevention and control; Sulaimani city; Hospital acquired infection.

Introduction

Work-related accidents are common in various fields of work, including hospitals or many different medical setting facilities. Needle stick injuries (NSIs) are the most frequent type of occupational hazard many healthcare workers face.(1) Needle stick injuries are well described as penetrating skin with a potentially contaminated sharp needle with a patient body fluid and are mainly caused by a needle during the medical process for treatment.(2)

The use of needles is an essential aspect of healthcare, and despite hospitals having established guidelines for their proper handling and disposal, as well as employing modern safety-designed needles, needle stick injuries remain

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a frequent issue. The NSIs occur in developed and developing countries but the rate in developing countries is significantly higher. The worldwide average prevalence of NSIs is about 40.97%, with a higher rate of 46.6% reported in developing countries compared to 30.5% in developed nations.[3] The major associated factors are inadequate training on infection control guidelines, lack of monitoring standard operating protocols, high workload, insufficient safety measures, and needle recapping practices.[4]

Healthcare workers injured by contaminated needle sticks face a significant risk of infection from serious bloodborne viruses, including hepatitis B (HBV), hepatitis C (HCV), and HIV/AIDS. Globally, needle stick injuries account for 36.7% of HBV infections, 39% of HCV infections, and 4.4% of HIV/AIDS cases.[5] Most blood-borne infections resulting from NSI have long incubation periods, meaning they are not immediately detectable. Therefore, NSI cases should be monitored and tested multiple times over an extended period to ensure any potential infections are identified and treated.[6]

Despite the high number of needle stick injuries (NSIs) among healthcare workers, many do not report them or get follow-up care. A systematic review demonstrated that unreported NSIs are near 60% and the major cause was injured healthcare staff not worried about it. This negligence among healthcare staff is related to their lack of time, doubt about the risk of infection, or other reasons.[7]

The prevention of needle and sharp injuries is a key component of every infection prevention and control guideline, and it is the responsibility of each hospital's infection control unit to implement these measures. Needle recapping is the main cause of NSI but behaviour change alone did not reduce the rate of NSI. Hospital management including infection control units is vital in preventing NSIs by enforcing safety protocols, offering regular training, and ensuring the availability of protective equipment. Ongoing monitoring and education are key to minimizing the incidence of NSIs among healthcare workers.[8] Developing effective training modules is crucial for enhancing NSI prevention efforts and improving healthcare workers' knowledge and risk awareness.[9] The NSI control guidelines demonstrate that hospitals' safety protocols for injured staff are first aid, risk assessment, notification and reporting for HBV, HCV, and HIV, and provision of post-exposure prophylaxis (PEP).[4]

The study aims to assess needle stick injury prevention and control management in the governmental and non-governmental hospitals inside Sulaimani city-Iraq.

Methods

Study design

A descriptive cross-sectional study was conducted in Sulaimani City governmental and non-governmental tertiary hospitals in the Kurdistan Region of Iraq to assess the needle stick injury prevention and control program. The study data was collected from 18 hospitals (11 governmental and 7 non-governmental) from 1st January to 1st March 2023. Only 3 non-governmental hospitals inside Sulaimani city were excluded from the study because they refused participation.

Data Collection Process

The data was gathered using the interview method with the infection control unit if they were available. If not, the data was acquired from hospital administrators. Constructed questionnaire forms from studies on similar topics were used to assess the needle stick prevention and control program.

Questionnaire Form Structure

The study questionnaire form was developed from the prevention and control needle stick injuries guidelines and the form has been validated by five experts in the Sulaimani Polytechnic University and infection control experts. The questionnaire form was divided into three parts, the first part includes questions regarding the

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infection control unit's responsibility for preventing and controlling needle stick injuries among medical care staff while the second part consists of questions about the guidelines, hospitals use as a source for their needle stick injury prevention measures, including medical staff training. In addition, the third part contained questions on the reporting mechanism for needle stick injuries and how hospitals address those reports.

Ethical Approvals

The study was approved by the Sulaimani Polytechnic University research ethics committee, and ethical approval was obtained from the Sulaimani Directory of Health and all hospital administrations that participated in the study.

Data Analysis

The SPSS (Statistical Package for the Social Sciences) software version 23 was used to analyse the data, producing descriptive statistical measures such as frequency and percentage for qualitative data, and mean and standard deviation for quantitative data.

Results

The data of the current study was collected from 11 (91.1%) Governmental hospitals and 7 (38.9%) non-governmental hospitals inside Sulaimani city. The table below shows that most of the hospitals have an infection control unit 14 (77.8%) while 4 (22.2%) did not and the governmental hospitals have more infection control units 10 (71.4%) compared with the non-governmental hospitals 4 (28.6%). To determine the responsibility of the infection control unit on needle stick injuries the following questions have been asked among those hospitals that had the infection control unit; most of the hospitals 13 (92.9) have a separate (special) room for infection control unit while only one 1 (7.1%) non-governmental hospital did not have among all hospitals. Also, most of the hospitals 12 (92.3%) have a free person on the job, while only one non-governmental hospital did not have a free person on the job, and in all the hospitals 13 (100%) their infection control is responsible for preventing and controlling needle stick or sharp injuries.

Table 2 shows that 17 (94.4%) hospitals in Sulaimani City have a prevention program to reduce needle stick injuries, including 11 (64.7%) governmental and 6 (35.3%) non-governmental hospitals. The sources of these programs vary, with 5 (31.3%) based on the Ministry of Health guidelines, 1 (6.3%) following international guidelines, and 10 (62.5%) using Sulaymaniyah Directorate of Health guidelines. For monitoring programs application 12 (80%) of these hospitals conduct it, with 8 (66.7%) being governmental and 4 (33.3%) non-governmental, while 3 (20%) hospitals lack such monitoring distributed in 1 (33.3%) governmental and 2 (66.7%) non-governmental hospitals.

Pre-employment training for needle stick injuries is provided in 14 (82.4%) hospitals, consisting of 10 (71.4%) governmental and 4 (28.6%) non-governmental hospitals. Written guidelines for managing needle stick injuries exist in 16 (94.1%) hospitals, including 10 (62.5%) governmental and 6 (37.5%) non-governmental facilities, while 1 (5.9%) governmental hospital lacks such guidelines. The sources of these guidelines are split between local sources, 7 (53.8%) hospitals (4 (57.1%) governmental and 3 (42.9%) non-governmental) and international sources, 6 (46.2%) hospitals, equally distributed between governmental 3 (50%) and non-governmental 3 (50%) hospitals.

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Table 1 The availability of the infection control unit and its responsibilities of both governmental and non-governmental hospitals

Questions		Governmental 11 (61.1%)	Non-Governmental 7 (38.9%)	Total	Not answered
		Frequency (%)			
1. Does this hospital have an infection control unit?	Yes	10 (71.4)	4 (28.6)	14 (77.8)	0
	No	1 (25)	3 (75)	4 (22.2)	
A. Does the Infection control unit have a separate room?	Yes	10 (76.9)	3 (23.1)	13 (92.9)	4
	No	0 (0)	1 (100)	1 (7.1)	
B. Does the Infection control unit have a special (free on- the-job) person?	Yes	9 (75)	3 (25)	12 (92.3)	5
	No	0 (0)	1 (100)	1 (7.7)	
C. Infection control unit responsible for the needle stick injuries in this hospital?	Yes	9 (69.2)	4 (30.8)	13 (100)	0
	No	0 (0)	0 (0)	0 (0)	
D. Infection control unit responsible for the application of the needle stick injuries prevention program in this hospital?	Yes	10 (71.4)	4 (28.6)	14 (100)	0
	No	0 (0)	0 (0)	0 (0)	
E. Infection control unit responsible for the needle stick injuries training program in this hospital?	Yes	8 (72.7)	3 (27.3)	11 (78.6)	4
	No	2 (66.7)	1 (33.3)	3 (21.4)	
F. Infection control unit responsible for the needle stick injuries report in this hospital?	Yes	8 (80)	2 (20)	10 (76.9)	5
	No	2 (66.7)	1 (33.3)	3 (23.1)	

Table 2 The guidelines for preventing and controlling needle stick injuries among governmental and non – governmental hospitals

Questions		Governmental 11 (61.1%)	Non-Governmental 7 (38.9%)	Total	Not answered
		Frequency (%)			
1. Is there any prevention program to reduce needle stick injuries in this hospital?	Yes	11 (64.7)	6 (35.3)	17 (94.4)	0
	No	0 (0)	1 (100)	1 (5.6)	
A. What is the source of the program?	Ministry of Health	5 (100)	0 (0)	5 (31.3)	1
	International guideline	1 (100)	0 (0)	1 (6.3)	
	Sulaymaniyah directorate of health guidelines	4 (40)	6 (60)	10 (62.5)	
B. Is there any unit to monitor the application of this program?	Yes	8 (66.7)	4 (33.3)	12 (80)	2
	No	1 (33.3)	2 (66.7)	3 (20)	
2. Is there any pre-employment training for needle stick injuries in this hospital?	Yes	10 (71.4)	4 (28.6)	14 (82.4)	1
	No	1 (33.3)	2 (66.7)	3 (17.6)	
3. Is there a written guideline (protocol) for how hospitals deal with needle stick injuries in this hospital?	Yes	10 (62.5)	6 (37.5)	16 (94.1)	1
	No	1 (100)	0 (0)	1 (5.9)	
A. What is the source of the guideline?	Local	4 (57.1)	3 (42.9)	7 (53.8)	3
	International	3 (50)	3 (50)	6 (46.2)	

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Regarding training, 11 (68.8%) of governmental and 5 (31.3%) of non-governmental hospitals offer training, making up a total of 16 (88.9%). Meanwhile, 2 (11.1%) of the hospitals do not provide training, with this gap filled by non-governmental hospitals.

The duration of training varies, in most of the hospitals 9 (60%) were provided when the medical staff were in need while 3 (20%) of the hospitals offer training occasionally and regularly for each. In addition, regular assessment of healthcare staff's knowledge regarding needle stick injuries is conducted by 10 (66.7%) governmental and 5 (33.3%) non-governmental institutions, resulting in a total of 15 (93.8%) institutions conducting assessments and 1 (6.3%) do not.

For providing the tools or procedures to prevent needle stick injuries, 10 (58.8%) of governmental and 7 (41.2%) of non-governmental hospitals provided, in total 17 (94.4%), with 1 (5.6%) of hospitals not providing these tools. Regarding the sharp safety tools, safety boxes are available in 15 (60%) of hospitals, Personal protective equipment in 7 (28%), training in 2 (8%), and post-injury tests in 1 (4%), reflecting the varying degrees of preventive measures implemented across these institutions. (Table 3)

Table 3 Rate of providing training and tools for the healthcare staff to prevent needle stick injuries

Questions		Governmental 11 (61.1%)	Non-Governmental 7 (38.9%)	Total	Not answered
			Frequency (%)		
1. Is there any training for needle stick injuries in this hospital?	Yes	11 (68.8)	5 (31.3)	16 (88.9)	0
	No	0 (0)	2 (100)	2 (11.1)	
A. In what duration?	Occasionally	3 (100)	0 (0)	3 (20)	3
	In regular time	2 (66.7)	1 (33.3)	3 (20)	
	When the workers needed	5 (55.6)	4 (44.4)	9 (60)	
B. Do you assess healthcare staff's knowledge about needle stick injuries at regular times?	Yes	10 (66.7)	5 (33.3)	15 (93.8)	2
	No	1 (100)	0 (0)	1(6.3)	
2. Hospitals provide tools to prevent needle stick injuries among healthcare workers.	Yes	10 (58.8)	7 (41.2)	17 (94.4)	0
	No	1 (100)	0 (0)	1 (5.6)	
A. Safety box	Yes	9 (60)	6 (40)	15 (60)	*
B. Personal protective equipment	Yes	5 (71.4)	2 (28.6)	7 (28)	
C. Training	Yes	2 (100)	0 (0)	2 (8)	
D. Tests	Yes	0 (0)	1 (100)	(4)	

* Multiple response question.

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Table 4 presents the data on needle stick injury reporting and post-injury care practices in healthcare settings. For recording needle stick injury incidences, 8 (88.9%) of governmental and 1 (11.1%) of non-governmental reported they recorded it, with an overall recording rate of 9 (50%). Conversely, 3 (33.3%) of governmental and 6 (66.7%) of non-governmental hospitals do not record these incidences. When it comes to having a special form for reporting such injuries, 6 (85.7%) of governmental and 1 (14.3%) of non-governmental institutions use them, representing 7 (58.3%) of the total. Meanwhile, 4 (80%) of governmental and 1 (20%) of non-governmental institutions do not have a special form, totalling 5 (41.7%). In addition, the type of recording varies, 5 (83.3%) of governmental and 1 (16.7%) of non-governmental institutions use paper records (6 (75%) total, while only 2 (100%) hospitals use computerized records from governmental hospitals, representing 2 (25%) of the total.

Annual reports on incidents are produced by 4 (80%) of governmental and 1 (20%) of non-governmental institutions, accounting for half of 5 (50%) overall. The remaining 5 (50%) do not produce such reports, with all of these being governmental institutions 5 (100%). Actions dependent on the incidence of needle stick injuries are taken by 7 (87.5%) of governmental and 1 (12.5%) of non-governmental institutions, totalling 8 (80%), while only 2 (100%) of the hospitals that do not take action based on incidence are governmental 2 (20%) total.

Regarding post-injury care, 9 (75%) of governmental and 3 (25%) of non-governmental hospitals provide medical attention within 2 hours after injury, representing 12 (66.7%) of the total, while 6 (33.3%) do not provide this care 2 (33.3%) governmental and 4 (66.7%) non -governmental. Furthermore, patients who are involved in needle stick incidents are universally tested for viral infections (100%), with equal participation from both governmental and non-governmental institutions. Similarly, special attention and placement for sharp and needle waste are observed universally across all institutions (100%).

Discussion

Although the Iraqi Kurdistan Regional Government's Ministry of Health (MoH) was founded in the early 1990s, the Infection Control Department in the Kurdistan Region (KRG) was established in 2010 by a team of specialists who were instrumental in creating the mapping program and infection control guidelines, which are based on the Iraqi National Guide to Infection Control.[10] However, no research has been conducted to assess the Sulaimani city Hospital's needle stick injury prevention or controlling program. The goal of this study was to assess the Sulaimani city Hospitals' Needle Stick Injury Prevention and Control Management Program.

The current study shows that among 18 hospitals in Sulaimani, 14 (77.8%) have an infection control unit and 1 from the government and 3 private hospitals did not have infection control units. This is an issue the Sulaimani Directory of Health should come in line to force this hospital to establish an IPC unit. Based on the WHO's basic components for IPC programs, IPC standards should be implemented at the national and hospital levels to offer patients, healthcare professionals, and visitors the bare minimum of protection and safety. The presence of these prerequisites serves as the first step towards constructing more crucial IPC core components methodically based on evaluations of the local environment.[11] Further, every hospital must adhere to regulations to control and prevent Health Associated Infections (HAI) since patient safety is seen as a primary concern.[12]

Concerning whether hospitals have infection control units in separate rooms and health personnel in charge, most governmental hospitals 10 have infection control units and 9 (75%) of them have

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Specially a person in charge. The National Guide for Infection Control in Iraqi Health Institutions emphasized the existence of an environmental health and pollution unit in hospitals, in addition to the necessity of forming committees to control bacterial pollution at the institutional level. This committee consists of cadres concerned with the policy and implementation of bacterial pollution control in all public and private hospitals (health institutions).[13] Furthermore, the result also indicated that in most hospitals the Infection control unit is responsible for the application of the needle stick or sharp injuries prevention program in the hospital public and private 10 (71.4%) and 4 (28.6%) respectively. Additionally, the IPC unit is also responsible for the training program in this hospital. Of note, IPC implementation is the responsibility of all Healthcare workers (HCWs) and not the sole responsibility of the IPC teams or policymakers. Therefore, all HCWs must be made aware of the IPC minimum requirements. The WHO indicated that all front-line clinical staff and cleaners must receive education and training on the facility IPC guidelines/

Table 4 The needle stick injuries report and post-injury care across governmental and non-governmental hospitals

Questions		Governmental 11 (61.1%)	Non-Governmental 7 (38.9%)	Total	Not answered
			Frequency (%)		
1. Do you record the needle stick injury incidences?	Yes	8 (88.9)	1 (11.1)	9 (50)	0
	No	3 (33.3)	6 (66.7)	9 (50)	
A. Do you have a special form for reporting needle stick injuries?	Yes	6 (85.7)	1 (14.3)	7 (58.3)	6
	No	4 (80)	1 (20)	5 (41.7)	
A. 1. Where do you record needle stick injuries?	On paper	5 (83.3)	1 (16.7)	6 (75)	4
	Computer	2 (100)	0 (0)	2 (25)	
B. Do you have an annual report on needle stick injury incidences?	Yes	4 (80)	1 (20)	5 (50)	8
	No	5 (100)	0 (0)	5 (50)	
C. Do your actions depend on the incidence of the needle stick injuries?	Yes	7 (87.5)	1 (12.5)	8 (80)	8
	No	2 (100)	0 (0)	2 (20)	
2. In the hospital there is a place where injured healthcare staff receive medical attention within 2 hours after injury?	Yes	9 (75)	3 (25)	12 (66.7)	0
	No	2 (33.3)	4 (66.7)	6 (33.3)	
3. The patients who were involved in the incidence test for the viral infections?	Yes	11 (61.1)	7 (38.9)	18 (100)	0
	No	0 (0)	0 (0)	0 (0)	
4. Does The needle waste in the hospital have special attention and place?	Yes	11 (61.1)	7 (38.9)	18 (100)	0
	No	0 (0)	0 (0)	0 (0)	

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Standard Operating Procedure (SOPs) upon employment. All IPC staff need to receive specific IPC training.[11]

Our study found that out of 18 participating healthcare facilities, 17 of them have adopted needle stick or sharps prevention programs. Five hospitals follow the Kurdistan Ministry of Health program, one hospital follows the international guidelines for needle stick or sharps prevention, and four hospitals follow the guidelines of the Sulaymaniyah Health Directorate. Almost all participating hospitals have adopted an infection control program, especially needle stick or sharps prevention, and most of the guidelines contain almost all points or recommendations for infection prevention, but the regulations or guidelines for infection prevention should be compatible with each other and follow the same standards. As we mentioned earlier, the Ministry of Health in the Kurdistan Region has a policy and approach towards infection control, which it has shared with the health directorates in the provinces of the region, which in turn should be circulated to all health departments to follow. Further, the study shows there is monitoring for the application of the IPC program which was confirmed by 8 government hospitals and 4 private hospitals.

The results showed that most of the hospitals offer training for their staff, 2 (11.1%) of the hospitals do not provide it, and in most of the hospitals 9 (60%) provide training on when it is needed for health care works. In addition, regular assessment of healthcare staff's knowledge regarding needle stick injuries is conducted by 10 governmental hospitals and 5 non-governmental hospitals. Healthcare workers (HCWs) are susceptible to acquiring infectious diseases in healthcare environments due to injuries from sharp objects and splash exposures to human fluids like blood. Interventions involving education and training are frequently employed to safeguard the health and safety of employees and to stop injuries from sharp objects. In certain nations, they are required for healthcare workers' professional growth.[9]

For providing tools or equipment to prevent needle stick injuries, 10 (58.8%) of governmental and 7 (41.2%) of non-governmental hospitals provided, the equipment that is available in hospitals for ICP safety boxes available in 15 (60%) institutions, personal protective equipment in 7 (28%). Providing post-injury tests, unfortunately, only one hospital provided 1 (4%). The risk of blood-borne disease infection among healthcare workers is influenced by a number of factors, including the availability of medical supplies, compliance with recommended precautions, and the accessibility and availability of post-exposure prophylaxis.[14]

The result illustrated that most hospitals recorded the needle stick or sharp injury incidence and five (83.3) of government hospitals and 1 (16.7) of non-government hospitals recorded needle sticks or sharp injuries on paper. Furthermore, 3 (33.3%) of governmental and 6 (66.7%) of non-governmental hospitals do not record these incidences. Hospitals may fail to record needle stick and sharps injuries (NSIs) properly for several reasons: (1): Factors concerning employees Some healthcare professionals may not completely understand the significance of reporting NSIs or the protocols for doing so because of a lack of awareness. Also, healthcare professionals' attitudes and behaviours may affect not reporting NSIs. (2): Ineffective reporting systems by hospitals or having complicated or time-consuming reporting processes may deter Healthcare professionals from reporting NSIs. The Ministry of Health and Health Directory in Sulaimani should require the hospitals to establish strong policies and processes for managing and reporting NSIs to address these problems. This entails ensuring that reporting methods are effective and user-friendly, increasing awareness, and offering sufficient training.

The study also shows that 4 (80%) of

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governmental and 1 (20%) of non-governmental institutions had annual reports on incidents of needle stick or sharp injury which account for half of participant hospitals. While the other half do not do such reports. The tasks of the Environmental Health and Viral Pollution Unit in health institutions include writing monthly follow-up reports and comparing them with the previous month to identify problems and develop plans to improve performance. In addition, monthly reports are sent to the Environmental Health Unit or the department centre.[13]

Although the procedure for taking an action is dependent on the incidence of needle stick injuries by health care institutions, the majority of hospitals provide post-injury care for HCWs within 2 hours after injury, while 2 (33.3%) governmental and 4 (66.7%) non-governmental did not provide any services. To mitigate the danger of exposure, organisations have prioritized primary prevention as a way to lower the frequency of needle stick injuries and, consequently, the number of bloodborne pathogen transmissions. There are still needle stick injuries, though, so anyone working in the healthcare sector must learn about the risks of exposure and how to react appropriately.[15]

This study faced several challenges and limitations. First, the evaluation of needle-stick injury management was based on responses from the infection control unit or hospital administrators. In some cases, particularly in private hospitals, there was a possibility that respondents aimed to present their hospitals in the best possible way, which might have introduced some bias. This could also explain why certain questions in the study went unanswered. Additionally, many non-governmental hospitals lacked infection control units, which meant we had to gather data from non-medical staff (administrators) who were often not aware of the guidelines for managing needle-stick injuries.

Another significant challenge was that three non-governmental hospitals in Sulaimani City declined to participate in the study, even though we had official permission from the Sulaimani Directorate of Health.

Conclusion

The study concluded that while most Sulaimani City hospitals have needle stick prevention programs, governmental hospitals generally implement and monitor them more effectively than non-governmental ones. Key gaps include inconsistent reporting, follow-up practices, and training, highlighting the need for stronger adherence to unified protocols and enhanced oversight. The study recommends it's crucial to strengthen NSI prevention efforts in Sulaimani hospitals. This means ensuring proper training, improving reporting systems, and making protective equipment readily available.

Competing interests

The authors declare that they have no competing interests.

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