Review Article

Prevalence of Needlestick Injuries among Health-Care Workers in Iranian Hospitals: An Updated Systematic Review and Meta-Analysis

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Abstract

Background: Needlestick and sharp injuries have been identified as the most dangerous factor among health-care workers. The Centers for Disease Control and Prevention estimates that 385,000 health-care workers experience needlestick each year. **Methods:** The aim of this study was to determine the prevalence of needlestick injuries (NSIs) in Iranian health-care workers. In this review and meta-analysis, the local and international databases such as Scopus, Medline, PubMed, ScienceDirect, Web of Science, Google Scholar, Scientific Information Database (SID), and Magiran were searched using keywords including "prevalence" OR "needle" OR "needle stick" OR "Sharp injury" OR "Iranian personnel's" OR "Iranian health care workers" OR "Iranian hospitals" OR "Iran." The original researches that determined the prevalence of NSIs among Iranian health-care workers and published from January 2005 to June 2019 were included in the current study. The pooled prevalence of NSIs was determined using a random-effects model with a 95% confidence interval. All analyses were performed using STATA version 11 (Stata Corporation, College Station, TX, USA). $P < 0.05$ was considered as a significant level. **Results:** The overall prevalence of NSIs among Iranian health-care personnel was about 50.8 (46.3–55.2). Furthermore, this prevalence in educational, noneducational, both noneducational and educational, and military centers was about 51.1 (46.5–57.7), 40.4.1 (34.2–46.6), 61.0 (32.1–89.9), and 41.5 (23.0–60.0), respectively. The prevalence of NSIs among the nurses was 51.1 (45.4–56.8), which was more than other groups. **Conclusions:** The prevalence of NSIs in Iranian hospitals was high. Since most of the injuries are caused by nurses, more intervention programs should be designed for nurses in these wards.

Keywords: Iranian hospitals, needlestick injury, prevalence

Introduction

A needlestick injury (NSI) is the penetration of the skin by a hypodermic needle or another sharp object, which has been in contact with blood, tissue, or other body fluids. These injuries caused by needles and sharp objects including medical devices that may have already been contaminated with infectious agents.[1,2] A NSI often occurs during activities such as blood transfusions, sampling, needle removal, collection of excreted materials, re-insertion of syringes, blood and body excretions, and secretions.[3] NSIs are considered as an occupational

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hazard for health-care workers.[4] The Centers for Disease Control and Prevention estimates that 385,000 health-care workers in America annually experience NSI.[5] Many countries, including Iran, try to prevent NSI, but despite safety precautions, NSIs still occur and inflict significant economic costs.[5] Several factors such as work-related stress, lack of skills, lack of caution, organizational factors, staff shortages, and fatigue are all contributing factors.[6] Cho *et al*., in an extensive review study, identified three main factors in NSIs that include engineering factors (e.g., design of devices and tools), organizational factors (such as reporting policies), and behavioral factors (such as needle reinsertion and disposal issues).[7] In addition to cost and concern, the NSI transmits blood-borne infections such as hepatitis B, hepatitis C, and HIV. Furthermore, more than 90% of infections caused by NSI among health-care workers occur in low-income countries.[5,8] The World Health Organization estimates that NSI is responsible for 40% of hepatitis B and C and 2.5% of HIV worldwide.[9] NSIs can cause diseases such as brucellosis, diphtheria, gonorrhea, and so on.[10] In addition to the risk of illness and death, it also causes psychological trauma and long-term disabilities, fear, stress, and anxiety.[3] Although it is important to report needlestick cases, in Iran, 59% of the NSI cases among health-care workers are not reported.[1] Due to the importance of NSI prevention among health-care workers, a pooled estimation of NSI prevalence is greatly warranted for planning effective preventive interventions among health-care workers. In spite of the presence of poled estimation of NSIs in published studies with different qualities in last years,[1] it needs to update previous information and consider new dimensions in the estimation of pooled measures. Thus, the present systematic review and meta-analysis aimed to update previous information in this issue and to estimate a pooled prevalence of NSIs among Iranian health-care workers.

Methods

Search strategy

This study reviewed data on the prevalence of NSIs in Iran during 2005–2019. In this review and meta-analysis, both local and international databases including Scopus, Medline, PubMed, ScienceDirect, Web of Science, Google Scholar, SID and Magiran were searched using related keywords. The search strategy for PubMed was as follows: "prevalence" OR "needle" OR "needle stick" OR "sharp injury" OR "Iranian personnel" OR "Iranian health care workers" OR "Iranian hospitals" OR "Iran." Similar specification was used for the other databases. Furthermore, a manual search of reference lists in the selected articles was conducted. In case of the unavailability of full texts or missed information, we attempted to obtain the full text or information from authors by E-mail. The Persian sites were also searched using the equivalent of these terms. Further, the sources of studied articles were reviewed to get access to other articles.

Eligibility criteria

Research papers conducted both in English and Persian on the prevalence of NSIs in Iran, between January 2005 and June 2019, were selected for the study. The inclusion criteria were as follows:[1] cross-sectional studies,[2] articles in Persian and English languages, and[3] articles with an appropriate methodological quality (quality score more than 7). Qualitative studies, reviews, letters to editors, and studies conducted on housekeeping staff were excluded from the study. More details are shown in Figure 1.

Risk of bias and quality assessment

The relevant articles were selected and their full texts were extracted. Each article was evaluated independently by two researchers. After selecting the studies, the related variables in each study including the study type, sample size, prevalence of needlestick, demographic characteristics of participants, time, and place of a study were entered in the predesigned Microsoft Excel datasheet.

In addition, to assess the risk of bias and the quality of studies, a 12-item checklist was used.[1] Using this checklist, the studies assessed different items including clarity in research question, selection of an appropriate approach for the research question, clarity in study context, role of the researcher, clarity in the sampling method, appropriateness of sampling method, clarity in methods of data collection, selection of an appropriate method of data collection, clarity in methods of data analysis, describing main characteristics of the understudy population, appropriateness of methods of data analysis, and reliability of findings. Items were reviewed for each study; one score was given for each item if the item met the criterion item. The minimum and the maximum scores by this checklist were 0 and 12, respectively.

Statistical analysis

The statistical heterogeneity was examined using the Chi-square test. $P < 0.05$ was considered as heterogeneity. Inconsistency

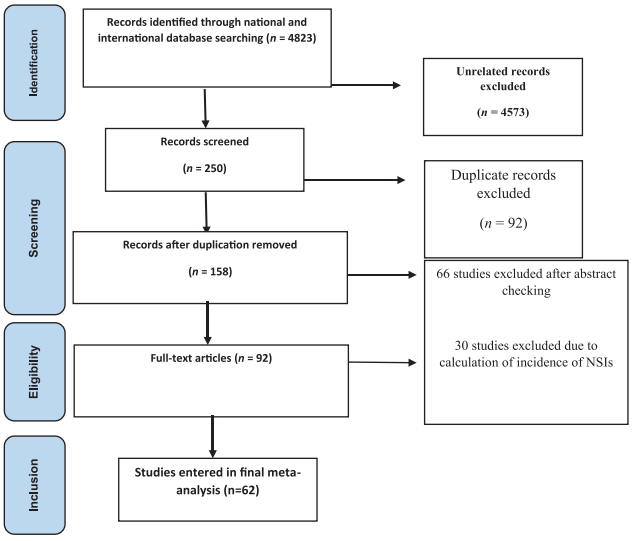

Figure 1: The process of surveying, screening, and selecting the articles according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement

between the studies was evaluated using the I^2 statistic; the higher amount of I^2 value indicates the real heterogeneity between studies. The range of this index is between 0% and 100%. Studies with an I^2 statistic of >75% are referred to as high heterogeneity.[11] We also estimated the between-study variance using the tau-squared (tau^2) statistic.[12] The Begg and Egger tests were conducted to assess the publication bias.[13,14] The final meta-analysis was conducted to estimate the pooled prevalence using a random-effects model[15] with a 95% confidence interval. We conducted subgroup analyses and meta-regression to assess factors related to the heterogeneity. All analyses were performed using the STATA version 11.0 software (Stata Corp, College Station, TX, USA). All statistical tests were two-tailed. For Begg and Egger tests, $P < 0.1$ was considered as statistically significant, but for other tests, $P < 0.05$ was considered as statistically significant.

Results

After risk of bias checking so, all of the 62 studies were checked using the mentioned checklist and none of the studies were excluded. Totally 4823 records were retrieved from January 2005 to June 2019 using the search strategy. In this study, 4573 of the records were removed because they were unrelated to the understudied issue. Furthermore, from a total of 4823 records, 92 duplicate records were excluded from the study. We also excluded 66 articles after screening their titles and abstracts. The full texts of the remaining 62 studies were screened, and 30 studies were excluded [Figure 1]. Finally, 62 full-text articles were included in this meta-analysis that the pooled prevalence of NSIs was estimated for them. The general characteristics of the studies are shown in Table 1. The total sample size was 19408 cases. In this study, 27 (43.5%) of the total studies had been performed on health-care workers and 24 (38.7%) and 11 (17.7%) of the studies had been conducted on nurses and students, respectively. The percentage of hepatitis B vaccination coverage in total personnel was 88.1% ± 11.8. All studies were performed on both men and women.

The lowest and the highest estimated prevalence rates of NSIs in studies were 17.2 and 89.3%, respectively. The overall prevalence of NSIs among Iranian health personnel was about 50.8 (46.3–55.2) (I^2 = 97.8%) [Figure 2]. The prevalence rates of NSIs in educational, noneducational, both noneducational and educational, and military centers were about 51.1 (46.5–57.7), 40.4.1 (34.2–46.6), 61.0 (32.1–

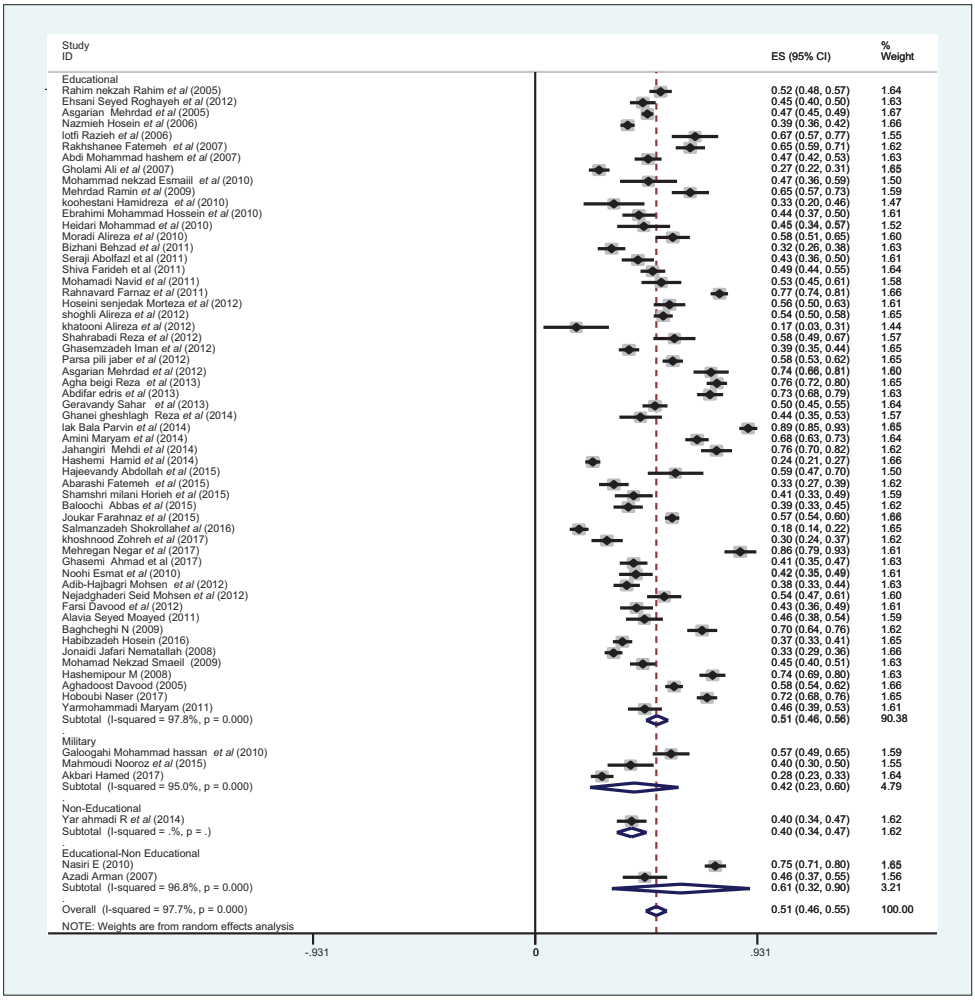

Figure 2: Prevalence of needlestick injuries in health-care workers of Iranian hospitals

Table 1: The list of included studies in the current meta-analysis

First author	Years	City	Sample size	Study design	Target personnel	Sharp objects	Damaged organ	Type of hospital	Working shift	Prevalence
Nejadrahim [16]	2005	Urmia	434	Cross-sectional	Nurses	Sharp object	Fingertip	Educational hospital	Morning	0.53
Seyyedeh[17]	2012	Tehran	328	Cross-sectional	Nurses	Needle	Fingertip	Educational hospital	Morning	0.45
Askarian[18]	2005	Fars Province	1555	Descriptive	Nurses	Sharp object	Fingertip	Educational hospital	Morning	0.47
Nazmieh.[19]	2006	Yazd	1020	Descriptive	Health-care workers	Needle	Fingertip	Educational hospital	Morning	0.39
Lotfi[20]	2006	Astara	90	Cross-sectional	Health-care workers	Needle	Hands	Educational hospital	Night	0.67
Rakhshani[21]	2007	Zahedan	231	Cross-sectional	Health-care workers	Needle	Fingertip	Educational hospital	Morning	0.65
Gholami[22]	2007	Urmia	400	Cross-sectional	Health-care workers	Needle	Fingertip	Educational hospital	Morning	0.27
Mohohammadnejad[23]	2010	Tehran	68	Cross-sectional	Nurses	Needle	Fingertip	Educational hospital	Morning	0.48
Mehrdad[24]	2009	Iran	144	Cross-sectional	Health-care workers	Sharp object	Fingertip	Educational hospital	Morning	0.65
Koohestani[25]	2010	Arak	52	Cross-sectional	Students	Needle	Fingertip	Educational hospital	Morning	0.33
Ebrahimi[26]	2010	Tehran	193	Cross-sectional	Health-care workers	Sharp object	Hands	Educational hospital	Circulator	0.44
Heidari[27]	2010	Shahrekord	77	Cross-sectional	Health-care workers	Sharp object	Hands	Educational hospital	Circulator	0.45
Moradi[28]	2010	Bahar Province	182	Cross-sectional	Health-care workers	Needle	Fingertip	Educational hospital	Circulator	0.58
Bijani[29]	2011	Ghazveen	246	Cross-sectional	Nurses	Needle	Fingertip	Educational hospital	Morning	0.32
Seraji[30]	2011	Arak	207	Cross-sectional	Students	Sharp object	Hands	Educational hospital	Morning	0.43
Shiva[31]	2011	Tehran	355	Cross-sectional	Nurses	Needle	Hands	Educational hospital	Circulator	0.49
Mohohammadnejad[23]	2011	Ghazveen	138	Cross-sectional	Nurses	Needle	Hands	Educational hospital	Circulator	0.53
Rahnavard[32]	2011	Rasht	500	Cross-sectional	Nurses	Sharp object	Fingertip	Educational hospital	Circulator	0.77
Senjedak[33]	2012	Birjand	214	Descriptive	Students	Needle	Fingertip	Educational hospital	Morning	0.56
Shoghli[34]	2012	Zanjan	600	Descriptive	Nurses	Needle	Fingertip	Educational hospital	Morning	0.54
Khatony[6]	2012	Kermanshah	29	Cross-sectional	Health-care workers	Sharp object	Hands	Educational hospital	Circulator	0.17
Shahrabadi[35]	2012	Tehran	120	Cross-sectional	Nurses	Sharp object	Hands	Educational hospital	Circulator	0.58
Ghasemzadeh[2]	2012	Bandar Abbas	500	Cross-sectional	Students	Needle	Fingertip	Educational hospital	Morning	0.39
Pili[36]	2012	Tehran	515	Cross-sectional	Health-care workers	Sharp object	Hands	Educational hospital	Circulator	0.58
Askarian[37]	2012	Shiraz	137	Cross-sectional	Students	Needle	Hands	Educational hospital	Morning	0.74
Aghabeigi[38]	2013	Ahvaz	385	Descriptive	Health-care workers	Sharp object	Fingertip	Educational hospital	Night	0.76
Abdifard[39]	2013	Kermanshah	258	Descriptive	Nurses	Sharp object	Hands	Educational hospital	Circulator	0.73
Geravandi[40]	2013	Tehran	344	Cross-sectional	Health-care workers	Sharp object	Fingertip	Educational hospital	Morning	0.50
Gheshlagh[1]	2014	Saqqez	120	Cross-sectional	Nurses	Needle	Fingertip	Educational hospital	Morning	0.44
Lakbala[41]	2014	Bandar Abbas	250	Cross-sectional	Health-care workers	Sharp object	Hands	Educational hospital	Circulator	0.89
Amini[42]	2014	Tehran	344	Cross-sectional	Health-care workers	Sharp object	Hands	Educational hospital	Circulator	0.68
Yarahmadi[43]	2014	Tehran	240	Cross-sectional	Health-care workers	Sharp object	Fingertip	Non-educational hospital	Circulator	0.40
Jahangiri[8]	2014	Shiraz	168	Cross-sectional	Nurses	Sharp object	Hands	Educational hospital	Circulator	0.76
Hashemi[44]	2014	Hamedan	700	Cross-sectional	Health-care workers	Sharp object	Hands	Educational hospital	Morning	0.24
Hajivandi[45]	2015	Booshehr	68	Descriptive	Nurses	Sharp object	Fingertip	Educational hospital	Morning	0.59

Contd...

Table 1: Contd...

First author	Years	City	Sample size	Study design	Target personnel	Sharp objects	Damaged organ	Type of hospital	Working shift	Prevalence
Abareshi[46]	2015	Sabzevar	223	Cross-sectional	Health-care workers	Sharp object	Fingertip	Educational hospital	Morning	0.33
Mahmoudi[47]	2015	Tehran	100	Cross-sectional	Nurses	Needle	Fingertip	Military	Morning	0.40
Milani[48]	2015	Tehran	150	Cross-sectional	Students	Needle	Fingertip	Educational hospital	Circulator	0.41
Balouchi[49]	2015	Kerman	240	Cross-sectional	Nurses	Needle	Fingertip	Educational hospital	Morning	0.39
Joukar[50]	2015	Rasht	1010	Cross-sectional	Nurses	Needle	Hands	Educational hospital	Circulator	0.57
Salmanzadeh[51]	2016	Dashte Azadegan	377	Cross-sectional	Health-care workers	Sharp object	Hands	Educational hospital	Circulator	0.18
Khoshnood[52]	2017	Kerman	190	Cross-sectional	Students	Needle	Fingertip	Educational hospital	Morning	0.30
Mehregan[5]	2017	Ahvaz	104	Cross-sectional	Health-care workers	Sharp object	Hands	Educational hospital	Circulator	0.86
Ghasemi[53]	2017	Tehran	278	Cross-sectional	Nurses	Needle	Hands	Educational hospital	Circulator	0.41
Nouhi[54]	2010	Kerman	190	Cross-sectional	Health-care workers	Needle	Hands	Educational hospital	Morning	0.42
Adib-Hajbaghery[3]	2012	Kashan	298	Cross-sectional	Health-care workers	Sharp object	Fingertip	Educational hospital	Morning	0.38
Nejadghaderi[55]	2012	Rafsanjan	186	Cross-sectional	Health-care workers	Needle	Fingertip	Educational hospital	Circulator	0.54
Farsi[56]	2012	Tehran	200	Cross-sectional	Health-care workers	Sharp object	Hands	Educational hospital	Circulator	0.43
Nasiri[57]	2010	Sari	352	Cross-sectional	Health-care workers	Sharp object	Hands	Educational hospital and non	Circulator	0.76
Akbari[58]	2017	Tehran	343	Cross-sectional	Nurses	Needle	Hands	Military	Circulator	0.28
Moayed[59]	2011	Tehran	160	Cross-sectional	Students	Sharp object	Hands	Educational hospital	Circulator	0.46
Baghcheghi[10]	2009	Arak	207	Cross-sectional	Students	Sharp object	Hands	Educational hospital	Circulator	0.70
Habibzadeh[60]	2016	Urmia	550	Cross-sectional	Students	Sharp object	Hands	Educational hospital	Circulator	0.37
Azadi[61]	2007	Tehran	111	Cross-sectional	Nurses	Needle	Hands	Education and non-education hospital	Circulator	0.46
Jafari[62]	2008	Tehran	613	Cross-sectional	Nurses	Sharp object	Hands	Educational	Circulator	0.33
Mohohammadnejad[23]	2009	Tehran	328	Cross-sectional	Nurses	Sharp object	Hands	Education hospital	Circulator	0.45
Hashemipour[63]	2008	Kerman	245	Cross-sectional	Students	Sharp object	Hands	Education hospital	Circulator	0.74
Aghadoost[64]	2005	Kashan	678	Cross-sectional	Health-care workers	Sharp object	Hands	Educational hospital	Circulator	0.58
Hoboubi[65]	2017	Ahvaz	416	Cross-sectional	Nurses	Needle	Hands	Educational hospital	Circulator	0.72
Yarmohammadi[66]	2011	Shahrod	191	Cross-sectional	Health-care workers	Sharp object	Hands	Educational hospital	Circulator	0.46
Abdi Mohammad Hashem[67]	2007	Jahrom	298	Cross-sectional	Health-care workers	Needle	Fingertip	Educational hospital	Morning	0.47
Galoogahi Mohammad Hassan[68]	2010	Tehran	158	Cross-sectional	Nurses	Needle	Hands	Military	Circulator	0.57

89.9), and 41.5 (23.0–60.0), respectively [Table 2]. The prevalence of NSIs among the nurses was 51.1 (45.4–56.8), which was more than other groups. Furthermore, the prevalence of NSIs among the night shift workers with a rate of 72.7 (64.2–81.2) was more than other groups. Moreover, sharp object and hand were the main cause of NSIs and the major organ involved in NSIs among Iranian health-care personnel [Table 2]. In terms of heterogeneity, the results of meta-regression showed that working shift had a significant effect on heterogeneity between the studies (*P*: 0.01), but other variables such as "year," "sample size," "target personnel," "damaged organ," "type of hospital," and "injury agent" had no significant effect on heterogeneity between the studies ($P > 0.05$) [Table 3].

The effect of "year" of study and "sample size" on determined prevalence is shown in Figure 3. According to these figures, the prevalence of NSIs was decreased by increasing the sample size. In addition, by increasing the year of the study, the prevalence of NSIs has been almost constant.

Discussion

Several studies have been recently conducted on the prevalence of NSIs, which have reported different results. This study showed the overall prevalence of NSI in Iranian health-care workers in Iran, which was 50.8% (46.3–55.2). This amount was higher than the prevalence of NSIs in Qatar (20.9%)[69] and Pakistan (94%).[70] According to another study, the prevalence of NSIs among Iranian health-care workers was about 42%.[1] The differences between the two studies may be due to different inclusion periods for the studies or different sample sizes.

The results of the present study showed that the prevalence of NSIs in educational hospitals was more than that in noneducational and military hospitals. This may be due to more patient referrals and overcrowding as well as staff fatigue in educational hospitals. Furthermore, this increased prevalence may be due to novice medical students with low training skills working in educational hospitals. Furthermore, the results indicated that the prevalence of NSIs in nurses was more than in other health-care workers. Similar to our findings, the systematic reviews conducted by Khraisat *et al*.,[71] Martins *et al*.,[72] and Voide *et al*.[73] showed that the prevalence of NSIs in nurses was higher than in other health-care workers in hospitals (64% vs. 44%).[71] Furthermore, in a study carried out by Yoshikawa *et al*., NSIs occurred in nurses three times more than in other health-care workers.[74] One explanation could be the fact that nurses are exposed to the injections more and are responsible for venipunctures, intravenous fluid administration, and other procedures that require the use of needles. Furthermore, they engage with direct contact with patients, high workload, and more exposure to sharp objects, inadequate staffing, and long working hours. Despite the findings of the present study, some studies such as Khatony *et al*.[6] and Lakbala *et al*.[41] showed that the prevalence of NSIs in operating room staff was more than nurses. Reviewing literature shows that the incident of NSIs is associated with three main factors: engineering (the form of devices), organizational (injury-reporting policies), and behavioral (recapping needles and disposing of them) factors.[7] According to the results, the cause of most injuries was reported to be behavioral factors such as recapping the needle.[40,75] Further, our findings indicated that the prevalence of NSIs was more among the night shift workers than in other groups.

Table 2: The prevalence of needlestick injuries according to different variables among Iranian health-care workers

Variable	Number of studies	Sample size	Prevalence (95% CI)	T^2	I^2 (%)	*P*
Type of hospital						
Educational	56	18104	51.1 (46.5-57.7)	0.03	97.8	<0.001
Noneducational	1	240	40.4 (34.2-46.6)	-	-	-
Educational and noneducational	2	463	61.0 (32.1-89.9)	0.04	96.8	<0.001
Military	3	601	41.5 (23.0-60.0)	0.02	95.5	<0.001
Target personnel						
Health-care workers	27	8241	50.9 (42.9-52.0)	0.04	98.5	<0.001
Nurses	24	8555	51.1 (45.4-56.8)	0.01	96.9	<0.001
Students	11	2612	49.5 (39.7-59.3)	0.02	96.3	<0.001
Type of working shift						
Night shift	2	475	72.7 (64.2-81.2)	0.002	62.7	<0.001
Morning shift	26	8907	44.7 (40.2-49.2)	0.01	95.0	<0.001
Circulatory shift	34	10026	54.1 (47.6-60.6)	0.03	98.0	<0.001
Damaged organ						
Fingertip	28	9316	47.5 (42.2-52.8)	0.01	96.6	<0.001
Hand	34	10092	50.8 (46.3-55.2)	0.04	98.3	<0.001
Injury agent						<0.001
Needle	29	8351	47.5 (42.7-52.3)	0.01	95.1	<0.001
Sharp object	41	11057	53.6 (46.8-60.4)	0.03	98.5	<0.001
Overall	62	19408	50.8 (46.3-55.2)	0.03	97.8	<0.001

CI: Confidence interval

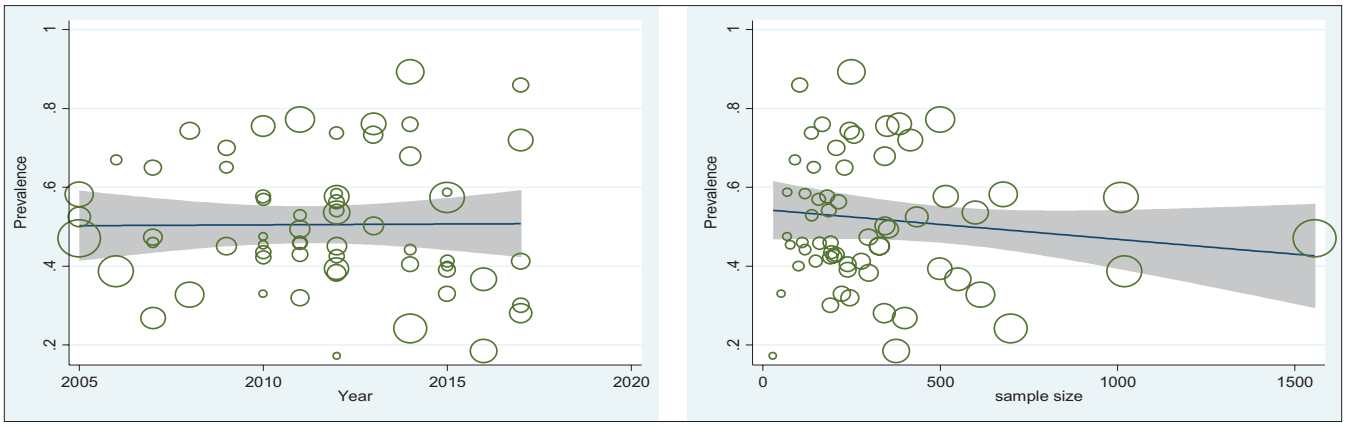

Figure 3: The effect of "year" and "sample size" of the studies on determined prevalence rates in Iran

Table 3: The results of univariate meta-regression in detecting the factors affecting heterogeneity

Prevalence	Coefficient	SE	*t*	*P>t*	95% CL
Years	0.001	0.01	−0.50	0.62	−0.02-0.01
Sample size	0.001	0.001	−0.67	0.50	0.00-0.001
Target personnel	−0.01	0.03	−0.23	0.82	−0.07-0.05
Damaged organ	0.06	0.04	1.42	0.16	−0.02-0.14
Type of hospital	−0.01	0.03	−0.43	0.67	−0.07-0.05
Working shift	0.10	0.04	2.55	0.01	0.02-0.18
Injury agent	−0.06	0.04	−1.47	0.15	−0.14-0.02
Constant coefficient	14.92	13.32	1.12	0.27	−11.77-41.62

SE: Standard error, CL: Confidence limit

Reasons for this include high fatigue, drowsiness, stress, and lack of staff during the night shift. The results of the present study are consistent with the results of some similar studies conducted by Salmanzadeh *et al*.[51] and Aghabeigi *et al*.[38]

Other findings of the present study showed that the sharp object and hand was the main cause of NSIs and the most damaged organ in NSIs among Iranian health-care personnel; these results are in line with the results of other studies conducted by Nejadrahim R, *et al*.,[16] Seraji *et al*.,[30] Rahnavard *et al*.,[32] Khatony *et al*.,[6] Pili *et al*.,[36] Aghabeigi *et al*.,[38] Abdifar *et al*.,[39] Lakbala *et al*.,[41] and Kebede *et al*.[4] Considering the effective factors and performing subgroup analysis, selection of an extended time interval for published articles, a large sample size, and a high number of selected studies were the strengths of the current study. Some limitations of the present study included inadequate information of some articles, irregular regional distribution of studies from around the country, small sample size, and unknown sampling method of some studies. Reporting an accurate estimate of this problem in Iran and comparing it with other countries through meta-analysis is highly recommended. We also suggest further studies to be conducted to investigate and compare the prevalence of NSIs in dentists, nursing and medical students, and housekeeping staff with other health-care workers.

Conclusion

The results of the present study showed a high frequency of NSIs. Lack of compliance with standards in using the equipment, wearing protective devices, and disposing of sharp objects may increase the risk of NSIs. NSIs and injuries due to sharp objects can be reduced by taking such measures as supplying standard and safe equipment, holding training courses regarding safety issues in the work environment, providing enough staffing, and cutting down working hours.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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