*Original Research*

# Assessment of knowledge and practice about needle stick injury among nurses at Nishtar Hospital in Multan; a hospital based cross-sectional study

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## Article Info.

## Abstract

Background: Needlestick injuries pose a risk to Health Care Workers and patients with whom they interact. These sharp injuries put nursing staff at high risk for occupational exposure to bloodborne pathogens (such as HBV, HCV, and HIV), which is continually adding to the burden of chronic liver disease in our country. HCWs must have comprehensive training in NSI prevention and management to avoid the spread of these infections. As nurses are most at risk for needle stick injuries, our goal was to evaluate and compare the degree of knowledge regarding safety measures to prevent needle stick injuries among nurses. Methods: This study design was cross-sectional and conducted between March and August 2022. The 360 female registered nurses engaged in direct patient care at Nishtar Teaching Hospital in Multan, were selected by using a simple random selection procedure. Data were gathered using a quantitative manipulative questionnaire. Data analysis was performed using SPSS 20.0. Nurses' needle-stick knowledge and safety procedures were correlated using the Chi-square test. The significance (p. value) was selected as 0.05.Results: In regard to needle stick injuries, the results indicated that 48.9% of nurses had enough knowledge, whereas 46.8% agreed with current practice. The majority of nurses (76.6%) know that a needle stick accident is a percutaneous injury, but only 57.8% recognize that it poses a danger for the spread of blood-borne diseases. Roughly half of the nursing workforce believes that needle stick casualties are inevitable. Questions such, as "Do needlestick injuries cause the spread of pathogens?" have a high Chi-square value because of the strong correlation between nursing expertise and age. The best category for knowledge and practice was found among nurses with 6-10 years of experience, suggesting that nurses' length of service to an organization shapes their expertise.Conclusion: The frequency of needle and sharp injuries may be decreased by educating people on how to avoid them by utilizing personal protective equipment while handling contaminated needles and sharp objects that contain blood or other bodily fluids.

**Introduction:** Needlestick injuries (NSIs) happen when a needle nicks or punctures the skin unintentionally, possibly exposing the sufferer to infectious blood or other body fluids [1]. Non-Sustained Injuries on the Job are a Worldwide Crisis in the Healthcare community [2]. Many hospital staff is vulnerable to bloodborne illnesses because of their line of work [3]. Hepatitis C (HCV), hepatitis B (HBV) and human immunodeficiency virus (HIV) are the diseases of the highest concern. Other blood-borne diseases that may be spread by NSI include Hepatitis G, Herpes Simplex 1, Group A Streptococcus, and Human Parvovirus B19 [4, 6]. A needlestick injury (NSI) affects an estimated three million healthcare workers worldwide each year [7, 8]. After sustaining these wounds, a person is at risk of contracting at least 20 different infections [9, 10]. NSI causes 25% of HBV and HCV, and 2.5% of HIV infections among healthcare workers worldwide [11–13]. In addition to having the greatest frequency of HIV-infected people throughout the globe, developing nations also have the highest rate of needlestick injuries [14]. In Japan, the yearly economic impact of NSI was estimated to be $302 million [15]. According to the CDC, 600,000 to 800,000 needle stick injuries occur yearly among 8 million US healthcare workers in hospitals and other settings [16], [17]. Needlestick injuries are common among nursing and dental students, yet they are not always reported. Workshops and seminars aimed at medical students, employees, and professionals regarding the risks of sharps injuries, blood-borne pathogens, and associated infections are crucial for lowering the rate at which these incidents occur [18, 19]. Due to illiteracy, poverty, misuse of sharp instruments, insufficient training, ignorance, and lack of disposal resources, developing countries have a greater rate of blood-borne infections from needle stick injuries than developed nations [20]. Pakistan is included in the Eastern Mediterranean Region D category of the World Health Organization's (WHO) regional categorization system. In comparison to the rest of the globe, the incidence of injuries caused by needle sticks is greatest in this particular location [21]. The incidence of needle stick injuries among healthcare workers in Pakistan was recently studied by R. Musroor and S. Saleem. The results suggest that 49.7% of respondents had needle stick injuries in the previous year [22]. Another research that was carried out on healthcare workers in the operating theatre of a private teaching hospital in Lahore revealed that 45% of them had been injured by needles or sharp objects in the course of their work [23]. A crucial component of occupational health practice is workplace safety. Thus, HCWs should always apply barrier precautions to protect skin and mucous membranes while handling blood or bodily fluids that need universal precautions [24]. In 2018, Bijani M, et al. published their randomized control trials in J Natl Med Associated. Needlestick injuries occur most often in the nursing profession and have a significant impact on the quality of life for nurses [25]. Students in nursing programs should be educated on the complexities of NSI and how to avoid its consequences. Few research has been conducted on needle stick injuries, particularly among nurses from this region (Pakistan) or underdeveloped nations [26–29]. The current gaps in the literature and nursing practices that may need additional attention may be highlighted by synthesizing the information on the prevalence and risk factors of NSIs, as well as the rate and causes of underreporting of NSIs among Nurses-HCWs in Pakistan. The purpose of the current research was to analyze the degree of knowledge and practice of needlestick injury prevention measures among nurses working in a governmental hospital in Multan city, Pakistan. The public health sector of the government will get vital baseline data from this research, which will be used for the development of policies to avoid needlestick injuries.

Objective: The objective of this research is to determine whether or not needle stick injuries are related to nurses' level of knowledge and adherence to best practices.

**Materials and Methods: Study Design:** This study design was cross-sectional and conducted between March and August 2022 among the female nurses engaged in direct patient care at Nishtar Teaching Hospital in Multan, Pakistan. A previously pretested structured questionnaire [30], [31] was used to gather the data. Before enrolling in the study, all participants were told about the study's design and provided written informed consent.

**Sample Size:** The sample size was calculated by the WHO calculator:

$$n \geq \frac{Z^2_{1-\alpha/2} \times p(1-p)}{d^2}$$

CI (1-α ) = 95%
P = 46%
d = 10%
n=360

This research included 360 nursing personnel and employed the "all available cases" sample strategy.

**Target population and Sampling techniques:** A simple random sampling method was applied.

*Inclusion Criteria*: The following criteria were used to include the nurses: (1) Subjects who were directly engaged in patient care. (2) Nurses with previous hospital experience.

*Exclusion Criteria*: Non-nurses, such as students and trainees and who were not directly engaged in patient care.

**Data collection procedure:** For an approach to protect health, a quantitative, instrumental questionnaire based on the health belief model and AIDE-MEMOIRE was employed with slight modification [32]. Data on nurses' awareness and prevention of needle stick injuries was gathered using a quantitative analytical question. In the form of a questionnaire, questions on demographics (such as age and working experience), any previous experiences with needlestick injuries, and variables impacting NSSI rates were included.

**Study variables:** Analysis of data was focused on the following comparisons:

Skills and understanding

To assess the risk category, demographic characteristics were compared.

**Data analysis:** Descriptive statistics (including demographics) were presented, and data analysis was performed using SPSS. Nurses' needle-stick knowledge and safety procedures were correlated using the Chi-square test. The T-test, and correlation test were used to assess the data. The significance (Probability –p) was selected as 0.05.

**Results:** This section includes two aspects of analysis. The first is demographic analysis, which provides information on two major demographic questions, and the second is descriptive analysis, which provides details on 12 questions of knowledge and 13 questions of practice, which are described using charts and tables.

**Demographic analysis:** The research included 360 nurses in total. Among them, 194 (53.9%) of the studied population falls under 26-30 Years as shown in figure 1. As a whole, the population studied had a mean age of 30.72 (7.02) years. The percentage of registered nurses with a total of experience is shown in Table 1. The greatest frequency was found among HCWs personnel with more than 5 years of experience, while the lowest frequency was seen among personnel with less than 1 year of experience. Only female nurses are included in the study in which 40.3% of female nurses had the experience of more than 5 years.

**Descriptive analysis:** This section provides a detailed study of the independent variable using tables and bars charts. Knowledge and practice are independent variables in this research.

**Knowledge of needle stick injuries:** Table 2 lists the 12 knowledge-related questions that were used to evaluate nurses' familiarity with needle stick injuries.

It was found that **49.1%** of nurses had adequate knowledge about injuries caused by needle sticks. In the case of percutaneous wounds, the greatest number of nurses with less than 10 years of experience in the organization (hospital) contribute to "good knowledge". When it comes to Recapping, the maximum number of nurses who contribute "good knowledge" under 6-10 years of stay in the organization are those who are younger. The maximum number of nurses under 6-10 years of service contribute to "poor knowledge" of the pathogen as shown in Figure 2. A maximum number of nurses under 6-10 years of service contributed to "good knowledge". To the greatest extent possible, PEP relies on nurses with less than ten years of experience in the organization to provide "good knowledge". Moreover "good knowledge" is most prevalent among SOAP nurses with tenures of 6-10 years. The maximum number of nurses under 6-10 years of service contribute to "good knowledge" of Tetanus vaccination. The maximum number of nurses under 6-10 years of service correlates to "poor knowledge" for one-handed Recapping. A large proportion of nurses with less than five years of experience in the organization contribute to "good knowledge" about HIV. However, when it comes to HCV, the maximum number of nurses who contribute "good knowledge" under 6-10 years of service are those who have been with the organization for less than 2 years.

**Practice/experience of needle stick injuries:** When it comes to providing care for patients, it is of the utmost significance that the nurses have sufficient information about injuries caused by needle sticks and apply the appropriate approaches. Table 3 presents the results of an evaluation in which nurses were asked a total of thirteen questions about their practices in order to determine the prevalence of needle-stick injuries.

According to the findings, **46.8%** of nurses are in agreement with the standard practice of addressing needle stick injuries. In terms of competence, the fewest disagreements were found among people aged 20–25. The majority of individuals who "agree" to remain with the organization for 6-10 years have worked using protective equipment. The most significant factor contributing to "disagree" among employees with less than six to ten years of service is an increase in responsibility. The maximum number of nurses under 6-10 years of service contribute to "agree" for nurse chance and for unavoidable as shown in Figure 3. Most nurses with less than ten years of experience in the organization strongly agree that the increased workload is a result of staffing shortages. Most nurses with less than five years of experience in the organization can "agree" on a treatment plan for HIV. With regards to critical care, the maximum number of nurses who have been within the organization for less than ten years is a major factor in the "disagree" category. The maximum number of nurses under 6-10 years of service contribute to "agree" for expertise. When it comes to safety gear, the maximum number of nurses who have been within the organization for less than ten years is what we consider to be "agree". The maximum number of nurses under 6-10 years of service can "agree" to gloves. Most nurses with less than ten years of experience in the organization contribute "strongly agree" with health education.

**Discussion:** The goal of the present study was to evaluate the nurses at Nishtar hospital Mullan's knowledge of needle stick injuries and post-needle stick injury care procedures/ practices. According to the findings of this research, almost 53.2% exhibited poor practice, and almost half of them (50.9% to be exact) exhibited an inadequate understanding of the preventative measures for needlestick injuries similar to previous research conducted in Yemen, which found 76.5% and 44%, respectively [28]. The absence of policies, training and ongoing education about needlestick injury prevention methods is related to the low level of practice and knowledge. Additionally, this is explained by the absence of safety equipment in hospitals. This outcome was consistent with the findings of the earlier research [33].

Based on the average ages of the women who participated there in this study, the age range for patients who met inclusion/exclusion criteria was 20 to 40 years old. The average age of individuals, as well as the upper and lower limits, might vary widely depending on who is included in the study. A total of 4 time periods, each lasting 5 years, were used to partition the data set. Most participants (53.9 percent) were between the ages of 26 and 30. About 5% of the participants were between the ages of 20 and 25, 23% were between the ages of 31 and 35, and 18% were between the ages of 36 and 40. None of the male population was included in this investigation. If men were included in the research, the findings might point to a gender gap in raising awareness of needlestick injury prevention methods among nurses. However, the findings of prior research conducted in Iraq revealed that there is no relationship between nurses' gender and their understanding of needlestick injury prevention techniques [34].

Participants' length of service with their current employer was measured in this research. The length of time subjects spend in the hospital after a needle stick injury might affect how they remember their treatment and the subsequent decisions made by medical staff. It may also affect how long an exposure lasts. In prior research, HCWs within five years of experience (45.0%) were more likely to develop

NSSIs [23] as reported. There were four groups of employees categorized in this research based on their length of service to the hospital: those who had been there for less than a year, between 1 and 5 years, 6 to 10 years, and more than 10 years. The majority of the participants in this research were in the 6-10 age range, according to the findings. Those who had been a member of the organization for over ten years made up 22.2%, followed by those who had been there for between one and five years (39.7%), those who had been there for below a year (1.4%), and those who had been there for only about a year (1.4%). The pilot study before this research includes a qualification evaluation of nurses for inclusion and exclusion. The majority of nurses (56.4%) had just the first level of nursing education, while the next highest percentages (27.2% and 16.4%) had the second and third levels.

Knowing how to treat injuries from needle sticks and putting that information into practice was the primary focus of this study. The nurses' age and years of experience were then compared to their needle stick knowledge and prevention practices. Tables 2 and 3 show the findings of a qualitative questionnaire intended to elicit information on injury awareness and prevention strategies. The percentage of respondents who correctly answered each of the 12 questions about needle stick injuries was calculated by adding up the percentages for each answer to the following categories: (a) NSI is an endovascular wound (76.7%), (b) NSI has the potential of transmission (36.9%), (c) recapping this same needle can protect the injury (59.4%), (d) it can spread pathogens (47.2%), (e) it must be reported (58.1%), (f) bleeding should be encouraged were 61.4%, (g) PEP should be used were 51.1%, (h) washing with soap were 55.3%, (i) recapping method was 56.1%, (j) it can spread HIV was 44.4%, (k) it can spread HCV was 47.8% and advanced engineering can reduce NSI was 44.4%. These percentages of individuals demonstrated great knowledge of the key variables correlated with the previous study [35]

The majority of respondents in our survey had a needle prick injury at some point in their lives, suggesting that basic safety precautions were not being followed while dealing with patients. The prevalence of NPIs in Nigeria is exacerbated by the country's lax approach to safety procedures and the inexperience of its medical staff [36]. Similar to what was shown by Sadoh et al., [37] we found that the percentage of NPIs was greater for nurses than for other HCWs. Despite their superior knowledge and training, nurses often fail to exercise enough care when dealing with potentially harmful circumstances. There was a comparison made between these findings and the participants' ages as well as their length of service to the organization. An individual's experience and age in the organization both had a role in how well they understood the risks of needle stick injuries [38].

Nurses who have been with the present organization for more than a year are more likely to have extensive knowledge of wound care than their less experienced colleagues. The findings showed that the percentage of participants with adequate knowledge regarding needle stick injuries rose in line with the length of their employment with the organization. Participants' knowledge was also examined across age groups, with a higher correlation found between older participants and a

deeper understanding of the risks associated with needle stick injuries. The table provides *P* values that are less than 1.00 for each question that examines knowledge as a function of age and length of stay. The findings here are consistent with those of prior research [30].

There were 13 items on the Likert scale questionnaire that looked at participants' needle-stick-injury attitude, and the findings revealed a good correlation between participants' knowledge and their actual practices. We evaluated the prevalence of needle stick injuries across age ranges and years of service in the organization. With longer tenure in the group, it was clear that participants adopted more preventative measures for needle sticks. The table provides *P* values that are all only about 1.00 for the correlation between regular practice and length of service to the organization. All of the Significance levels for the various age ranges and clinical settings are likewise included in the table, and they all are almost less than 1.00.

There was a strong correlation between what people knew and what they did. Throughout the research, it becomes clear that theory and practice are mutually informing one another. Putting what you learn into practice has a chi square value of 0.05, meaning it is statistically significant. Knowledge and practice were shown to have a favorable and statistically significant link. Therefore, knowledge is a crucial factor that considerably influences performance in actual settings. Research demonstrates that nurses are not adequately trained to prevent needle stick injuries. Injuries caused by needle sticks are a major warning sign of subpar injection safety standards among healthcare providers. Therefore, it is crucial to keep in mind that even with appropriate training and education, understanding and adherence to taught practice may still be lacking as a result of poor information retention [20].

The present research was a success in many respects; the primary objective was met, the planned number of patients (360) was enrolled, and enough progress was made toward the secondary objective (excellent follow-up rates). However, the present research has some drawbacks. The research period was too brief. The sample size was insufficient to draw any firm conclusions about the population as a whole. The questionnaire relied heavily on self-report measurements, which are highly subject to bias.

**Conclusion:** More than half of nurses seem to have poor knowledge of current practice guidelines for preventing needle stick injuries. Nurses' familiarity with the prevention of needle stick injuries is related to their age and the length of time they have worked for the same organization. Nurses' knowledge and abilities improved most rapidly between the ages of 6 and 10, suggesting that length of service had an effect on both.

**Recommendations:** Good practices or skills are crucial in any healthcare environment; thus, nurses must be aware of needle stick injuries. In addition to enhancing the understanding of other healthcare professionals, the research aids hospital authorities in developing new standards and regulations for the highest quality patient care.

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**Table. 1.** Experience of studied participants

| Stay in organization | Frequency (*n*) | Percentage (*n*%) |
|---|---|---|
| < 1 Year | 6 | 1.7 |
| 1-5 Year | 131 | 36.3 |
| 6-10 Year | 145 | 40.3 |
| >10 Year | 78 | 21.7 |
| Total | 360 | 100.0 |

**Table. 2.** Evaluation of knowledge concerning needlestick injuries

| Questions | Variable | Frequency (*n* = 360) | Percent (*n*%) | P.Value |
|---|---|---|---|---|
| One kind of percutaneous wound is a needle stick injury. | Good Knowledge | 276 | 76.7 | 0.671 |
| | Poor Knowledge | 77 | 21.4 | |
| | No Knowledge | 7 | 1.9 | |
| | Total | 360 | 100.0 | |
| The risk of catching a blood borne disease from a needle poke. | Good Knowledge | 133 | 36.9 | 0.02 |
| | Poor Knowledge | 208 | 57.8 | |
| | No Knowledge | 18 | 5.0 | |
| Simply capping the used needle may prevent needle stick accidents. | Good Knowledge | 214 | 59.4 | 0.307 |
| | Poor Knowledge | 115 | 31.9 | |
| | No Knowledge | 31 | 8.6 | |
| Needlestick injuries are a leading cause of the spread of many contagious diseases (pathogens). | Good Knowledge | 170 | 47.2 | .000 |
| | Poor Knowledge | 173 | 48.1 | |
| | No Knowledge | 17 | 4.7 | |
| Needlestick injuries are mandatory to report once they occur. | Good Knowledge | 209 | 58.1 | 0.138 |
| | Poor Knowledge | 136 | 37.8 | |
| | No Knowledge | 15 | 4.2 | |
| At the site of the injury, bleeding ought to be stimulated. | Good Knowledge | 221 | 61.4 | 0.053 |
| | Poor Knowledge | 107 | 29.7 | |
| | No Knowledge | 31 | 8.6 | |
| Within an hour after being exposed to a needle stick injury, PEP should be initiated. | Good Knowledge | 184 | 51.1 | 0.072 |
| | Poor Knowledge | 156 | 43.3 | |
| | No Knowledge | 20 | 5.6 | |
| Soap and water should be used to clean the affected area. | Good Knowledge | 199 | 55.3 | 0.106 |
| | Poor Knowledge | 122 | 33.9 | |
| | No Knowledge | 39 | 10.8 | |
| Is tetanus vaccination required for the person who suffered a needle stick injury? | Good Knowledge | 202 | 56.1 | 0.276 |
| | Poor Knowledge | 126 | 35.0 | |
| | No Knowledge | 32 | 8.9 | |
| One hand should be used to recap the needle while the other holds the needle. | Good Knowledge | 160 | 44.4 | 0.247 |
| | Poor Knowledge | 146 | 40.6 | |
| | No Knowledge | 54 | 15.0 | |
| When a person has a needle stick injury, is there a chance that they might get HIV? | Good Knowledge | 172 | 47.8 | 0.028 |
| | Poor Knowledge | 130 | 36.1 | |
| | No Knowledge | 58 | 16.1 | |
| After a needle stick injury, is the HCV vaccination available and necessary? | Good Knowledge | 160 | 44.4 | 0.201 |
| | Poor Knowledge | 150 | 41.7 | |
| | No Knowledge | 50 | 13.9 | |

**Table. 3.** Evaluation of Practice concerning needlestick injuries

| Questions | Variable | Frequency (*n* = 360) | Percent (*n*%) | P.Value |
|---|---|---|---|---|
| Every nurse is at risk of suffering a needle stick injury. | Agree | 291 | 80.8 | 0.697 |
| | Strongly agree | 42 | 11.7 | |
| | uncertain | 13 | 3.6 | |
| | Disagree | 14 | 3.9 | |
| | Strongly disagree | 0 | -- | |
| | Total | 360 | 100.0 | |
| For nurses, needle stick injuries are unavoidable. | Agree | 188 | 52.2 | 0.008 |
| | Strongly agree | 63 | 17.5 | |
| | uncertain | 30 | 8.3 | |
| | Disagree | 65 | 18.1 | |
| | Strongly disagree | 13 | 3.6 | |

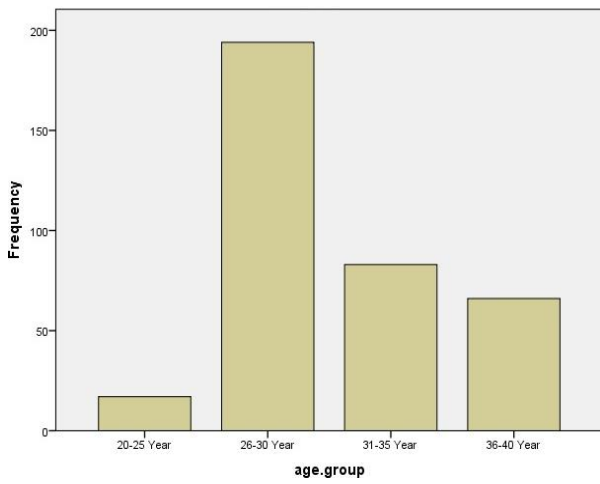| | | | | |
|---|---|---|---|---|
| Needle stick injuries can happen when workload gets higher. | Agree | 89 | 24.7 | 0.004 |
| | Strongly agree | 89 | 24.7 | |
| | uncertain | 45 | 12.5 | |
| | Disagree | 120 | 33.3 | |
| | Strongly disagree | 16 | 4.4 | |
| Nurses who contract HIV should consider leaving the profession. | Agree | 181 | 50.3 | 0.079 |
| | Strongly agree | 42 | 11.7 | |
| | uncertain | 31 | 8.6 | |
| | Disagree | 104 | 28.9 | |
| | Strongly disagree | 2 | .6 | |
| Because even a minor slip up in handling a blade can result in a serious infection, it is imperative that people always take the necessary safety precautions when working with blades. | Agree | 189 | 52.5 | 0.009 |
| | Strongly agree | 63 | 17.5 | |
| | uncertain | 30 | 8.3 | |
| | Disagree | 65 | 18.1 | |
| | Strongly disagree | 13 | 3.6 | |
| Needlestick injuries may lead to potentially fatal infections. | Agree | 89 | 24.7 | 0.003 |
| | Strongly agree | 89 | 24.7 | |
| | uncertain | 46 | 12.8 | |
| | Disagree | 120 | 33.3 | |
| | Strongly disagree | 16 | 4.4 | |
| In spite of the potential for infection, harm can be avoided through competence and assurance. | Agree | 178 | 49.4 | 0.008 |
| | Strongly agree | 115 | 31.9 | |
| | uncertain | 33 | 9.2 | |
| | Disagree | 33 | 9.2 | |
| | Strongly disagree | 1 | .3 | |
| Unfortunately, we have not been educated on how to prevent needle stick injury. | Agree | 197 | 54.7 | 0.127 |
| | Strongly agree | 96 | 26.7 | |
| | uncertain | 35 | 9.7 | |
| | Disagree | 32 | 8.9 | |
| | Strongly disagree | 0 | -- | |
| Lack of protective clothing/ equipment might increase needle stick injuries. | Agree | 213 | 59.2 | 0.347 |
| | Strongly agree | 94 | 26.1 | |
| | uncertain | 22 | 6.1 | |
| | Disagree | 30 | 8.3 | |
| | Strongly disagree | 1 | .3 | |
| Handling a needle without gloves is preferable than wearing gloves. | Agree | 136 | 37.8 | 0.139 |
| | Strongly agree | 88 | 24.4 | |
| | uncertain | 47 | 13.1 | |
| | Disagree | 86 | 23.9 | |
| | Strongly disagree | 3 | .8 | |
| Reporting needle stick injuries is useless. | Agree | 190 | 52.8 | 0.052 |
| | Strongly agree | 95 | 26.4 | |
| | uncertain | 27 | 7.5 | |
| | Disagree | 39 | 10.8 | |
| | Strongly disagree | 9 | 2.5 | |
| Every health-care professional should be vaccinated against hepatitis B. | Agree | 125 | 34.7 | 0.295 |
| | Strongly agree | 87 | 24.2 | |
| | uncertain | 30 | 8.3 | |
| | Disagree | 93 | 25.8 | |
| | Strongly disagree | 25 | | |
| Students and healthcare personnel may prevent needle stick injuries by learning about universal precautions for NSIs. | Agree | 105 | 29.2 | 0.032 |
| | Strongly agree | 105 | 29.2 | |
| | uncertain | 22 | 6.1 | |
| | Disagree | 47 | 13.1 | |
| | Strongly disagree | 81 | 22.5 | |

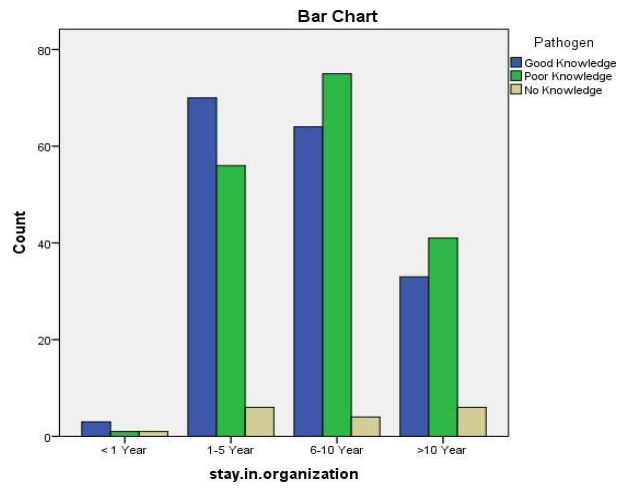**Fig. 1.** Bar chart for the age group of nurses



**Fig. 2.** Knowledge of nurses under 6-10 years of service for pathogen
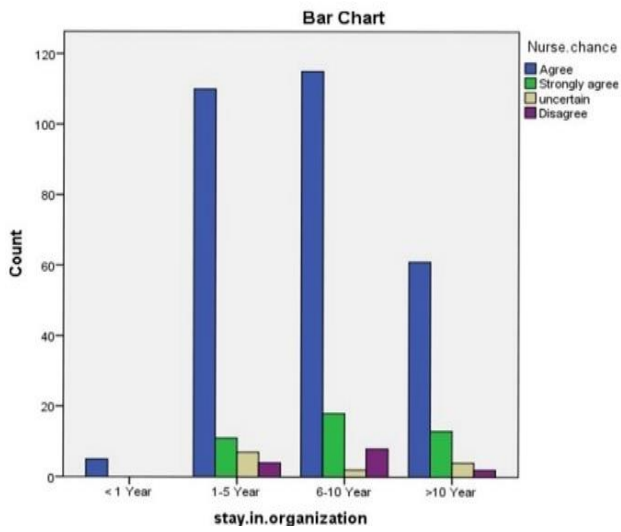




**Fig. 3.** Practice of nurses under 6-10 years of service for needle stick injuries.