

Magnitude and Factors Associated with Needle Stick Injuries among Nurses at Yekatit 12 Hospital Medical 2021

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Abstract Background of the study: Needle stick injury means penetrating stab wound, introducing blood or other potentially hazardous material into the body of healthcare worker, during the performance of their duties, by a needle or sharp instruments, including, needles, lancets, scalpels, and contaminated broken glass. **Objective of the study:** To assess the magnitude and associated factors for needle stick injury among nurses in Yekatit 12 hospital medical college, Addis Ababa, Ethiopia, in 2021. **Method:** Hospital based cross-sectional study was conducted to assess the magnitude and associated factors for needle sticks injury among all nurses in Y12HMC from November 2020 to march 2021. A pre-tested structured questionnaire was employed to obtain the necessary information after getting both written and verbal consent from the concerned bodies and study subjects. Data was entered and cleaned using EPI INFO and analyzed using SPSS statistical package. The final result of this study will be presented and disseminated to Yekatit 12 hospital medical college and other concerned body. **Result:** A total of 257 questionnaires were returned giving a response rate of 86.5%. Ninety-six 96 (37.4%), had sustained needle stick injury during the one year prior the survey, of which 31(12.1%) admitted experiencing at least one needle stick injury in previous one month. This means that ONE THIRD of nurses working in Yekatit 12 hospital medical college had get injury to NSI in one year duration. Independent risk factors for experiencing needle stick injuries including age, sex and departments. Female sex were two times more likely to be injured by NSI than male sex AOR; **2.2 (95% CI, 1.0, 4.1)**. nurses less than 25 yrs of age four times more likely to get injury by NSI than those of age above 40yrs; AOR = 4.0 (95% CI; 1.7, 5.2). Staffs working in maternity unit were 99.1% less probably of having needle stick injury than those working in other unit. AOR =0.09 (955 CI, 0.04, 0.23) **CONCLUSION AND RECOMMENDATION:** The survey determined the very important significant association factors to needle stick injury depended on age, working departments, extended working hours and low experiences which directly related skill development. And also, over use of injection, unsafe practices and unfavorable environment are factors associated to needle stick injury. Training concentrating on injection safety, guide line on universal precaution and monitoring such implementation is much needed.

Keywords: *Magnitude and Factors Associated with Needle Stick Injuries*

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1. Introduction

1.1. Background of the Study

Needle stick injury means penetrating stab wound, introducing blood or other potentially hazardous material into the body of healthcare worker, during the performance of their duties, by a needle or sharp instruments, including, needles, lancets, scalpels, and contaminated broken glass [1].

Needle-stick injury (NSI) is a major occupational health and safety issue faced by healthcare professionals globally [2]. Globally, more than 35 million Health Care Workers face the risk of sustaining a percutaneous injury with a contaminated sharp object every year [3].

Needle-stick injuries have been widely recognized as a source of exposure to blood borne pathogens for workers in healthcare occupations [4]. Nurses are at risk of many infections at their workplace through airborne, blood-borne, fecal-oral transmission, and direct contact and their exposures to blood-borne pathogens have received increased attention since the HIV pandemic [4]. The transmission of blood-borne pathogens may occur through percutaneous and mucocutaneous routes, and sometimes, through exposure to other body fluids [5]. Needle stick injuries are the commonest route by which more than 20 blood borne pathogens that can be transmitted from it, including hepatitis B, hepatitis C, and human immunodeficiency virus [6].

Such infections serve as high occupational risks and threats to health professionals especially to nurses who are prone to it, mostly where basic rules of occupational safety and health are not implemented [6]. The risk of contracting acute hepatitis C infection due to a needle stick injury is estimated to range from 1% to 5 % and the risk of transmission of HIV following a needle injury is approximately 0.3%, compared with 3% for HCV and 30% for HBV [7].

1.2. Statement of the Problem

In a UK report, 37% of nurses reported that they have sustained a needle-stick injury at some stage during their career [8]. In Australia, the rate of reported needle-stick injuries is 1 in 5 occupied beds per year which equates to an annual sharps-related injuries incidence of 47,000 [8].

In developing countries, the incidence of needle stick injury is much more than developed countries, in Iran alone; the reported incidence of NSIs in nurses is 63.3% [9].

According to a study conducted in Taiwan, the most important risk factors were recapping needles and handling needles without using gloves [10]. According to study done in Kenya in tertiary hospital, Maximum number of Needle stick injuries 32.1% occur at the time of recapping the syringe; followed by 24.5% while opening syringe cap; 18.9% during filling the injection; 9.4% while giving injection to the patient; 5.7% while drawing of blood; and 9.4% due to suturing and, higher rates of percutaneous injuries were observed among nurses (50%), during stitching (30%), and in obstetric and gynecologic department (22%) [11]. According to research done eastern Gojjam zone of Amhara regional state, 212 (49%) nurses faced needle stick injuries [12]. Study done in khanevadah hospital in Tahrán shows the

finger was the most commonly injured site (81%), while the eye mucosa was the most frequently exposed to splashes (56%) [13]. Lack of knowledge of risk factors and circumstances in which these exposures occur in hospitals as well as lack of training of infection prevention and standard universal pre cautions contributes to needle stick injuries [14]. Therefore, assess the magnitude and associated factors for needle stick injury is essential for proper preventive measures and educational programs.

1.3. Significance of the Study

The persistence of preventable, life-threatening occupational hazard particularly needle stick injury at work place is a failure to given attention. This research is intended to generate base line information on the possible determinants of needle stick injuries and its prevalence.

There is a paucity of information in Ethiopia particularly in Addis Ababa describing occupational injuries by needle sticks and consequently exposures to Blood and Body Fluids and associated factors. Credible evidence is paramount in designing strategies and in taking action-based interventions. Such information would also be useful in identifying any gaps that might need further attention in the implementation of infection control practices for different organizations and in providing feedback to these groups about improving safe practices. Finally, it will provide essential baseline data for developing and testing low-cost training interventions in standard precautions for nurses.

1.4. Objective of the Study

1.4.1. General Objective

To assess the magnitude and associated factors for needle stick injury among nurses in Yekatit 12 hospital medical college, Addis Ababa, Ethiopia, in 2021.

1.4.2. Specific Objectives

- To identify the magnitude of needle stick injury in Yekatit 12 hospital medical college, in 2021.
- To assess the associated factors for needle stick injury in Yekatit 12 hospital medical college, in 2021.

2. Literature Review

2.1. Prevalence of Needle Stick Injuries

Centers for Disease Control and Prevention (CDC) estimates that approximately 385,000 needles and sharps-related injuries occur every year to nurses in the United States. Nurses have the highest rate of needle stick injury among health care workers [15].

It is estimated in USA that the reported incidence of needle stick injury in nurses is currently 16.3% [16]. In United Kingdom, nearly 48% of the nurses have reported that they have been stuck by a needle or sharp used on a patient at some point in their careers this is one in ten respondents (10%) had been stuck by a needle or sharp in the last year [17]. In Australia the reported incidence of needle stick injury during the previous 12 months in nurses is 13.9 % [18].

Incidence of needle stick injuries is also alarming in developing countries, in a study of injection safety conducted in Saudi Arabia, it was noted that needle stick injury in the previous one year was reported was 16.5% of nurses (0.21 and 0.38 injuries/person/year respectively) [19].

In a recent survey of 296 Health Care Workers in India, reporting Needle Stick Injuries (NSIs) in India it was noted that it was 28.4% in nurses, 9.1% in nursing students [20]. In Pakistan the reported incidence of needle stick injuries is 16.3% in nurses [20].

Needle stick injury exposure in African countries is higher than elsewhere and a significant public health issue due to the fear of occupational infections faced by ill paid, ill protected and overworked health-care workers [21]. Similar studies in Ethiopia show that 32% of the needle stick injuries were reported in the Sidama zone, 31% in north western Ethiopia and 66% in 52 of the health facilities [22].

2.2. knowledge, Attitude and Practice of Nurses

According to study done in Changsha, China Needle stick injuries in nurses at work shows Out of 77 nurses, 38 (49.4%) reported needle stick injury to the higher officials whereas 39(50.6%) never reported it, Approximately 59.7% of the nurses (46 out of 77) had received sharp management course and the other 40.3% (31) did not .Seventy-five (97.2%) of the nurses reported that they had needle cutter available at their work place and 2 (2.6%) reported that needle cutter was not available at their workplace. Only 25 (32.4%) named Hepatitis B alone, 18 (23.4%) named Hepatitis B and C, and 34 (44.2%) knew about HIV inclusion to the list, only 27 (35.1%) of the participants used to wear gloves and 50 (64.9%) did not wear gloves while injecting the patient. It was asked from the nurses that have they ever got screening for the infectious diseases which can be transmitted by needle stick injuries and it was noted that 56 (72.7%) have screened themselves for Hepatitis B, 53 (68.8%) for Hepatitis C and only 37 (48%) have got screening for HIV. the safety measures taken by these nurses after needle stick injury, it was noted that 67 (87.1%) of the nurses washed the specific area after needle stick injury and 92.2% nurses cleaned the area with a spirit swab. Plaster was put on the wound by 75.3% nurses. out of all 46.8% of the nurses went for screening after a needle stick injury and 53.2% did not go for further investigation. When nurses were inquired about their vaccination status, it was noted that only 57 (74.1%) of the nurses were vaccinated against HBV and 20 (25.9%) were not vaccinated against HBV[23].

Similar study done in Nigeria Regarding awareness towards NSIs, 32.5% knew that only HBV could be transmitted via contaminated needles while 23% knew about both HBV and HCV and 44.2% were aware that HBV, HCV and HIV all could be transmitted through infected needles. Overall knowledge regarding the potential transmission of Hepatitis B, C and HIV was high among the participants, in this study, 64.9% nurses failed to use gloves while injecting which is comparably high to Canadian rates where failure to wear gloves by nurses constituted only 17%[24]. It is important to note that the chances of getting punctured while handling trash is decreased considerably with the use of needle cutter, as our study showed the availability of needle cutters at working place was 97%[24].

A randomized controlled trial study done on needle stick injury indicated, one hundred ninety-five (45.14%) of the workers were satisfied by their job and (55.8%) have job related stresses. From the total study participants, 397 (91.9%) believe that needle stick and sharp injury is a preventable problem and 403(93.3%) believes that sharp and needle stick injury have high risk of infectious diseases. Two hundred sixty-one (60.4%) used Personnel protective equipment and/or gloves when it was necessary [25].

2.3. Associated Factors of Needle Stick Injuries

2.3.1. Socio Demographic Factors

The socio-demographic characteristics include factors like age, sex, duration of exposure, service year or experience and etc. A study done in South Africa reported that less than 23 years age of respondent are more likely to be injured than higher age, and more female than male also with needle stick injuries. The lower the service year (less than 5Yrs), is the higher likely to be injured (64%) by NSI. [26] In other study in Pakistan reported that those health professionals less than five years are more likely to be injured than those experienced health care workers. Professionally, more nurses are likely to be injured than others health professions. [27]

2.3.2. Work Environment Related Factors

Medical workers directly involved in treating patients face a great risk of needle stick injury which consequently acquiring blood born infections from the work place. One study witnessed that the risk activity in work places are 56% recapping, 35.5% transfusion and 74.8% of inadequate waste disposal are directly related to needle stick injury. Health care workers in Hospitals with the most favorable working environment were one third less likely to be injured than those in the opposite situation. [28] In other study related to work environment factors reasoned injection and sample taking were the most causes of needle stick injury (42%), followed by two handed recapping used after injection. [27] In Ethiopia a national survey done in 2000 by JSI documented that only 48% of them had at least one steam sterilizer. 38% of Health Facilities sharps were disposed in an open ground or other unprotected field... Majority of health facilities had open waste basket for sharps disposal that were overflowing. 21% of the facilities dump sharps in unsupervised area. [29] In 72% of the health facilities, collection of sharps was with either open, non-leak or puncture proof containers. In 14 (35%) of the health facilities, dirty syringes and needles were observed disposed in a way that exposed the health workers and the community for injury or other condition.

2.3.3. Behavioral Factors

Extended hours of working was associated with the increasing the chance of getting NSI; only 23% of health providers and 4.2% of the waste handlers are trained in injection safety practices and infection prevention. In Middle East 15 to 19%, in West Africa 15% and in Sub-Saharan Africa more than 50% of injections were given without any formal training. , recapping collection cause b/n 5% and 28% of needle stick injuries. [29]. The sudden movement of a patient during blood sampling or during the

intramuscular or venous injection of drugs (34.4%); during suturing of episiotomy or obstetrics and gynecology (26.2%); during the handling of specimens (21.5%); during recapping of samples (13.6%); during the handling and collection of waste (10.1%); and due to a lack of PPE (15.5%). [30] A study surveyed in Nigeria revealed that 81.3% of the respondent recapped the used syringe.

2.4. Conceptual Frame Work

The factors associated to work place injury like needle

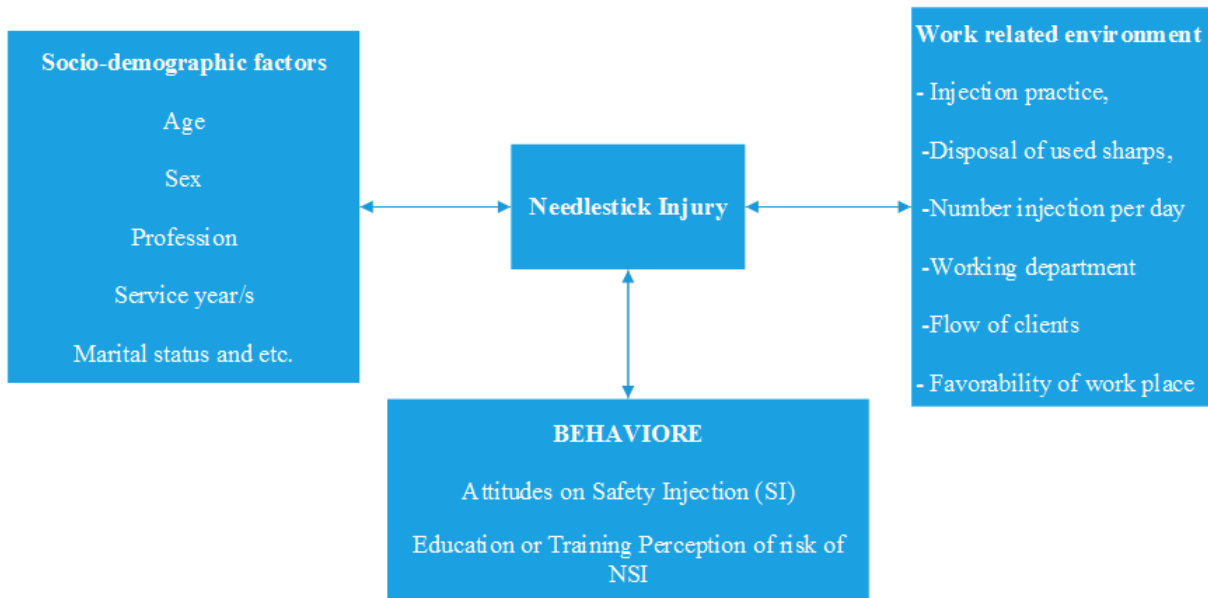


Figure 1. Conceptual frame work of the study

3. Methods and Material

3.1. Study Area and Period

3.1.1. Study Area

The study was conducted at yekatit 12 hospital medical college in Addis Ababa.

Yekatit 12 hospital medical college is teaching hospital under Addis Ababa city administration health bureau. This Hospital is known by plastic surgery, pediatric cases and ENT (ear, nose and throat). It has more than 45 case. The hospital has 1134 workers of which 344 are nurses according to human and resource bureau report 2017GC.

3.1.2. Study Period

was from Nov 30, 2020 to Mar 30, 2021.

3.2. Study Designs

- Hospital based cross-sectional study was conducted to assess the magnitude and associated factors for needle stick injury among all nurses in Y12HMC.

3.2.1. Target Population

- Were all nurses' professionals in Addis Ababa.

stick injuries are classified as socio-demographic factors like, sex, age, type of profession, service year or experiences and etc., work environment factors are like; injection practice, disposal of used sharps, department, client situation, favorability of work place and etc. and behavioral factors are like; workers' perception risk of NSI, attitudes of workers and etc. The three factors are interrelated to affect one another. The following figure shows the interrelation between occupational NSI (the independent) variables in detail and it is adapted from Ethiopian nurse association.

3.2.2. Source Population

- Were all nurses' professionals working in Yekatit 12 hospital medical college.

3.2.3. Study Population

- Were all nurses 'professionals working in Yekatit 12 hospital medical college Available during study period.

3.2.4. Inclusion Criteria

- Volunteer to participate in the study
- Available during study period

3.2.5. Exclusion Criteria

- All nurses who are not willing to participate in the study
- All nurses who are not available during study period.
- All nurses and who are not working in yekatit 12 hospital medical college.

3.3. Sample Size Determination

3.3.1. Sample Size

- All nurses professionals working in Yekatit 12 hospital medical college.

3.4. Data Collection Instrument

- Data collection instrument was structured questionnaire which was prepared English. It was translated into Amharic and back to English.
- A questionnaire was adopted from different literatures and used to explore the objective of the study. The questionnaires were pre-tested on 10% nurses similar with the study subject's nurses working in Minilik Hospital to find if there is any confusion. It takes about 20 minutes.

3.5. Data Collectors

Two BSc nurses from selected hospital who were not participate in the study and work in the hospital was recruited for three months and two days training were given on the data collection and interview techniques by the primary investigators.

3.6. Data Quality Assurance and Management

Data assurance was applied from the very beginning by review prior study and adopted from WHO/ICN, CDC tool kit, giving training for the data collecting group, pretested by taking 10% of the study sample and close monitoring of the activity of data collectors and supervisors by principal supervisor. The collected data was checked for completeness, accuracy and clarity. Codes were given to the questionnaire and participant during data collection so that any identified errors could get traced back using the codes. Each filled questionnaire was checked and reviewed for completeness by supervisor and principal investigator, the necessary feedback was given to the data collectors in the next morning.

3.7. Data Processing and Analysis

Data was first checked manually for completeness, coded and entered in to computer using Epi Info 3.5.3 and transferred to SPSS version 20. After completion of data entering, it was cleaned before analysis. SPSS loaded and recoded, at hand data undergone description of frequency, mean, median, proportion and SD. Logistic regression analysis was carried out at two levels. Bi-variate and multi-variate analysis was done between independents and dependent variables to identify independent factor/s. During the analysis p-value and/or 95% CI for OR were used in determining the significance of association; p-value less than 0.05 or CI not contain 1 was taken as significance of association. Result was presented in text, table and graphs.

3.8. Study Variable

3.8.1. Dependent Variable

- The dependent variable is needle stick injury (NSI).

3.8.2. Independent Variable

The independent variables are unsafe injections (recapping, bending needle, reusing syringes and etc.) and unsafe

clinical practices (more injection than oral, inconsistency use of protective materials, not using the right equipment's, not using the right sharp disposals), and background variables (socio-demographic characteristics of the nurses.) Others like unsafe handling, using safety box, using incinerate or burring included here.

3.9. Ethical Consideration

Ethical approval was applied from ethical committee of Yekatit12hospitalmedecal college research and publication office. Approval for the study area was obtained from ethical committee of Yekatit12hospitalmedecal college research and publication office. An informed consent was obtained from participants who were signed or gave verbal consent to fill the questionnaires were allowed to do so. Nurses whom refused to participate in the survey were not forced to participate in the study. Privacy and confidentiality of information were kept by replacing all names with codes, and kept all information in locked bag or cabinet including questionnaires. Each study subject was informed about the objective of the study. A letter of cooperation had handed from Yekatit12hospitalmedecal college research and publication office to Hospital participated in the study.

3.10. Operational Definitions of Key Terms

Needle sticks and sharps injury: Any kind of injury which is occurred on the health care worker in relation to his/her job in the health institution within 12 months period.

Health and Safety Training: Trainings given to a worker about health and safety to health nurses.

Nurses: are health care workers graduated by nursing profession I either bachelor degree or diploma in nursing and working in yekatit12 hospital medical college.

Safe injection: an injection that does not harm the recipient, does not expose the health care worker to any avoidable risk and does not result in waste that is dangerous for the community.

Unsafe practice: an injection that expose health care worker at risk of HBV, HCV, and HIV infection through percutaneous injury or contact of mucus membrane or non-intact skin with blood, tissue, or other body fluids that are potential infectious.

Safe: Clean and no potential contamination of any sharps, syringe and needle with blood or other body fluids

Risky: Dirty and potential contamination of any sharps, syringe and needle with blood or other body fluids.

3.11. Scope of the Study

The scope of the study is to assess the magnitude and associated factors for needle stick injury among nurses in Yekatit 12 hospital medical college. Needle stick injury is common to all health workers, however, the investigator focused only on magnitude and associated factors for needle stick injury of yekatit 12 hospital medical college nurses because of nurses are more prone to needle stick injuries.

3.12. Dissemination of the Result

- A formal report will also be submitted to Yekatit 12 Hospital medical college research and publication office, to advisor and to Yekatit 12 Hospital medical College medical provost.
- The final document of study will be distributed to Federal Ministry of Health, Addis Ababa City Administration Health Bureau, and the policy and decision makers' ministry of health in particular to guide them to design an intervention program and for public in peer reviewed journal.

4. Result

4.1. Demographic, Work environment and Behavioral Characteristics

4.1.1. Socio demographic Characteristics

A self-completion 297 questionnaire distributed among nurses working in Yekatit 12 Hospital medical college in Addis Ababa and 257 filled the questionnaire completely, which was 86.5% response rate. The remaining 13.5% were those excluded due to incompleteness, less than one year experience and stopped in between as a result of their work environment characters. The majority of respondents were age group 26 –30yrs: 138 (53.7%), female 176 (68.5%), Degree nurses 150 (58.4%); followed Diploma nurses 64 (24.9%). Unmarried health professionals was 162 (63%), hence, 178(69.3%) had less than 5 yrs clinical experiences, highest numbers of participants were from ward 62 (24.1%), 199 (77.4%) staffs were working their job in regular time (8hrs only) and 108(42%) of study participants were giving injection as much as 10 – 20 injections per nurses per day.

4.1.2. Work Environment Characteristics

Regarding the work environment, 137 (53.3%) staffs responded that their working environments were risky for NSI, the average numbers of injection given per department was 10 – 20 per day per person, 168 (65.4%) were seen the presence of needle at some points in the hospital working points in a situation that could be expose them for NSI; most needle stick injuries 61.9% (159) was occurred by co-workers or during the interaction between patients and staffs.

4.1.3. Behavioral Characteristics

160 (62.3%) respondents were reported that used sharps or needles were seen in area they move to work; 56.4% (145) were working their regular work without any on site or off-site training on safe practices or infection prevention. 73.2% (188) of the staffs did recapping after injection; of which 55.5% (12) of staffs were recapping by two hands. 76% (73) of injured staffs was get the accident

of NSI while the give care to patients. Table below shows the distribution of demo-graphic, work environment and behavioral factors.

4.2. Prevalence of Needle Sticks Injuries Among Yekatit 12 Hospital Nurses in 2021.

Ninety-six 96 (37.4%), had sustained needle stick injury during the one year prior the survey, of which 31(12.1%) admitted experiencing at least one needle stick injury in previous one month. This means that ONE THIRD of nurses working in Yekatit 12 hospital medical college had get injury to NSI in one year duration.

4.3. The distribution of Potential Risk Factors in Relation to the Occurrences of NSI

4.3.1. Age Related to Needle Stick Injuries

According to the study result exposure to needle stick injury was varied among age groups; age group less than 25yrs were 31(32.3%), those of 25 to 30 yrs which was the highest frequency 52 (54.2%), age group 31 to 40yrs 10 (10.4%), and age group above 40yrs was 3(3.1%). This study focused on the risk of NSI among their age group rather than the general samples of participants; according to the finding, age less than 25yrs was 56.4%, age between 25 to 30yrs 37.7%, age group 31 to 40yrs is 20.4% and those of above 40yrs is 20%. From this result we see that as age increases, the level getting injury by needle stick injury dramatically decreases.

4.3.2. Professional Distribution Related to Needle Stick Injury

The distribution of nurses sustained needle stick injuries were others, (MSc) (7.3%) and 50% among their group, mid wives 16 (16.7%) and 55.2% among their group, degree nurses were 60(62.5%) and 40% among their group, and diploma nurses 13 (13.5) and 20.3% among their group. These groups were seen in their status marriage; married staffs were 26 (28.1%) and unmarried staffs were 70 (72.9%). The distributions of NSIs among these groups have no difference in general sample and in their groups.

4.3.3. Work Experience in Relation to Needle Stick Injuries.

Under this study service year or experiences has effect on occurrences of needle stick injuries (NSI). The exposure level, among the nurse health professionals, was more than the general prevalence of NSI (37.4%) in those less than 5yrs experiences 46 (47.9%); and less than for age groups: 6 to 10yrs 28 (29.2%) and above; 11 to 16yrs 13(13.5%), above 17yrs: 9(9.4%). This study showed that as working experiences increases, the risk of sustaining by needle stick is decreases.

Table 1. Distribution of Demographic, Work environments and Behavioral characteristics in yekatit 12 hospital nurses in 2021 in Addis Ababa

Variables		Frequency n=257	Percentage (%)
Sex	Male	81	31.5
	Female	176	68.5
Marital status	Married	95	37
	Not Married	162	63
Age	≤25	55	21.4
	26-30	138	53.7
	31-40	49	19.1
	≥41	15	5.8
Educational status	Diploma	64	24.9
	Degree	150	58.4
	Mid Wives	29	11.3
	Others(MSc)	14	5.5
Ethnic group	Amharic	104	40.5
	Oromo	86	33.5
	Tigre	31	12
	Gurage	12	4.7
	Others	24	9.3
Religion	Orthodox	184	71.6
	Muslim	31	12
	Protestant	35	13.6
	Catholic	2	0.8
Department	Others	5	2
	Emergency	56	21.8
	Ward	92	35.8
	Maternity	45	17.5
	ICU/OR	64	24.9
Number of Injection per day	10to20	111	43.2
	21 to 30	75	29.2
	≥31	71	27.3
	≤ 5	105	40.9
Service in year	6 to 10	73	28.4
	11 to 16	37	14.4
	≥17	42	16.3
Used syringe	Recapping: (two Hands)	188	73.2 (51.8)
	Not recapping	69	26.8
Training	Yes	102	39.7
	No	155	60.3
Injection room	Safe	118	45.9
	Risky	137	53.3
Open Disposal	Yes	160	62.3
	No	97	37.7

4.3.4. Departments in Relation to Needle Stick Injuries

Departments in which different procedures carried out were one of the potential risk factors to needle stick injuries. Among the hospital departments emergency 10(10.4%), ward 12(12.5%), maternity 20(20.8%), other units and ICU/OR both are 27(28.1%) each. In analysis among departments themselves the occurrence of needle stick injuries was: emergency 33.3% ward

19.4%, maternity 44.4%, other units (burn and all ROPD) 42.2%and ICU/OR 48.2%.

According to these results the ICU/OR is the highest risk department to NSI in the hospital.

4.3.5. Frequencies of Injections in Relation to Needle Stick Injuries

Most of the annual occurrences of NSIs were while giving injection to the patients. Results from this study showed that the number of injections given by each nurse health professional was directly related to the increments of the risk of needle stick injuries. Nurse health professionals those giving 10 to 20 injection per day per individual was 41/111(36.9), 21 to 30 injection per day per individual 12/32(37.5%), 40 to 50 injection per day per individual 15/36(41.7%) and those give injection more than 50 injection per day per individual was 6/33(18.2%). In this result we see that as the number of injections given by each health care worker increases, the risk of getting

injury by needle stick injury also increases. In this result also showed that of these groups 180 staffs did recapping after therapeutic injections and share 38.9% of needle stick injuries.

4.3.6. The Effects of Training on Occurrence of Needle Stick Injuries.

Training health professionals on injection safety can minimize the risk of getting injury by NSI. Those nurse health professionals previously had training on injection safety has the risk of NSI as less as 30(28.8%); while those practices without any training have got NSI 66/152 (43.4%), and 153 (59.5%) dispose used syringes in open space which is highly dangerous to the health workers, patients and community, of which 60(39.2%) got injury by needle stick injuries (NSI).

4.3.7. Clinical Procedure Related Needle Stick Injuries

In the study result those procedures cause needle stick injuries (NSI) were giving therapeutic injection 69

(27.2%), followed by recapping 49 (19.1%), and the rest sample taking 43 (16.7%), during emergency situation 39 (15.2%), suturing 35 (13.6), IV securing 14 (5.5%), and inappropriate use of safety box 7 (2.7%). The following figure shows this distribution inyekatit12 hospital medical college.

4.3.8. The Distribution of Medical devices and Occurrence of Needle Stick Injuries

Although individual behaviors influence risk of needles stick injuries, medical devices can play important role for occurrences of injury by needle stick. As the result of the survey syringe with needle was the device that caused more injury 29(30.2%), followed by bended suturing needle 27(28.1%), canula 23 (24%), blade 9 (9.4%), insulin needle and butterfly needle caused 6(6.3%) and 2 (2%) respectively. This information put on the following figure.

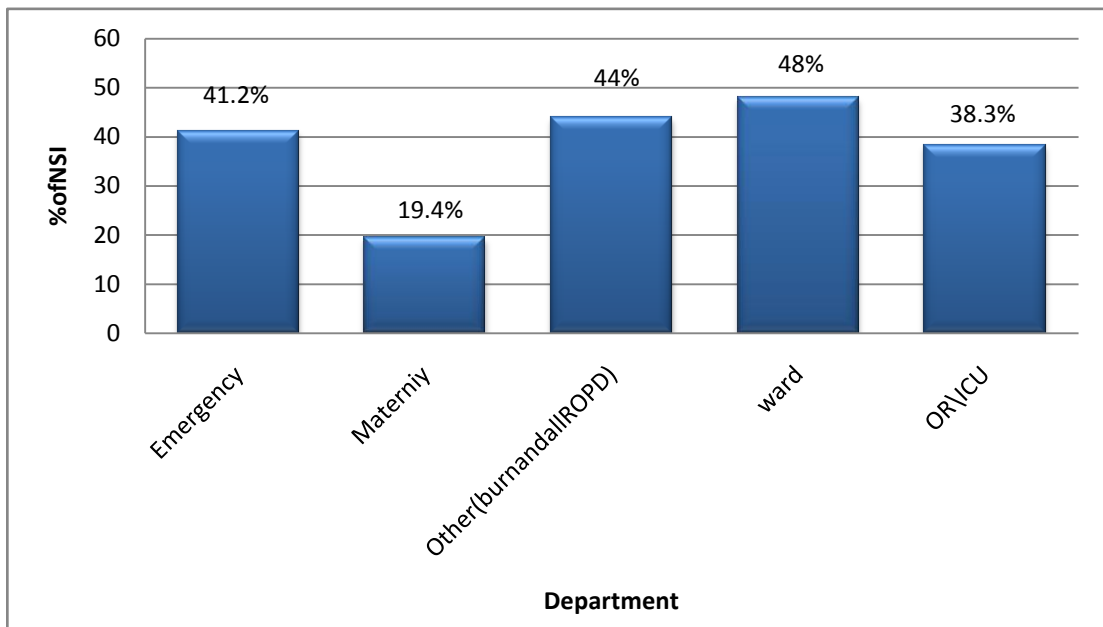


Figure 2. Prevalence of NSI among departments; yekatit12 hospital medical college, 2021.

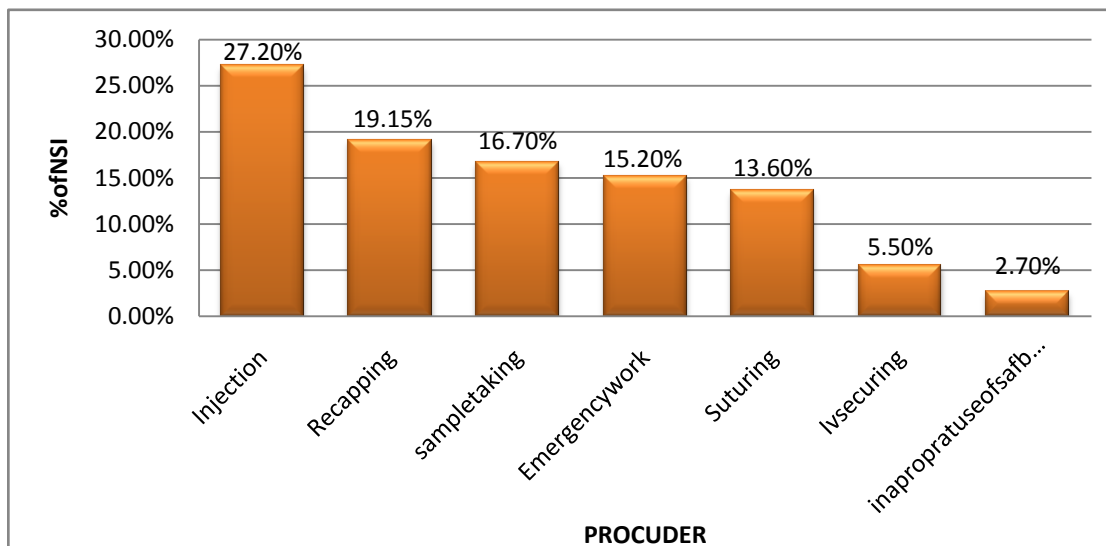


Figure 3. Risk of NSI related to type of sharp used in yekatit 12 hospital medical colleges, Addis Ababa, Des, 2021.

Table 2. The distribution of NSI in yekatit 12 hospital medical college; Addis Ababa, Des, 2021.

Variables	Category	Frequency NSI, n = 96	Percentage (%)
Sex	Male	41	42.7
	Female	55	57.3
Age	<25yrs	31	32.3
	25 to 30	52	54.2
Department	>30	13	13.5
	Wards	24	25
	Emergency	23	24
	Maternity	12	12.5
	OR\ ICU	14	14.9
Educational status	Others (burn and all ROPD)	23	24
	Diploma	13	13.5
	Degree	60	62.5
	Mid Wives	16	16.7
Marital status	Others (MSc)	7	7.3
	Married	26	27.1
Service year/Experience	Unmarried	70	72.9
	≤ 5	46	47.9
	6 to 10	26	27.1
Methods of Recapping	≥11	24	25
	One hand	70	72.9
Training Status	Two hands	26	27.1
	Yes	30	31.3
Open disposal	No	66	68.7
	Yes	60	39.2
Item caused injury	No	36	34.6
	Syringe with needle	29	30.2
	Insulin needle	6	6.30
	Butterfly needle	2	2
	IV needle/canula	23	24
	Blade	9	9.40
	Suture needle	27	28.10

1.129, 3.269) have association with NSI.

4.4. Bi-variate and Multi-variate Analysis

4.4.1 Bi-variate Analysis

4.4.1.1. Socio Demographic, Work Environment and Behavioral Characteristics

As described in table below the regression analysis of socio-demographic, work environment and behavioral Characteristics variable on binary logistic regression showed that sex, COR = 2.2 (95% CI, 1.314, 3.869), age, COR = 5.167 (1.309, 20.39), educational status COR = 0.7 (95% CI, 0.5, 0.9), department, COR = 0.3 (95% CL, 0.1, 0.6), marital status, COR = 2.2 (95% CI, 1.3, 3.9), Experience, 2.859 (95% CI, 1.244, 6.568), number of injection COR = 4.3 (95% CI, 1.5, 12.41) and status of training COR = 1.919 (95% CI,

4.4.2. Multi-variate analysis

In the logistic multi variate analysis sex and age only are statistically significant with the occurrence of needle stick injury. But educational status, marital status, department, service year and status of training had not showed any significant association. In this analysis female health professions were two times more likely to be sustained by NSI than male staffs. AOR = 2.2 (95% CI, 1.01, 4.1). This is may be due to more of females staffs exposed to clinical work than male staffs rather than non-clinical activity like team leading and those age group less than 25yrs old four times more probably get injury by NSI than those above 40 years; AOR = 4.0 (95% CI, 1.7, 5.2). This is also may be due to their poor perception to the risk of NSI.

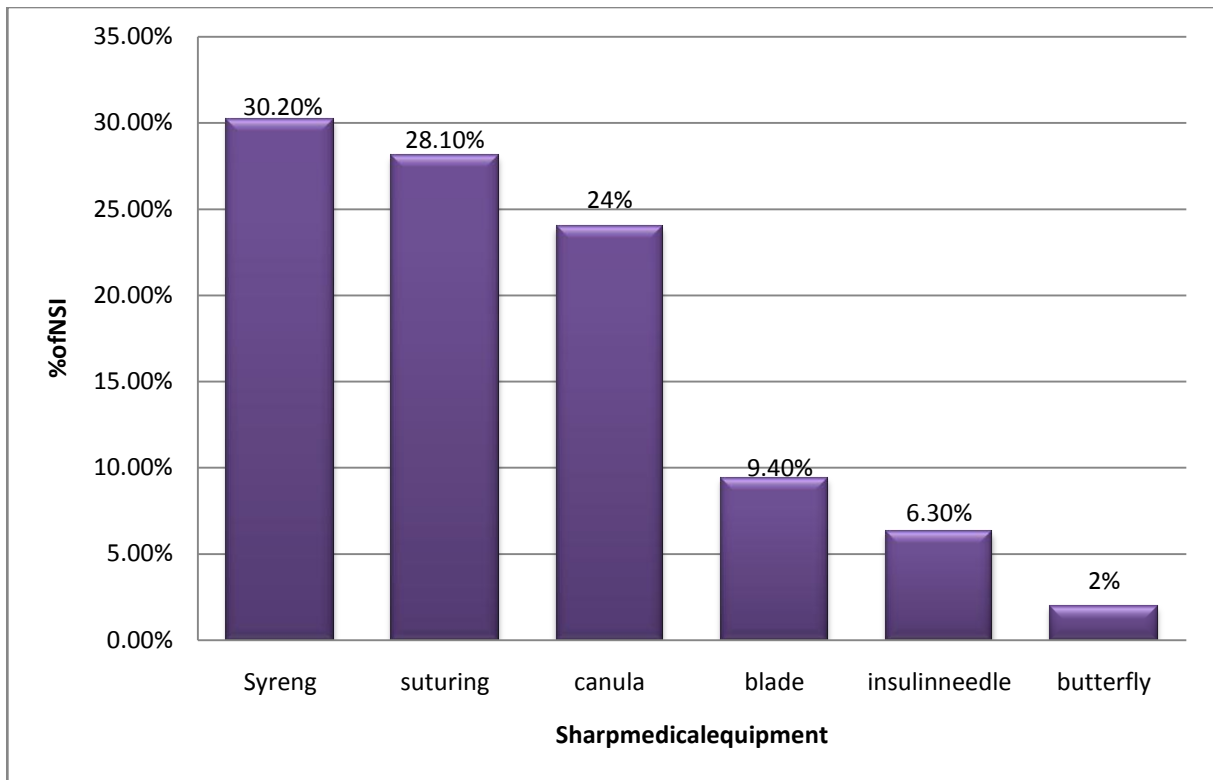


Figure 4. Sharp medical equipment's and their level of effect for NSI; yekatit 12 hospital medical college in Addis Ababa, Des, 2021

Table 3. Logistic Regration Model Analysis of Factors Associated With NSI; Addis Ababa, Des, 2021

Variables	Category	NSI		COR (95% CI)	AOR (95% CI)
		YES	NO		
Age	<25	31	24	5.167 (1.309, 20.39)	4.0 (0.7, 2.2)
	25 - 30	52	86	2.4 (0.7, 8.9)	0.4 (0.2, 0.8)
	31 - 40	10	39	1.1 (0.2, 4.3)	0.2 (0.06, 0.5)
	> 40	3	12	1	1
Sex	Male	41	40	1	1
	Female	55	121	2.255 (1.314,3.869)*	2.2 (1.01, 4.1)*
Educational status	Diploma	13	51	1	1
	Mid Wives	16	13	1.2 (0.6, 2.6)	0.2(0.3, 1.2)
	Degree	60	90	0.7 (0.5, 0.9)	1.1(0.2, 6.0)
Marital	Others(MSc)	7	7	0.204 (0.048, 0.868)	1.9 (0.2, 2.7)
	Married	26	29	1	1
Experience	Unmarried	70	92	2.2 (1.3, 3.9)	0.8 (0.1, 3.2)
	< 5yrs	46	59	2.859 (1.244, 6.568)	0.947 (0.297, 3.018)
	6 to 10	28	45	2.3 (0.9, 5.5)	0.6 (0.8, 2.1)
Department	>16	46	49	1	1
	Emergency	11	21	0.8(0.3, 1.8)	0.3 (0.07, 1.6)
	Maternity	25	22	0.3(0.1, 0.6)*	0.09 (0.04, 0.23)*
	Ward	32	45	0.9(0.4, 1.9)	0.8 (0.3, 2.0)
Inject./day	Others(Burn and all ROPD)	13	49	1	1
	<20	41	70	2.6 (1.1, 6.9)	0.60 (0.01, 4.922)
	21 to 30	22	23	4.3 (1.5, 12.4)	1.3 (0.5, 3.2)
	31 to 40	12	20	2.7 (0.9, 8.4)	2.3 (0.9, 5.9)
Training	>40	21	48	1	1
	Yes	30	75	1.919 (1.129, 3.263)	0.619 (0.322, 1.102)
	No	66	86	1	1

5. Discussion

Our study found that 96(37.4%) of Nurses sustained at least one NSI in 12 months preceding the survey; of which 32(12.5%) had got injury during one month prior to the data collection. The prevalence of needle stick injury is become more risk to Nurses in yekatit 12 hospital medical college. Our findings have similarity to the studies done in Ethiopia; Jima University which showed 39% [32], and a study in Mongolia reported 38.4% NSI [31,32] ; But this result is lower with study done in Ethiopia, Bahir Dar, 66.6% [33]; the same in Nigeria is 40.2% [34] and higher to the result done in Malaysia 23.5% [35]. These are may be due the set up their working environment. The statistical analysis in this study indicates that female workers are more victims as compared with male workers. This may be due to the fact that males are less exposes themselves to clinical work than females. But, another study done in Ethiopia, East Gojam indicated that males are more victim of this NSI; this is may be due to lower numbers of female

Distribution in the institution and females are often involved in blood drawing and testing HIV in the same room with other activities than males. Medical ward was the departments where high risk of NSI observed. This is obviously medical ward is where major clinical care carried there. Individual behavior influences risk of sharp stick injuries. Only less than half of the staffs had training on safe clinical care. Young age and low work experiences affect the level of prevention of sharp injury. Environmental factors appeared to provide important context for safety. The frequency of injection reported contracts of high risk of NSI. Exposure and injury rates differ by occupation, professional and working departments depending on the frequency and length of time of handling of sharp equipments. These results are similar to the finding from Malaysia (36.1%) and with the study of Ethiopian Nurse Association of 2007 (35%). In Vietnam 38% of phyciance and 66% nurses reported sustaining a sharp stick injury in the previous 9 months. In Taiwan also the same report (38%) revealed percutaneous injury among health care workers. Needle stick is not single life time event. Usually health care were experience it more than once. In these survey health professionals, female nurses and mid wives and those working in emergency and maternity departments are more experiences NSI than other paramedical, hence, few of them sustained more than one episode (12.5%). In Ethiopia previous study included health facilities under the monitoring of WHO, was shown that few of unsafe practices are resulted from lack of equipment or supply; but this study couldn't find that there were shortage of supply; and health facility in the country are required by the ministry of health to use only Single use and sterile injection and not practices recapping. Factors found to be strongly associated with high prevalence of NSIs were female workers twice more likely to be injured by NSI than male; AOR; **2.2 (95% CI, 1.0, 4.1)**, AOR; this may be due to more female assigned at clinical setting more, age less than 5 yrs are more likely to be injured by NSI than those above 40yrs. This is may be due to low perception to the occurrence and care of against NST. Age

group between 26 – 30yrs were 96% less likely to be injured by needle stick injury than those above 40 yrs; AOR; 0.4(0.3, 0.8). Working as a Degree nurse was 93% less associated to NSI; AOR; 0.7 (95% CI, 0.5, - 0.9). Unmarried staffs were significantly associated to NSI; AOR; 2.2 (95%CI, 1.3, 3.9). Staffs those less 5 years were significantly associated with NSI; AOR; 0.6 (95% CI, 0.3, - 0.9). Maternity ward was 99.1% less probability to be injured by NSI; AOR; 0.09 (95% CI, 0.04 – 0.23). Health professions who had formal training on safety of injection are 95% less likely to be injured by NSI than those working without any on site or off site formal training; AOR; 0.5 (95% CI, 0.3 - 0.9.) This is may be due to, lack of formal educational training (58%), unsafe injection practices, recapping: especially two hands recapping (38%), improper disposal of used sharps, and poor monitoring universal precaution were some factors related to sharp injuries. Furthermore, high numbers of injection, unfavorable working environment, poor practice due to in access of in-service training and inadequacy adherence to the universal precaution measurement likely to increase the risk of NSI. In most these hospitals clinical care unit were have not seen written information materials on their working room's wall or tables. Those staffs stayed only 8 hours in clinical setting have 97% less probability of injury by NSI than those work additional hours. Extended working hours and 24hrs duty time AOR = 0.3 (95% CI 00.09, 0.7) followed by 10hrs continuous working is associated with the risk of NSI, among degree nurse and mid wife. So these results implicating for policy makers and Hospitals and Health bureau administrator to ensure that working hours especially, long hour continuous working and lack of training on safe practices are associated to increase risk of NSI.

Our study is consistent with study finding from different studies that female health workers particularly nurses and mid wives more likely sustained NSI as compared to other health workers. A study from Malaysia reported no significant different in prevalence of NSI based on duration of work experiences; however this study finding is contrast with these results. This could be explained by more exposure due to longer duration of service with condition mental and physical extortion that could result in NSI. Hence, low experience or shorter service workers are more likely to be injured by NSI.

This could be also being a reflection of poor injection practices and practice without formal training. This work time related risk of NSI, for example the association of NSI injury with the long hour working time, is congruence with finding in other country. This could be a result of mental and physical stress associated with excessive working hours. Results from this study should be interpreted with caution as this study is a cross section survey and considered only yekatit 12 hospital medical college from five hospitals in Addis Ababa city administration. In Ethiopia like Kenya, , Rewanda, Zambia and other African country used designated incinerators but most of the incinerator found in this study was open or lack fences and in most respondents were found outside the facilities and outside the incinerators. The delivery and injection environments were not safe and have the potential for needle stick injury and exposure to potentially infectious blood borne pathogens. This study

did not show the practices of reusable syringe and needle; which was common before the era of HIV. Generally, needle stick or sharp injury has significance different among the sex, age, profession and working departments. For the health care provider, complete surveillance of exposure is necessary for identification of high risk activities and environments in order to define new targets for preventive measure and monitoring of the success and failure of the measure taken.

6. Strength and Limitation of the Study

6.1. Strength of the Study

This study

- Give information about level of occupational injury related to NSI.
- Help principal researcher develop skill in Research work.
- Found base line information for future health plan.
- Resources for next researchers.

6.2. Limitation of the Study

- Some staffs couldn't remember that they sustained needle stick injuries within the past 12 months, some respondents were not sure their information kept secrets and health workers was recruited during their lunch time and not comfortable to answer freely.
- Even if the result will be generalized to source population, it may not be generalized to all nurses in the country due to inadequate sample size.
- Since the study design is cross sectional, the respondents may overestimate the needle stick injuries.

7. Conclusion

This study revealed that more than one third of the study participants had needle stick injury at least once in the previous 12 months. Females were more affected than males, and age less than 25 years also more victims than other age groups. Three fourth of the staffs practiced recapping used syringe and greater than half of the respondents did recapping by two hands. Marital status, professions, experiences, and training were the predictors for needle stick injury.

8. Recommendation

After analyzing the major finding from this cross sectional study the following recommendation forwarded to MOH Ethiopia, Addis Ababa City Administration Health Bureau, Hospital Managers and health care professionals.

- Formal training and continuous monitoring of the work place safety should be ensured by MOH, AARHB, and Hospital level decision makers.

- On job training by the health bureau of Addis Ababa and other NGO to the health care worker on safety practices of injection. Patient education at facility level on advantage and disadvantage of injection and oral medication.
- Similar studies at regional health bureau level by expert officer that involve all health centers and remained Hospitals are much needed.
- Qualitative assessment is needed to determine the reason for these unsafe practices by using standard tool.
- Health Professions should never bend, break, recap needle, remove needle from disposable used syringe, or over fill, reach in to, open, empty, or reuse a sharp container.
- All staffs should be involved in safe segregation and disposal of all sharp's items immediately in marked containers.

Abbreviations and Acronyms

AARHB: Addis Ababa Regional Health Bureau, **AIDS:** Acquired Immuno Deficiency Syndrome, **BBF:** Blood and Body Fluids, **CDC:** center for disease control, **CI:** Confidence Interval, **HBV:** hepatitis b virus, **HCV:** hepatitis c virus, **HCW:** health care workers, **HIV:** Human Immuno- Virus, **IP:** Infection Prevention, **KAP:** knowledge, attitude and practice, **MOH:** Ministry of Health, **NSTs:** Needles stick injuries, **PEP:** Post Exposure Prophylaxis, **SD:** Standard Deviation, **SPSS:** Soft Ware Program for Social Science, **USA:** unitedstates of America

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