ADDIS ABABA UNIVERSITY
FACULTY OF MEDICINE
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ASSESSMENT OF THE SAFETY OF INJECTIONS AND RELATED MEDICAL PRACTICES IN HEALTH INSTITUTIONS AT SIDAMA ZONE, SNNPRS.

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A thesis submitted to the school of graduate studies of Addis Ababa University in partial fulfillment of the requirement for the degree of masters of public health.

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Abstract

Background: There is substantial discrepancy between much of the epidemiological evidence and the belief that nearly all of the HIV burden in sub-Sahara Africa can be accounted by heterosexual transmission and the sexual behavior of Africans. For this a number of observations raise the question of an alternative route of transmission, for which medical care and the use of injections are prime candidates.

Objective: To assess the potential risk of transmission of blood born pathogens (HIV, HBV, and HCV) through needles and sharps in health care settings found at Sidama zone of SNNPRS.

Methods: Health institutions based cross sectional survey was conducted from November 2003 to March 2004. From 22 government, 9 NGO and 9 private health institutions, 213 health care workers and 352 clients/patients were interviewed; 178 injection practices were observed; and dressing and delivery practices were observed in 37 and 27 health institutions respectively.

Result: Accordingly, 74% of the observed injections were found out to be unsafe to the health workers, recipients or to the community. Contaminated and unsterile medical equipment that contact open skin or used for percutanous procedure were observed put ready for reuse in most health institutions. Most (97%) of the health institutes lack at least one equipment that was used for wound care or to assist delivery. Although, most the health care workers were aware of the transmission of diseases through contaminated

needles, only 7% of them cited HBV, HCV, and HIV simultaneously. Thirty two percent of the health care workers reported a 12-month prevalence of accidental needle or sharp injury. 64% of these were deep or penetrating injuries.

Most clients/patients (89.5%) were knowledgeable on the transmission of diseases through dirty needles. One hundred fifty seven (44.6%) of clients responded that they prefer oral drugs to injection preparations, which was preferred by 136(38.6%), when their children have fever. As opposed to the clients/patients, the majority (64.9%) of the HCWs claim that clients prefer injections when they appear to the out patient departments.

Conclusion and recommendations: The study revealed that many injection and related medical practices were poor exposing clients/patients, health care workers and the community at risk for blood born pathogens. On job training for health care workers, and assessing reasons for the poor safety using assessment tool "A" was recommended.

Key words

Unsafe, Injection, medical, practice, health institution, blood born pathogens, health worker, clients, patients, clients

1. Introduction

The World Health Organization (WHO) defines unsafe injections as injections that harm the recipient, exposes the provider to any avoidable risk, and that results in waste that is dangerous for other people (1). Unsafe injections are major public health problems in many areas of the developing world because of the high prevalence of certain blood born diseases, and the enormous popularity and over use of injectable therapy.

WHO reported that in sub-Saharan Africa and Asia, 50% of injections were reported unsafe. In some countries the proportion of injections given with reused syringes or needles without sterilization is as high as 90% (2).

Blood born pathogens constitute a variety of infectious agents that can be transmitted via blood and sometimes other body fluids and tissues (3). Among the forty pathogens reported to be transmitted through unsafe injections or sharps, Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and Human Immunodeficiency Virus (HIV), pose the greatest risk (4). The contribution of injections by contaminated needles and other sharp devices such as surgical blades and scissors to the above three viruses has been clearly demonstrated by outbreaks of HIV in orphans in Romania and an extensive outbreak of HCV following national campaigns against schistosomiasis control where there were many reuses of syringes without sterilization in Egypt (5). The proportion of HBV infections attributable to unsafe injections was also estimated to be in the range of 20-80% in China, India, the Republic of Moldova, and Romania (2, 6).

Unsafe injections are also the most common cause of HCV infections in developing countries. Each year unsafe injection practices are responsible for 2.3 to 4.7 million people contracting HCV worldwide (5).

A debate on the issue that the majority of HIV infections in sub-Saharan Africa are due to unsafe medical practices, particularly injections than heterosexual route, is still unresolved. A review of evidence, which included recent articles, suggested that a majority of HIV infections in sub-Saharan Africa are due to unsafe medical practices (7).

Altogether, illnesses due to HBV, HCV, and HIV infections account for 1.3 million deaths and to a loss of 26 million years life (2). Such proportions can no longer be ignored. Therefore, in the holistic effort to reverse the spread of the diseases, understanding the problem around medical practices that put the health workers and the community at large to these risks is a contemporary and burning issue. In Ethiopia there are very few studies describing the risk of injection and other medical practices like delivery and dressing. Thus this survey was conducted to assess the safety of injection and other medical practices in health institutions at Sidama Zone of the SNNPRS.

2. Literature Review

HBV, HCV, and HIV are distinct viruses sharing the same property i.e. all are the most common and fatal pathogens that can transmit from patient to patient, patient to Health Care Workers (HCWs), and rarely from HCWs to patients, usually facilitated by contaminated needles, and medical sharps (scissors, blades, suturing needles etc.). The risk of transmission of blood born pathogens is dependent on three major factors: the dose of pathogens transmitted, the infectious characteristics of the pathogen, and the probability of exposure. The transmission risk appears highest for HBV, followed by HCV and HIV consecutively (3).

There is substantial discrepancy between much of the epidemiological evidences and the belief that nearly all of the HIV burden in sub-Sahara Africa can be accounted for by heterosexual transmission and the sexual behavior of Africans. There are few data on the architecture of socio-sexual network in Africa, but no study from sub-Sahara Africa evidencing appropriate sexual network configuration on a scale considerably larger than observed in developed countries. Thus, rapid propagation of HIV in Africa would be difficult to sustain without such evidence (7). Similarly, in a number of studies, there appears to be discrepancy between the observed HIV prevalence in women undergoing reproductive medical care, and the HIV prevalence that would be observed in such a group from heterosexual transmission alone (7).

Moreover, HIV prevalence is often higher in cities and among persons of high socioeconomic attainment than in rural areas or among less fortunate persons. Favorable access to health care is one of the differences that distinguish between these groups (7).

For this a number of observations raise the question of an alternative route of transmission of HIV, for which medical care and the use of injections are prime candidates (2, 8, 9). The WHO on its side estimates that currently 12 billion injections are given annually worldwide more than half of which are unsafe and they account for much larger proportion of blood born disease transmission (10).

To alleviate this problem United Nations Children's Fund (UNICEF), the WHO, and other partner organizations are recommending all health institutions world wide to use the Auto Disable (AD) type syringes, which is considered as a standard injection device. (11). Thus use of a new, single use syringe and needle provides the highest level of safety to the recipients. When new single-use injection equipment is not available due to inconsistent or unreliable supply, sterilizable injections can be sterilized according to the WHO recommendation and monitored using time, steam, and temperature (TST) spot indicators. Boiling injections equipment for 20 minutes, which is not part of the recommendation, kills HIV, however other pathogens can survive (12).

Safety of Injection, Dressing, Delivery and Related Practices:

WHO reports that in some countries the proportion of injections given with syringes or needles that were unsafe was as high as 90% (2). Among 19 countries representing five regions of the developing world, where Ethiopia was included, in 14 of these countries 60% of the injections were unsafe. In Pakistan, for example, an observation study of 52 injections given in 18 clinics in one region, the unsafe injection was estimated to be 94% (13). On the same line, although there was evidence that childhood

immunizations were safer than curative injection, several reports from these countries estimated that 31% to 90% childhood vaccinations were unsafe (2).

Similarly in Burkina Faso, where the official policy was to use sterilizable syringes, a recent assessment indicated that 17% of the health centers actually used sterilizable injection equipment for EPI, while the majority 83% used both sterilizable and disposable syringes (14).

Besides the direct reuse of needles, syringes, and sharps without sterilization or poor sterilization, the probability of exposure and transmission risk to blood born pathogens is fueled by environment contaminated with blood, the frequency of injection, delivery, and dressing procedures performed, and the high prevalence of carriers in the community (17). HBV maintains its transmission risk for up to seven days on surfaces (15, 16, 17). Thus a hygienically sound working environment is crucial to decrease the transmission risk.

Unsafe sharps waste collection also causes 5% to 28% of needle stick injuries. Needles and sharps collection boxes should be designed to be puncture and liquid proof and closed (1). The presence of puncture-and liquid proof containers designed for the collection of contaminated sharps are associated with a lower risk of needle stick injuries particularly those related to recapping of needles (1).

Health Care Workers:

The first report of a health care worker infected with the HIV by a needle stick injury (NSI), published in medical literature in 1984, launched a new era of concern about the occupational transmission of blood born pathogens (18).

In many regions, there is lack of understanding on many levels in the health sector of the real risk of unsafe injections, or even of what comprises an unsafe injection. A common misconception is that it is safe to reuse the syringe between patients if the needle is changed (5).

In a study done on health care workers (HCWs) in periurban Pakistan, 70% of them said that life-threatening diseases could be spread through the reuse of non-sterile needles and syringes. None of the HCWs referred to HCV as transmittable, only 10% mentioned HBV, and over half of them mentioned tuberculosis (13).

In USA there are documented reports that following occupational exposure, HCWs had seroconversion to HIV. For the majority of these HCWs the exposure was percutaneous (puncture or cut injury)(18). In addition, studies have showed that needle stick injuries to HCWs are usually attributed to abrupt movement of patients during the procedure and two handed recapping of needles (20,21).

Among the best infection control practices in using intradermal, subcutaneous, and intramuscular needle injections, to prevent needle stick injuries to the provider are, avoiding recapping of needles and other hand manipulation of needles such as disassembling injection equipment. If recapping is necessary, using a single-handed scoop technique is strongly recommended and strongly supported by well designed experimental and epidemiological studies (1).

In a passive system of surveillance conducted on major hospitals in Trinidad and Tobago from 1991-1997 to examine the incidence of inoculation injuries showed needle stick injuries incidence was 34.3% and the majority of the incidents occurred during needle and/or sharp disposal.

Similarly studies done in Ethiopia reported a twelve-month incidence of 30-67% needle stick injury among the health workers (23, 24).

Clients/Patients:

It is known that, clients' /patients' preference of routes of drugs administration has its own contribution for the wide spread of unsafe injections. The reason why some patients prefer injections is because they believe them to be stronger and faster medications. They also believe that doctors regard injections to be the best treatment (25). The study by Aamir *et al* in Pakistan showed that 44% of clients/ patients exiting the health institutes after receiving services claimed that they would prefer injectable medications, even if oral and injectable medications were equally effective in the treatment of a given illness (13). In a similar study done in rural Ethiopia by Tesfaye *et al*, while only 38% of the clients/ patients said that they would prefer injection to oral treatment, as opposed to the clients/ patients, about 82% of health workers in this study reported that they felt patients preferred injections when they appear to the out patient departments (23).

Many medical procedures require reuse of equipment, such as forceps, scissors, and suturing needles. Ensuring that health care providers have and use equipment for sterilization correctly is therefore a priority. On the other hand, availability and

functionality of equipment and supplies may contribute to the reuse of equipment for different patients without sterilization (3,26).

A survey conducted in Ethiopia under the auspices of WHO showed that, of the 43 facilities surveyed, 29(67%) had at least one steam sterilizer fully functional. Only 2 of 56 facilities visited had a TST indicator to monitor the appropriateness of sterilization (24).

Safety of Method of Disposal of Needles and Sharps:

Where as disposable syringes and needles gained popularity as a way to reduce the risks associated with improper sterilization practices, unfortunately, they do not eliminate the underlying causes contributing to injection associated morbidity. Besides the widespread misuse and reuse of the syringes, it has imposed an environmental problem in countries with no infrastructure for disposal of sharps.

It is important to manage sharps waste in an efficient, safe and environment-friendly way. Current system for the safe and environmentally acceptable disposal, destruction, and final containment of sharps waste have been developed for the richer countries with well developed physical infrastructure and management systems. WHO has recognized that, if disposables are to be used in poorer countries, such countries must have similar systems as the richer countries (27,28). However at present the least detrimental option for destruction is incineration (29).

In an observation done in nine governmental and mission hospitals covering a total of 27 wards in Mwanza, Tanzania, it was found out that all except four wards (15%) had at

least one puncture proof container for disposal of sharp objects, though only one fifth of such containers were covered. For about half of the departments, waste was disposed of in a pit. Incineration was the mode of disposal in six (22%) general wards; In none was the waste buried (30).

Another survey conducted in 13 African countries where Ethiopia was included, it was reported that in Ethiopia used needles were stored in open containers in 70% of the health institutes. Furthermore in 33% of the cases studied, used injection equipment was dumped. In half of the centers that were equipped with an incinerator, people were dumping the syringes and needles around the facility (2).

2.1 Significance of the Study

Transmission of blood born pathogens by means of unsafe injection practices is drawing much attention in developing countries. This is because the public health risks resulting from unsafe injection and related medical practices are also very serious. HIV/AIDS particularly is a burning issue, which has created a big challenge to the social, economic, and political affairs of the world society. Even though much work is being done, little is known about the disease. There are some documented works on the contribution of the health care system for the transmission of HIV, HBV, and HCV. However, there are very few studies in our country on the safety of injection, delivery and dressing practices including the disposal of needles and sharps in health care settings. So this work may give preliminary information on the risk of transmission of blood born pathogens through needles and other sharps including HIV/AIDS in health care settings found at Sidama Zone.

Furthermore this survey was designed to be an exploratory study providing some basic information for policy makers, program managers, administrators, other researchers, and health professionals about the risk of transmission of blood born pathogens (HIV, HCV, and HBV) in government, None Governmental Organizations (NGO), and privately owned health centers and health stations/clinics found in Sidama Zone of the SNNPRS. Findings of this study could be used for planning, and implementation of effective strategies that could help in making the health care service safe for health workers, patients and the community.

3. Objectives of the Study

General objective: To assess the potential risk of transmission of blood born pathogens (HIV, HBV, and HCV), through needles and other sharp objects in the health care setting, at the Sidama Zone.

Specific objectives:

- To assess the safety of injection, dressing, delivery and related practices, which involve the use of needles and sharps;
- To assess the availability and functionality of surgical (minor) equipment and supplies, including disposable needles sharps, and sterilizers;
- To assess the method of disposal of contaminated syringes, needles and other medical sharp objects such as blades;
- To determine the knowledge and practice of HCWs with regards to the safety of injections and other medical procedures;
- To examine the preference of routes of drugs for treatment, and awareness about the risks of unsafe injection among patients.

4. Methods and Materials

4.1 The Study Area and Period

The study was carried out in Sidama Zone in the Southern Nations, Nationalities Peoples Regional State (SNNPRS). The zone is located about 275 kms. from Addis Ababa along the main highway to Moyale - Kenya. According to the population and housing census, the zone has 2,549,280 inhabitants. Awasa town serves as the capital city to both the SNNPRS and the Sidama Zone.

In Sidama zone there is one government hospital, 16 governmental and one NGO owned Health centers, 40 governmentally, 14 NGO, and about 15 privately owned health stations/ clinics. Concerning the distribution of health care workers in the zone, there are 33 physicians, 11 health officers, 270 nurses, 223 health assistants, 58 laboratory technicians, and 24 sanitarians. Overall, there are 389 administrative staff working in the health institution under the zone (31). The survey was carried out from November 26-December 20, 2003.

4.2 Study Design

Health Institute based cross-sectional survey was employed to assess the potential risk of transmission of blood born pathogens in the health center and health stations/clinics at the Sidama Zone.

4.3 Study Population and Sampling

Study population: two different population groups and health institutions were studied in accordance with the objective of the survey so as to generate complementary information.

Health institutions: Ten governmental and one NGO owned health centers, 12 governmental, 8 NGO and 9 privately owned health stations/ clinics found in the Sidama zone were surveyed. Injection, immunization family planning, laboratory, delivery practices and the needle and other sharp wastes management were observed.

1. ***Health care workers:*** Physicians, Health Officers, Nurses Health Assistants, Laboratory Technicians and Cleaners working in the study health institutions were interviewed.

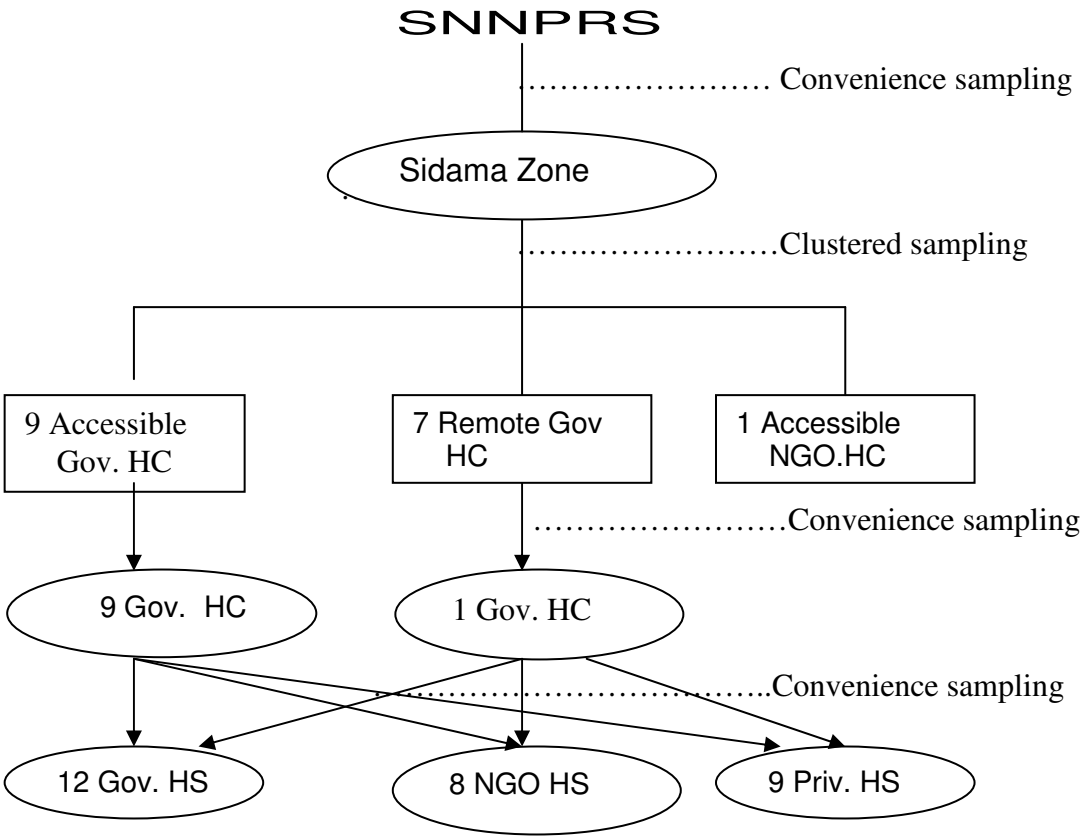
2. ***Clients/ patients:*** Clients or patients who visited the study health institutions on the day when the study was carried out were interviewed while leaving the health institutions after they received services.

Sampling

1. ***Health institutions:*** First the region and the zone were selected conveniently on the basis of their proximity. Sidama Zone particularly was selected because of the familiarity to the area by the principal investigator and the convenience for transportation of the zone compared with other zones. The health centers were stratified according to their proximity and convenience for transportation into remote and accessible groups where each stratum consisted six and nine

government health centers respectively. Then considering the time, financial, and the transportation capacity all the government health centers from the accessible health centers and one health center from the remote stratum was selected. Then governmental and one NGO health station/ clinic found near each of the Health centers were included in the survey.

Figure 1: Schematic representation of sampling steps for the health institutes at Sidama Zone.



More over the sampling of these health institutes had considered the possibility of getting the minimum number of HCW that are eligible for the interview. Thus the sampling of health institutions was set at 9(56%) of the government owned health centers, 1 (100%) of the NGO owned health center, 12 (30%) of the government

owned health stations, 8 (57%) of the NGO owned health stations, and 9 (18%) of private clinics. These made the total study health institutions to be forty.

Health care workers: Using the formula for simple population proportion:

$$n = \frac{Z_{(\alpha/2)}^2 P(1-P)}{d^2}$$

Where reliability coefficient (Z (α/2) is 1.96; P=32%, the prevalence of one of the variables needle stick injuries among HCWs; d=0.05; n= 334 (23). Further utilizing the finite population correction, where N=600 and non response rate of 10%, the sample size was fixed at 235. (Thus all the HCWs in the study health institutions were recruited for the interview; and we got only 213 HCW in the Health institutions.)

2. ***Clients / patients:*** By applying the simple population proportion formula for the calculation, the size of clients/ patients interviewed was:

$$n = \frac{Z_{(\alpha/2)}^2 P(1-P)}{d^2}$$

Where reliability coefficient (Z(α/2) is 1.96; d=0.05, and p=30% i.e. prevalence of preference of injectable medications over other modes of treatment; sample of 323 clients/patients were interviewed from all the study health institutions where at least 14 and 6 clients/ patients were interviewed from each health centers and health stations respectively.

4.4 Measurement

4.4.1 Data collection

A. ***Observation: -*** Observation was made on injection delivery and dressing practices on HCWs assigned to work on the date of the data collection as applies in each health institution. Cleanness of the environment, safety, availability and functionality of

equipment including the sterilization process and the collection and disposal system of dirty syringe, needle, and other sharps was observed.

An injection assessment tool "Tool C" developed by the Safe Injections Global Network (SIGN) was used to observe the injection procedure. For the delivery and dressing procedures a structured checklist was developed and used. The sterilization of reusable medical equipments was checked using TST spot indicator. The indicator is originally yellow in color. When the TST is exposed to a steam of temperature 121^{0}c for 15 minutes in the sterilizer, its color changes to blue. Otherwise the color change will be either mottled yellow or brown indicating failure (inadequacy) of the sterilization.

B. ***Interview:*** For the purpose of preventing the contamination of data from observations, the interview was carried out after conducting the observation. HCWs in the selected health institutions were interviewed face to face on their knowledge and practices with regard to the safety of injection and related medical practices using a pretested and modified assessment Tool C.

Assessment tool C was used to interview clients/ patients face to face when they leave the study health institutions after receiving any type of service on the date of the data collection.

4.4.2 Interviewers

Twelve registered nurses who recently graduated from different higher education institutions participated on the pretesting the instruments, data collection, and supervision activities.

4.5 Pretest

To evaluate the understandability and applicability of the instrument, data were collected in two health institutions found in the neighboring Gedeo Zone, i.e. out of Sidama Zone. Then important amendments and arrangements were made on the instrument.

4.6 Data Management, Analysis and Interpretation

Data were coded, entered in to a computer using EPI Info version 6 cleaned and exported in to SPSS version 11. Then bivariate and multivariate analyses were done, frequencies of variables was determined, and chi-square tests and odds ratios were measured where 95% CI and P values were utilized to examine statistical significance.

4.7 Variables

The independent variables of the study were: The age and sex (for the HCWs and clients/ patients), qualification of the HCWs, type of the health institute and the department, and the reasons for visiting the health institute by the clients/patients.

The dependent variables were: the safety of injections, needle stick or sharp injury, condition of needle stick or sharp injury, knowledge of transmission of blood born pathogens, preference of injection by clients/patients, and ever development of injection abscess by clients/patients.

4.7.1 Operational Definition of Variables

1. **Unsafe injection:** Any one of the following procedure:

    - Reuse of syringes or needles after boiling or without sterilization,

- Injections given in a dirty environment where there is potential for contamination of syringe and needle with blood or other body fluids,

- Injections given in a place where there is no sharp collection box around, or needle and sharp collection in an open, and non puncture or liquid proof container,

- Any needle left on the septum of multiple dose vial,

- Two handed recapping of needles,

- Any syringe, needle Conditions where the needle, syringe, and sharp collection boxes were over filled or torn and needles seen through the hole; any observable dirty needles and sharps in place where they expose HCWs to needle stick or sharp injuries,

- Any syringe needle sterilization for which the TST spot indicator turned to mottled yellow or brown,

- Any syringe and needle disposal other than protected incineration or open incineration and burial in a pit.

2. ***Health care workers (HCWs):*** for the purpose of this survey are defined as those health workers working in the health institute and have contact with syringes, needles and other sharps by the virtue of their duties. This group includes physicians, health officers, all types of nurses, health assistants, laboratory technicians and cleaners.

4.8 Ethical Considerations

Ethical clearance was first obtained from the Department of Community Health, Faculty of Medicine, Addis Ababa University. Then the SNNPRS Health Bureau, Sidama Zonal and Wereda infrastructure department and units heads of each health institutes authenticated the study through a formal letter. All the study participants, health care workers and clients/ patients were informed about the purpose of the study, the right to refuse, and assured confidentiality, and informed verbal consent was obtained prior to each interview. Data collectors were told to tactfully and carefully interfere when they observe any reuse of syringes or needles for different patients.

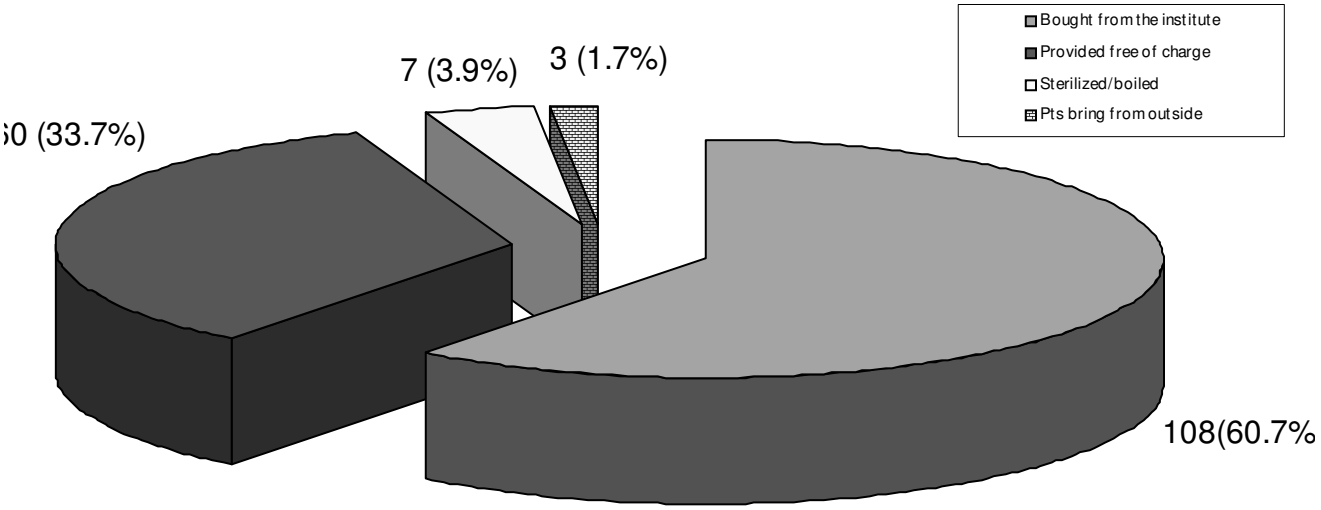
5. Results

A total of 40 health institutions under the Sidama Zone were studied. These were 10 (66.7%) of the government health centers, 1 (100%) of the NGO owned health centers, 12(33.3%) government health stations, and 8 (53.3%) of the NGO owned health stations, 4 (100%) of the higher, and 5 (83.3%)of the medium privately owned clinics found in the zone. Five (12.5%) of the surveyed health institutions were geographically more remote than the rest of the health institutions. Overall, seven out of ten Weredas in Sidama Zone were covered in this study.

I. Safety of injections

A total of 178 injections were observed in the 40 health institutions. The departments include EPI, family planning, regular therapeutic or curative injections, tuberculosis/ leprosy programs, and laboratory services. The highest observed injection practices 120 (67%), were given for curative purpose, followed by EPI and family planning which account for 34 (19.1%) and 24 (13.5%), respectively. Based on the data from the observation of the injection practices, the major sources for the syringes and the needles was buying for 108(60.7%) and provided free of charge from the health institutions for 60(33.7%). Among the seven observed reuse of syringes and needles, two were boiled for vaccination purpose, for the three (from one health institutions in regular injection room), the TST color changed to blue, and for the remaining two (in EPI department from a different health institute) the TST spot indicator changed to mottled yellow and so it was resterilized (Fig2).

Figure 2: Observed sources of syringes and needles. Sidama, 2003.



Among those clients/patients who remember the time for their last injection, for the majority, 181 (83.7%), the source for the syringes and needles during the injections was blister package. Syringes or needles obtained from boilers/sterilizers were also mentioned by 28 (13%) clients.

Twenty-two (6.3%) clients/patients claimed that they/their children ever had abscess following injections.

As shown on fig 3 below, both EPI and other departments have equally about 80% unsafe syringes and needles collection boxes, which was either open, non-liquid proof, or non-puncture proof. Twenty-nine (72%) of the health institutions use unsafe syringe and needle collection system. Only in three NGO owned health institutions were safe collection boxes in all their departments observed. The difference, however was not statistical significant (P.V>0.05).

Fig 3. Conditions of syringe and needle collection. Sidama, 2003.

In three injection occasions needle left on multiple dose vials that were ready for drawing medication from multiple dose vial was observed. One needle reuse on the same patient was observed but no syringe reuse was observed at all.

Based on the parameters set to measure the safety of injections, the majority, 131 or 73.6% (95% CI (47.1-100.2)) of the injections were found out to be unsafe.

Injections administered for vaccination purpose and those in government owned health institutions appeared to be the most unsafe compared to those administered for family planning and regular, and NGO and privately owned health institutions respectively; the difference, nevertheless, was not statistically significant (P>0.05). No significant difference also observed on the level of safety of injection practices based on the stock of syringes and needles they had during the time of the survey, or cleanliness of the environment of injection preparation (P>0.05)(Table 1).

Table 1: Safety of injection in the study health institutions Sidama, 2003.

Variable	Safe		Crude OR	Adj.OR
	N_O	%	95% CI	95% CI
Type of HI				
Gov.	19	15.2	0.16 (0.08,0.033)	0.43 (0.15,1.2)
Others	28	52.8		1
Department				
EPI	6	17.6	0.54 (0.21, 1.4)	3.1 (0.54, 17.6)
Others	41	28.5		1
Stock*				
<793	37	25.2	0.71 (0.31, 1.64)	0.59 (0.16, 2.1)
≥793	10	32.3		1

* stock of syringes and needles

II. Safety of delivery and dressing procedures

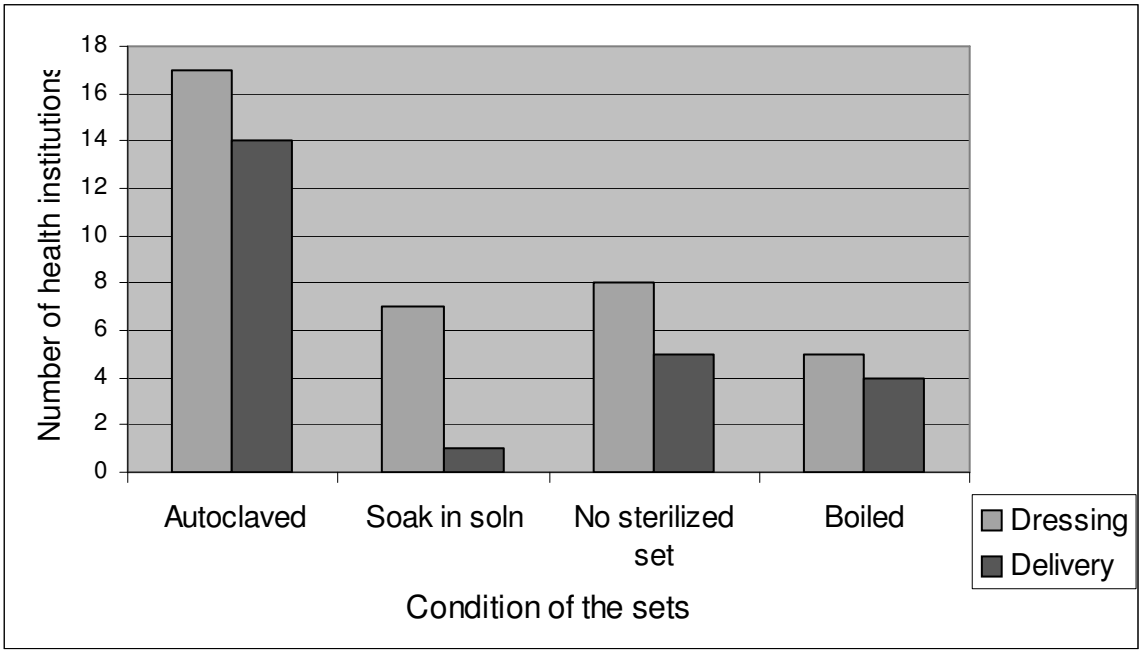
The safety of dressing services was assessed in 37 (92.5%) of the health institutions. The remaining health institutes are private and NGO clinics that claim as not giving dressing service at all. Concerning delivery services data were collected from 24 (60%) of the health institutions only. Among the 16 (40%) health institutes from which data was not found, the main reasons given were either no delivery service provided or no delivery set available. However the reasons given by some of the health institutions were out of the official knowledge of the Sidama Health Bureau.

Overall for 15 (39.5%)of the health institutions either delivery or dressing set sterilization was checked depending on the temperature and pressure of the sterilizers and the TST

spot indicator's color change. Accordingly in 12 (31.6%) of the observed sterilization process was OK (for the 5 the TST spot turned blue and in the 7 the sterilization was perf ormed at the appropriate time, pressure and temperature). For the rest of the 3 (8.7%) the TST spot indicators turned mottled yellow or brown indicating the inappropriateness of the sterilization.

Autoclaving, for 14 (58.3%) and 17 (46%) of the health institutions was the most commonly observed means of sterilizing and putting ready the delivery and dressing sets respectively. Getting contaminated and unsterilized dressing 8(21.6%)and delivery 5(20.9%) sets was also not uncommon phenomenon. Similarly most, 73.3% and 61.9% HCWs replied that the means to sterilize dressing and delivery sets respectively was autoclaving. Boiling, 22.7% of the HCWs for the dressing set, and 16.7% of the HCWs for the delivery sets followed this. Furthermore, although during observation, the HCWs pretended to demonstrate high caution in maintaining sterility, in 14 (36.8%) health institutes, the environment for dressing wounds and delivery were dirty and had the potential for contamination with blood or fluids.

Figure 4: Condition of the delivery and dressing sets on observation. Sidama, 2003.



III. Health care workers

A. General Socio-demographic and Work Related Characteristics of HCWs in the Study Health Institutions.

Two hundred and thirteen HCWs from the study health institutions were interviewed. This makes up 33.2% of the total HCWs in the zone. The majority, 131 (63.9%) of the HCWs were below the age of 32 years, where the mean age (SD) was 32.29 ± 8.72, and the male to female ratio was one to one. Both senior and junior nurses together with the health assistants constitute 60.1% of the study HCWs. Twenty eight (13.1%) cleaners also participated in the face-to-face interview.

B. Knowledge of HCWs with regard to the safety of injection and other medical practices

As shown on table 2 below, HIV was mentioned as the most common disease that can be transmitted through dirty needles and sharps by 197 (92.9%) HCWs. Only 15(7%) of the HCWs mentioned HIV, HBV, and HCV simultaneously. On the other hand, excluding cleaners, 169 (91.4%) of health care workers think that it is safe to reuse syringes by changing the needles only. Most HCWs 181 (85%) were not knowledgeable about the presence of Post Exposure Prophylaxis (PEP) for a person sustaining injury by needles or sharps.

Table 2: Responses of HCWs to knowledge questions related to the safety Practices. SIDAMA, 2003.

Question	Response	Freq	Percent (%)
Most common diseases transmittable through needle or sharps (n=222) *	HIV	197	92.9
	HBV	65	30.7
	Tetanus	55	25.9
	HCV	19	9.0
	Indifferent	28	13.2
Safe if reuse of syringe by changing the needles only (n=185)	Yes	169	91.4
	No	13	7.0
	In different	3	1.6
PEP after needle or sharp injury (n=185)	Yes	14	6.6
	No	181	85.0
	Don't know	18	8.4

* Multiple responses

C. Accidental needle and sharp injuries and reasons for the injuries on the HCWs:

Sixty- nine (32.4%) HCWs reported that they had sustained at least one form of accidental injury by needle or other sharps. Among these injuries, both deep and penetrati ng injuries constitute 51(63.8%). Nurses and health assistants sustained the highest propo rtion of accidental injury by needles or sharps. However, the over all difference was not statistically significant (P>0.05). Male HCWs had less chance of sustaining injury by either needle or other sharps than the females. On the other hand, type of the health institution and ownership had positive association with risk of needle or sharp injury (OR=1.98, and 95%CI (1.06,3.71). The majority of the HCWs, 193 (90.6%) didn't remember ever receiving vaccine against hepatitis B or had never taken one before (Table 3).

Table 3: Needles or sharps injuries sustained by HCWs (n=69). Sidama, 2003.

Variable		Needle or sharp injury Yes	%	Crude OR (95%CI)	Adj.OR (95%CI)
Sex					
	Male	26	24.1	0.46 (0.25, 0.82)	0.44 (0.24, 0.8)*
	Female	43	41.0	1	1
Qualification					
	Nurse/HA	35	31.5	0.92 (0.52,1.64)	1.19 (0.61, 2.32)
	Others	34	33.3	1	1
Type health HI					
	Gov.	47	37.9	1.86 (1.02, 3.4)	1.98 (1.06, 3.7)*
	Others	22	24.7	1	1
Age					
	<32	37	32.7	1.04 (0.58, 1.84)	.99(0.96, 1.04)
	≥32	32	32	1	1

* P< 0.05

Reasons listed by HCWs for sustaining the NSI

Sudden movement of patients followed by collecting used needles, and needle recapping 43.6%, 30.6%, and 29% respectively are the main reasons mentioned by the HCWs as causes for the accidental needle stick or sharp injuries. By the majority, 67 (89.3%) of the HCWs, the health status related to HIV/AIDS or hepatitis of the clients/patients who used the needles/sharps that caused the injury on them was not known. Only 7 (9.4%) of the HCWs mentioned that the clients/patients were known clinically diagnosed AIDS cases or blood tested and confirmed carrier cases.

As shown on table 4 below, overall 82(39%) of the HCWs, fear that they might have acquired HIV through their profession. This fear has no difference among the sex, age, and qualification of the health workers, and the type of the health institution the HCW was working (OR=0.68, 95%CI (0.37, 1.25)). However, there was statistically significant positive association between past histories of injury by needle or sharps (OR=2.3, 95%CI (1.25, 4.2)) and HCWs fear that they had acquired HIV through their profession.

Table 4: HCWs perceived risk of acquiring HIV through their profession. Sidama, 2003.

Variable		Yes		Crude OR,95%CI	Adj.OR, 95%C
		No	%		
Sex					
	Male	37	34.3	0.69(0.40, 1.21)	0.68(0.37, 1.25)
	Female	45	42.9	1	1
Age					
	<32	37	32.7	0.6(0.34, 1.04)	0.96(0.93, 1.0)
	≥32	45	45.0	1	1
Qualification					
	Nurse/HA	45	40.5	1.2 (0.69,2.08)	1.13(0.59,2.16)
	Others	37	36.3	1	1
Owner					
	Gov.	54	43.5	1.68 (0.95, 2.97)	0.6 (0.33, 1.12)
	Others	28	31.5	1	1
NSSI*					
	Yes	37	53.6	2.54 (1.41, 4.59)	2.3 (1.25, 4.2)②
	No	45	31.3	1	1

IV. Clients/Patients

A. General Socio-Demographic and Health Description of the Clients/Patients:

Children and adults were interviewed face to face on their exit from the study health institutions after they received any type of service on the date of data collection. Families or caretakers accompanying children responded to the separate questionnaires prepared for children less than fifteen years old.

The table below shows us that mainly adults above the age of 14 and female, 62.2% and 56.2% respectively, constitute the exit-interviewed group of the clients. Most i.e. 120 (34.1%) of them came to the health institution because of different ailments; 216 (61.4%) of the clients/patients remember the last time they took injection recently.

* Needle and other sharps injury
② P< 0.05

Table 5: General socio demographic and health characteristics of the clients/ patients Sidama, 2003.

Variable	No	Percent
Age		
<15	133	37.8
≥15	219	62.2
Sex		
Female	198	56.2
Male	154	43.8
Reasons for visiting the HI		
Different sicknesses	120	34.1
Fever or malaria	71	20.2
Cough	50	14.2
GIT problems	40	11.4
Family planning	30	8.5
Indifferent	59	16.8

B. Awareness of clients/patients on the risks of unsafe injections

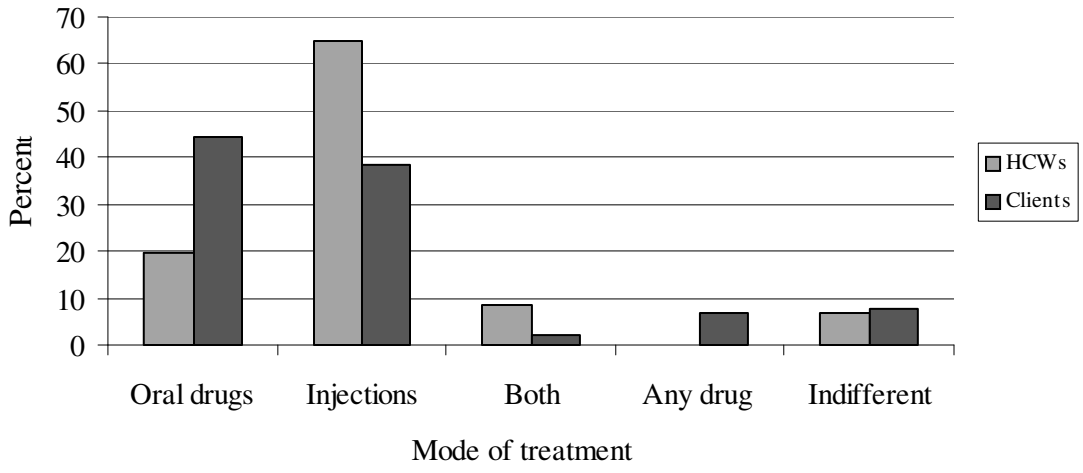
Three hundred and fifteen (89.5%) of the clients/patients were knowledgeable on whether dirty needles transmit diseases. Knowledge of whether dirty needles transmit disease or not, had no association with the sex or age of the clients/patients. HIV was the most common pathogen mentioned (by 70%) as transmittable through dirty needles. It was also mentioned by 17 (5.4%) of the clients/patients that tuberculosis could be transmittable through dirty needles. Answers to whether dirty needles transmit diseases have no statistical difference between the sexes or ages of the respondents.

C. Clients/patients preference of injection over oral/ other routs of drugs:

As indicated on the figure below, relatively higher number of clients/patients, mentioned that they preferred oral drugs 157 (44.6) to injectables 136 (38.6%) when their children have fever. The clients'/patients' preference of injections over other mode of treatment had no association with their age, sex, and their belief of the risk of dirty needles (P.V>0.05).

As opposed to the clients/patients the majority 120 (64.9%) of the HCWs claim that, clients/patients preferred injection preparations to oral or other routes of drugs when they come to the out patient departments with febrile illnesses.

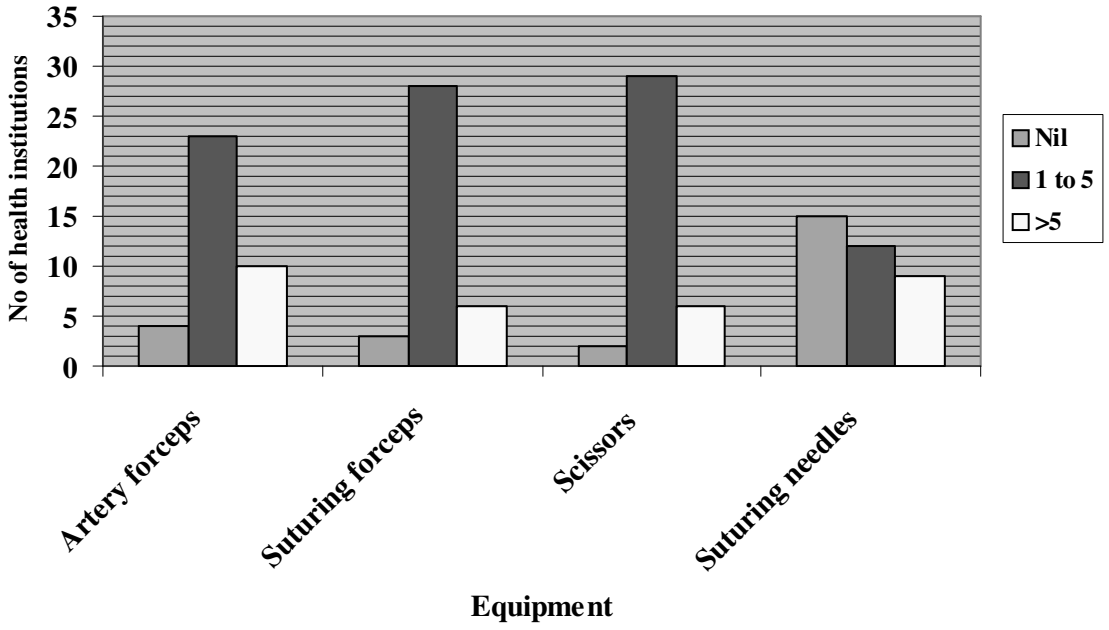
Figure 5: Preference of mode of treatment; Sidama, 2003.



V. Availability and Functionality of Minor Surgical Equipments:

Four (16%) of the study health institutions do not have forceps to clean wounds. Moreover, the majority, 36 (97%) of the health institutions, lacks at least one of the equipments, mentioned below mainly suturing needles 15 (41.7%) (Fig. 6).

Figure 6. Counted dressing equipments (n=36). Sidama, 2003.

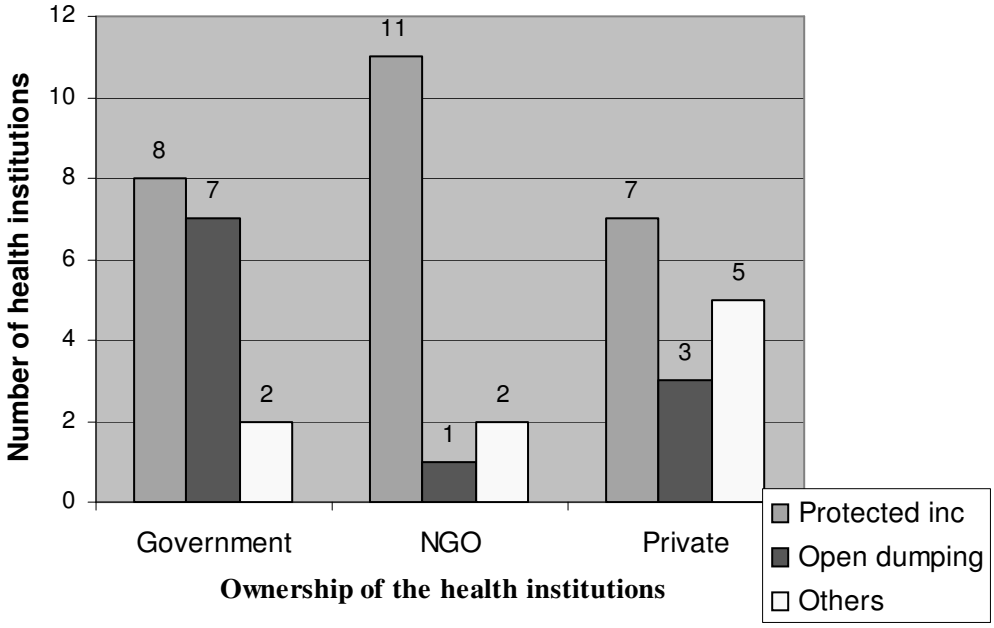


The functionality of autoclave was assessed by observing the presence and functionality of the temperature gauges, pressure gauges, and leakage of steam. Accordingly, in 8(38.1%) health institutions the sterilizers for the dressing and delivery equipments were not fully functional.

VI. Method of disposal of needles, syringes and other sharps

Among the private clinics, protected incinerator for disposing syringes, needles or sharps was observed in only two of them; on the other hand for NGO health institutes, protected incineration was the most commonly observed (80%) means of disposal. The differences, however, between the disposal systems between government owned and the other health institutions was not statistically significant (P>0.05). In total, 17 (42.5%) of the health institutes use protected incinerators to dispose syringes, needles, and other sharp objects. In 14 (35%) of the health institutes, dirty syringes, needle or sharps were observed to be disposed in a way that exposed the health workers and the community for injury or other conditions. On the same line, only 12 (5.8%) of HCWs from six different health institutions claimed that needles, syringes, and sharp objects were discarded immediately after use in their current working health institutions.

Figure 7: Needles, syringes and other sharp objects disposal system; Sidama, 2003.



6. Discussion

The results of this study revealed that major proportion of injections given in the study health institutes were unsafe to the recipients, the health workers, or to the community. This indicated that nearly 2 syringes and needles out of three administered in the health institutes were prepared, collected or finally disposed inappropriately. This figure is consistent with the findings in other sub Saharan countries where the proportion of unsafe injections ranges from 31% to over 90% in Burkina Faso (2). Even though the risks associated with the unsafe injections are difficult to quantify, this study showed that 22 (6.3%) of the clients/ patients reported having had injection related abscess. This further indicates how poor the injection practices were. However, abscesses only represent the tip of the iceberg of adverse events following injections. Furthermore, because febrile, ill and HIV infected persons tend to receive 10-100 times more injections than healthy people (2), the probability of unsafe syringes transmitting pathogens is very considerable.

Safety of the injection practices in this study was the result of method of syringe, needle or sharps collection and final disposal methods by the health institutions. In a previous study which included sixty health institutes and conducted under the auspices of WHO by Berhan and Miiogo, it was shown that few of the unsafe practices identified in Ethiopia appeared to be the result of a lack of equipment or supplies (24). The difference in the findings of these two studies can be explained by the time lapses between the two studies and the contemporary fact that nowadays many health institutes in the country are required by the ministry of health to use only single use and sterile injection materials as part of the WHO program.

Lack of disposal and destruction systems is a serious shortcoming of disposable syringe use. Sharp boxes must be available at each point of use; transportation and supervision of the medical waste is required; and safe destruction needs to be assured, as well as final containment of the residue. Lapses in any of these steps can lead to resale, reuse, increased likelihood of accidental needle-stick injuries, and danger to the community (27,28). However, in most African countries, waste disposal was reported to be problematic. Different studies done in Cameroon (1998), Chad (1997), Cotedivoire (1997), Guinea-Bissau (1997), and Uganda (1998), showed that no health center had the facilities for safe disposal of used material (14). In Ethiopia (1997-98), like Kenya, Rwanda and Zambia, incineration of used syringes and needles was reported to be the common practice (14). In the study by Tesfaye et al, it was reported that, 36% of the health centers had designated incinerators, however, at 75% of the health centers, used needles were found outside the health centers (23). Our findings were similar to the above mentioned study in that only at 42.5% of the health institutions incinerators were used, and in 35% of the health institutions dirty syringes and needles were observed disposed around the health institutes.

Factors that might facilitate blood born pathogens infection among patients are the high prevalence of infection among patients, an environment contaminated with blood, a high frequency of percutaneous procedures, and the presence of patients with viremia. In Romania for example, where some of these conditions were present, HBV epidemic was probably related with environment that was potentially contaminated with blood or body fluids (1). The present study showed us that reusable medical equipments that contact open skin or used for percutanous procedure (for delivery and minor surgeries) were put

ready for reuse without proper or no sterilization in most health institutions. Even for some of the sterilizations performed, the sterilization process was inappropriate. Besides, it was common to observe an environment where dressing and the delivery were performed in unclean manner where there was the potential to contaminate the equipment with blood or body fluids. Thus the delivery and dressing services in most health institutions were unsafe and have the potential for transmission of blood born pathogens. In addition most of the health institutions that denied providing delivery/dressing services, when they were supposed to do so by the zonal health bureau, the most probable reason could be the intention not to disclose the dirty and contaminated equipment behind their curtains. To modify and improve infection control in the health care environment, many health institutes elsewhere have taken measures to reduce the probability of exposure to pathogens by introducing universal blood and body fluid precautions. The concept of universal precaution is based on the assumption that all patients may be infected with blood born pathogens and stressed the importance of applying appropriate precautions to all patients and their body fluids (27,28). The same measures could have serious importance in health institutions in our country.

The findings of this study showed that although all health care workers were aware of the transmissibility of diseases through reuse of needles and other sharps, only 15 (7%) of them mentioned HIV, HBV, and HCV simultaneously. Similarly, most (91.4 %) of the HCWs think that it is safe to reuse syringes by only changing the needles between patients and 85% of them had no information on the presence of prophylaxis for a person sustaining accidental injury by needle or other sharps. HCWs especially those working at peripheral (primary) health institutions, as essential members of a community in

prevention and management of diseases and important opinion leaders in their communities, need to be knowledgeable of the risks of unsafe injections. The present finding implicated the urgency of massive mass campaign to educate HCWs working at the peripheral level.

Needle stick injuries are the commonest form of HIV, HBV and HCV exposure in health institutions (33). In developing countries the data available are very few and are mere gross under estimation of the real risks. In this study, the 12 months prevalence of injury by contaminated needle or sharp objects among HCWs was 32%, where 64% were deep or penetrating injuries. Sudden movement of patients, collecting used syringes and needles, and needle recapping were most common reasons for sustaining the injuries. The needle stick or sharp injury has no statistical significant difference among the sex, age, and qualification of the HCWs. The past accidental needle-stick or sharps injury report by the HCWs could be substantiated with the observed figures of two-handed needle recapping (29 of the 35) and the presence of needles and sharps at some of the health institutes (30%) in a situation that could expose HCWs for accidental injury. On the same line, most (39%) of the HCWs think that they have acquired HIV through their work. However the majority (90.6%) of the HCWs neither took hepatitis B vaccine in the past two years nor knew that there is a post exposure prophylaxis for HIV by 83.4%.

Although, for the majority of the HCWs who sustained accidental injury by needles or sharp objects, the health status of the source patient related to HIV infection or hepatitis was not known, for 7(9.4%) of the accidental injuries on the HCWs, the source patients who used the needles or the sharp objects were clinically suspected or blood test confirmed HIV positive carrier cases.

Moreover, those HCWs who sustained the injuries were more likely to think that they have acquired HIV through their occupation. The finding of this study was different from previous studies by Berhan and Millogo where needle stick injury was reported in two-third of the HCWs (24). But, it agreed to the findings of Tesfaye et al (23). These findings implicate us that, injury by needle or sharp objects is not uncommon and even though the risk of acquiring diseases through professional exposure is low, the consequences of being infected could be obviously severe. The hazard of the exposure involved medical, psychological, educational, and social aspects of the victim (26).

Most clients/ patents in the present study were aware of the transmissibility of diseases particularly HIV through dirty needles. The majority of them cited HIV as a common pathogen that could be transmissible in that route. In a holistic approach to injection safety, public awareness is an integral component (14,25). So this high knowledge on the risk of injection may drive consumers to demand safe injection equipment and improved injection practices.

The results of this study showed that relatively higher number of clients/ patients prefer oral drugs to injectables when they or their children have fever. This finding was inconsistent with most HCWs response that, clients/ patients prefer injection preparations when they appear to the out patient departments with febrile illnesses. This difference could partly explained by the study procedure in that, because data collection was an exit interview where clients/ patients were interviewed on their exit after receiving services, they might have been thought (confronted) on their “wrong request” of injections in any ways or their fear of risks of unsafe injections.

Shortage of medical equipments to run routine activities including sterilization of reusable equipments is common. Observation made in district and regional hospitals in Tanzania showed that many procedures are carried out in the absence of basic equipments (30). Similarly, a cross-sectional study to assess the quality of private clinics in Addis Ababa showed that few clinics had enough equipment (32). The findings from the health institutes in this study were not far from this fact. Most (97%) of the health institutes lack at least one suturing needle, scissors or forceps for wound care or to do minor percutanous procedures. Sterilizers leaking steam, or that do not have temperature or pressure-measuring gauges was common in 38% of the health institutes. In primary health institutes, where access to alternative health service is difficult, sterilizing the equipments now and then after each use to help patients could be time consuming and difficult. Even, if they have to, some of them do not have fully functioning sterilizers. So if they must help the patients, lack or shortage of equipments may urge them to reuse the available equipments without proper sterilization or use equipments for many procedures for which they were not prepared. All these could aggravate the cross contamination and spread of diseases.

7. Strengths and limitations of the study

7.1 Strengths of the Study

- This study has used data collection through observation and interview of both health care workers and clients/patients. These methods could compliment the findings each other;

- The observation method used to collect data particularly, helped to uncover problems and practices that people do not know they had;

- The survey included non-governmental organization owned health institutions found at periphery and private clinics found in the zone.

7.2 Limitations of the Study

- Limitations related to the very nature of observational studies:
  - Possibility of observation bias;
  - Subjectivity of observation results;
  - Costly and time consuming.

- The clients/patients for the interview were recruited when they exit from health institutes than selecting from the community.

8. Conclusion

This survey has revealed that considerable proportion of injection practices in the study health institutes were unsafe. The poor safety of the injection practices was due mainly to the improper collection and/disposal of the needles and other sharps.

Many medical procedures that use re-useable equipment are carried out in the absence of one of the basic equipments like scissors, suturing needle, and forceps. Poorly functioning sterilizers was also a common problem in some health institutions.

The observed condition that the equipments used for delivery and percutanous procedures put ready for the next coming procedures in non sterile and contaminated manner and the poor functionality of sterilizers for the equipments and the poor hygienic condition of the environment where the procedures were performed, had made the procedures unsafe for patients putting them at risk of blood born pathogens.

In most of the health institutions protected incineration was not used to dispose needles, syringes and other sharp objects and thus observing dirty needles and sharps was common in some health institutions.

Most HCWs in this study had the textbook knowledge of the transmission of diseases through contaminated needles. However a few of them were able to comfortably cite the major viruses namely HBV, HCV, and HIV simultaneously. On the same line, most HCWs were not aware of the presence of prophylaxis against HIV immediately after accidentally sustaining injury by needles or sharps.

Injury by needle or sharp was common among HCWs. The majority of these injuries was deep or penetrating the skin, and occurred at the occasions of sudden movement of patients collecting used needles or needle recapping.

In this study most of the interviewed clients/patients were aware that unsafe injection were risky. The majority had no difficulty citing HIV as a disease that could be transmitted through unsafe injections.

Relatively higher number of clients/patients reported the preference of oral drugs to injectables in condition that their children have fever. On the contrary, HCWs perceive that clients/patients prefer injections to oral medications.

9. Recommendations

After analyzing the major findings from these cross-sectional study the following recommendations are forwarded:

- Due emphasis should be given by the health institutions and the Zonal Health Bureaus on the proper collection and disposal methods of needles, syringes and sharp objects in all the health institutions in the zone.

- The zonal and regional health bureaus should ensure adequate supply of delivery and dressing sets and the functionality of the sterilizers in all the health institutions;

- Mass campaign to give on job training to the HCWs on the safety of injections, dangers of reuse of needles and other sharp objects, and educating them on post exposure prophylaxis.

- Post Exposure Prophylaxis should be made available to the HCWs after sustaining accidental needle or sharp injury while on their job.

- Reinforcing the public awareness programs on the safety of injections and on the transmission and the consequences of blood born pathogens.

- Similar studies that include assessment of the magnitude of blood born pathogens among health care workers and the community.

- More studies of safety of injection and related medical practices in different settings: and qualitative assessment to determine the reasons for these unsafe practices by using “Tool A” of the SIGN research tool.

10. References

1. Hutin Y., Hauri A., Chiarello L., et al. Best Infection control practices for intradermal, subcutaneous, and intramuscular injections. B. WHO 2003; 81(7): 491-500

2. Simonsen L., Kane A., Lioyd J. Zaffran M., and kane M. Unsafe injections in the developing world and transmission of blood born pathogens: a review. BWHO 1999; 77 (10): 789-799.

3. Hu DJ, Kane MA, Heymann. Transmission of HIV, HBV, and other blood borne pathogens in health care settings: a review of risk factors and guidelines for prevention. BWHO 1991; 69(5): 623-630.

4. Jagger J, Hunt EM, Brand-Elnaggar J., Pearson RD. Rates of needle-stick injury caused by various devices in a university m hospital. N Eng J of Med 1988; 319: 284-8.

5. Kane A., Lloyd J., Zaffran M., Simonsen L., and Kane M. Transmission of hepatitis B, hepatitis C, and human immunodeficiency viruses through unsafe infections in the developing world: model-based regional estimates. B WHO 1999; 77(10): 801-7.

6. Murakami H., Kobayashi M., Zhu X., Li Y., Wakai S., Chiba Y. Risk of transmission of hepatitis B virus through childhood immunization in north western China. Social science and Med 2003; 1821-1832.

7. Brewer D., Brody S., Drucker E. et al. mounting anomalies in the epidemiology of HIV in Africa: Cry the beloved paradigm (Review). Int. J STD and AIDS 2003; 14: 144-147.

8. Gisselquist D., Rothenberg R., Potterate J. et al. HIV infections in sub-Saharan Africa not explained by sexual or vertical transmission. Int .J STD and AIDS 2002; 13: 657-66

9. Drucker EM, Alcabes PG., Marx lPA. The injection century: consequences of massive unsterile injecting for the emergence of human pathogens. Lancet 2001; 358: 1989-92.

10. Hutin Y.J and Chen R.Y. Injection safety: A global challenge (Editor.). B WHO 1999; 77(10): 787-8.

11. Lane M. Point of view: Unsafe injections. BWHO. 1998; 76(1): 199-100.

12. Sopwith W., Hart T., and Garner P. Preventing infection from reusable medical equipment: A systematic review. BMC infect. Diseases 2002; 2(4). Available at: URL: http://www.biomedcentral. Com.

13. Khan A.J., Luby S.P. Fikree F., et al. Unsafe injections and the transmission of hepatitis B and C in a periurban community in Pakistan. B WHO 2000; 78(8): 956-63.

14. Dicko M., on; A., Ganivet S., Kone S., Pierre L., and Jacquet B. Safety of immunization injections in Africa; not simply a problem of logistics. B. WHO. 2000; 78(2): 163-8.

15. Bond, W.W et al Survival of hepatitis B after drying and storage for one week. Lancet 1981; 1: 550-1.

16. CDC. Recommendations for preventing transmission of injections among chronic hemodialysis patients. MMWR 2001; 50 (RR05): 1-43.

17. Hutin YJF, Crciun D., Ion-Neldlcu N., Mast EE, Alter MJ, Margolis HS. Using surveillance data to monitor key aspects of the epidemiology of hepatitis B virus (HBV) infection in Romania. November 1999.

18. Risk to health care workers in developing countries. N Engl J Med 2001; 355 (7) at WWW. Nejm. Org

19. CDC. Surveillance of Health care workers with HIV/ AIDS. Oct. 2001

20. Haiduven DI, Demajo TM, Steven Da., A five year study of needle-stick injuries: significant reduction associated with communication, education and convenient placement of sharps containers. Infection control and hospital Epidemiology 1992; 3: 265-71.

21. Jagger J., Hunt EH, Brand-Elnaggar J., Pearson RD., Rates of needle stick injuries caused by various devices in university hospital. New Engl. J Med 1988; 319: 284-8.

22. Chadee DD., Edwards JR., Sharma K., Shivanath B. Inoculation Injuries in Hospitals in Trinidad and Tobago. The West Indian Med. J Dec. 1999; ISSN 0043-3144: 48 (4).

23. Tesfaye F., Mengistu Y., Priddy F. et al. Potential for Medical Transmission of HIV in Ethiopia 2003 (unpublished pilot study).

24. Berhan Y. and Millogo J. Reports of injection safety survey in Ethiopia, B WHO Oct-Nov.2000, at 10-11.

25. WHO. Injection safety. Tropical Doctor Jan. 2003; 33: 48-49.

26. Health Action AIDS. HIV transmission in the Medical Setting: A white paper by physicians for Human Rights; Found at: http://WWW.phrusa.org/campaigns/aids/contact.htm/

27. CDC. Injection Safety: Emerging Infectious Diseases.2001: 17(3).

28. Battersby A, Feilden R, and Nelson C. Sterilizable syringes: excessive risk or cost-effective option? BWHO. 1999; 77(10): 812-818.

29. Battersby A, Feilden R, Stieckel P, Da Salva A, Nelson C, and Bass A. Strategies for safe injections. BWHO. 1999; 77(12): 996-9.

30. Gumodoka B, Favot l, Berega Z.A, and Dulmans U.M.V. Occupational exposure to the risk of HIV infection among health care workers in Muanza Region, United Republic of Tanzania. BWHO; 75(2): 134-140.

31. Sidama Zone Health Bureau. SNNPRS Health Profile (Quick reference). Yr II, VII; February 2002/03.

32. Afework S. Quality of Health Care in Private Clinics in Addis Ababa. (MPH thesis); 2003.

33. Standing Board: Risks to Health Care Workers In Developing Countries. N Engl. J Med. 2001; 34(7): 538-540.

11. Annexes

Annex 1: English observation and interview questionnaire

A Questionnaire Prepared To Collect Data On The Safety Of Injections And Related Medical Practices In Health Institutions At Awasa Zone, SNNPRS.

Hallo! Good morning?

My name is Sr./Ato…….. I am here today to collect data on the assessment of the safety of injections and related medical practices in health institutions.

The objective of this questionnaire is to assess the safety of injections and related medical practices in health institutions at Awasa Zone. Your correct and genuine answer to the questions can make the study achieve its goals. Therefore, you are kindly requested to respond voluntarily with patience. The interview may take about 25 min. We assure you that this study is surely confidential, thus writing your name is not needed. Are you willing to participate in the interview?

Yes! Go to the next page.

No! Thank them and interrupt the interview.

Sign of the consenting interviewer ……

Result of the interview 1. Completed

2. Partially completed

3. The interviewee refused

4. Others……..

Supervisor's name…… Sign……

Observation Checklist

For Injection administration

100A. Name of Health institution: -……

100B. Date: -…….. 100C. Time.

100D. Department /unit: -……

100E. Code Number of the checklist……

(Note: - use only one form for each injection!)

No.	Questions	Choice	Skip to
101	Type of ownership of the health institution?	1. Government health center 2. NGO Health center 3. Government health station 4. NGO health station 5. Private health station	
102	Type of injection equipment (syringe and needle) used in the health institution.	1. Sterilizable 2. Single use 3. Auto disable 4. Others (specify)…….	
103	Source of the syringes and needles	1. Patients buy from the health institution 2. Patients bring from outside/drug venders 3. Sterilized in the health institution for reuse 4. New syringes are provided free of charge by health facility 5. Others, (specify)……	
104	Does the health worker leave needle in the septum of multidose vial	1. Yes 2. No …….⇒	106
105	If yes, does the health worker use the same syringe to draw medication repeatedly	1. Yes 2. No	
106	Have You observed recapping of needle?	1. Yes 2. No …….⇒.	108
107	How was the condition of recapping of the needle occurring?	1. Single handed 2. Two handed	
108	Have you observed any needle-stick injury on the health worker?	1. Yes 2. No…….⇒	110

No.	Questions	Choice	Skip to
109	How did the needle stick injury occur?	1. Because of abrupt movement of a patient/s 2. Because of two handed recapping 3. Because of unsafe sharp collection 4. Because of carelessness/negligence 5. Others, specify……	
110	Any observed reuse of needle for more than one person (about to take place)?	1. Yes 2. No 3. Interrupted by the observer	
111	Any observed reuse of syringe for more than one person (about to take place)?	**1.** Yes **2.** No **3.** Interrupted by the observer	
112	How is the injection environment?	1. Clean and no potential contamination of syringe and needle with blood or other body fluids. 2. Dirty and potential contamination of syringe and needle with blood or other body fluids. Comment:……	
113	Are there any Needle, syringe and sharp collection box?	1. Yes 2. No …….⇒	115
114	Type of needle, syringe and sharp collection box	(Multiple responses are possible) 1. Safety box 2. Liquid proof 3. Open container 4. Puncture proof 5. Others, (specify)…… Comment:……	
115	How was the condition of the collection box during data collection?	1. Over filled 2. Torn and needles seen through the hole 3. Empty or few dirty syringes and needle inside it 4. Others, (specify)..... Comment.....	
116	Are there any dirty needles and sharps in places where they expose health care workers to needle stick injuries	1. Yes 2. No	

<table>
<tr><th>No.</th><th>Questions</th><th>Choice</th><th>Skip to</th></tr>
<tr><td>117</td><td colspan="3">Observed sterilization
<table>
<tr><th></th><th>Time</th><th>Pressure</th><th>Temperature</th></tr>
<tr><td>116.1. Boiling</td><td>(116.11)</td><td>(116.12)</td><td>(116.13)</td></tr>
<tr><td>116.2. Incineration</td><td>(116.21)</td><td>(116.22)</td><td>(116.23)</td></tr>
<tr><td>116.3. Autoclave/ steam sterilization</td><td>(116.31)</td><td>(116.32)</td><td>(116.33)</td></tr>
</table></td></tr>
<tr><td>118</td><td>If auto clave/steam sterilization, do they use TST control spot indicator?</td><td>1. Yes
2. No …….⇒</td><td>119</td></tr>
<tr><td>119</td><td>TST control spot indicator color change from yellow to:</td><td>1. Blue
2. Brown
3. Mottled yellow
4. Other (Specify).....</td><td></td></tr>
<tr><td>120</td><td>How are needles, syringes and sharps disposed of in the Health facility?</td><td>1. Open incineration
2. Protected incineration
3. Open dumping
4. Burial in a pit
5. Dumping
6. Other, specify……</td><td></td></tr>
<tr><td>121</td><td>Are there contaminated needles, syringes or other sharps in the immediate surrounding of the health institution?</td><td>1. Yes
2. No</td><td></td></tr>
<tr><td>122</td><td>Qualification of the observed injector</td><td>1. Health assistant
2. Junior nurse
3. Nurse
4. Health Officer
5. Physician
6. Others (specify).....</td><td></td></tr>
<tr><td>123</td><td>Age of the observed injector,</td><td></td><td></td></tr>
<tr><td>124</td><td>Sex of the observed injector</td><td>1. Male
2. Female</td><td></td></tr>
<tr><td>125</td><td>Year of graduation of the observed injector</td><td></td><td></td></tr>
<tr><td>126</td><td>Stock of syringe and needle in the health institution counted</td><td></td><td></td></tr>
</table>

Interviewer's name=……..Sign……..

Supervisor's name=…… Sign……

Observation Checklist
For delivery room

200A. Name of Health institution: -……..
200B. Date: -…….. 200C. Time.
200D. Department /unit: -…….
200E. Code Number of the checklist……

No.	Questions	Choice	Skip to
201	Type of ownership of the health institution?	1. Government health center 2. NGO Health center 3. Government health station 4. NGO health station 5. Private health station	
202	Number of prepared delivery sets observed		
203	How are the delivery sets stored (put ready): -	1. Soaked in …… solution 2. Boiled and packed with clothes 3. Autoclaved and packed with clothes 4. Others (specify)_____	
204	How are the delivery sets sterilized?	**1.** Soaked in……solution ⇒ **2.** Incinerating…….⇒ **3.** Boiling **4.** Autoclaving **5.** Others (Specify)……	206 206
205	If the delivery sets are sterilized by autoclaving	205.1 Time -------min 205.2 Pressure ----------mm. Hg 205.3 Temperature……. 205.4 TST Spot color change……	
206	How are the delivery forceps put ready?	1. Soaked in_____solution 2. Boiled and packed with clothes 3. Autoclaved and packed with clothes 4. Others (specify)_____	
207	How are the vacuum cups Put ready (stored)?	1. Soaked in_____solution ⇒ 2. Boiled and packed with clothes ⇒ 3. Autoclaved and packed with clothes 4. Others (specify)_____	209 209
208	If the vacuums are sterilized by autoclaving,	208.1 Time -------min 208.2 Pressure ----------mm. Hg 208.3 Temperature……. 208.4 TST Spot color change……	

No.	Questions	Choice	Skip to
209	Any observed reuse of a needle for different patients without sterilizing (about to happen)?	1. Yes 2. No 3. Interrupted by the observer	
210	Any observed reuse of a syringe for different patients without sterilizing (about to happen)?	1. Yes 2. No 3. Interrupted by the observer	
211	Any observed reuse of sharps for different patients without sterilizing?	1. Yes 2. No …….⇒ 3. Interrupted by the observer	214
212	For how many patients were the sharps reused without sterilization?		
213	Describe the instrument, and the purpose/reason		
214	Are there any observable needles or sharps in places where they expose HCW to injury?	1. Yes 2. No	
215	What does the cleanliness of the environment of delivery area looks like?	1. Clean and no potential contamination of syringe and needle with blood or other body fluids. 2. Dirty and potential contamination of syringe and needle with blood or other body fluids Comment:……	
216	Specify the type of used needles, syringes and other sharps' collection box observed	(Multiple responses are possible) 1. Safety box 2. Liquid proof 3. Open container 4. Puncture proof 5. Others, specify)…… Comment:……	
217	Is any observed needle left on the septum of a local anesthesia vials?	1. Yes 2. No	
218	How much deliveries are assisted in the past three months	……	
219	How many deliveries did you observe today?		
220	Who is (the observed) sterilizing the delivery sets?	1. Nurse 2. Health Assistant 3. Cleaner 4. Guard 5. Junior nurse 6. Others, (specify)----------	
221	Year of graduation of the sterilizer		

Interviewer's name=……..Sign……..

Supervisor's name=…… Sign……

Observation Checklist

For dressing room

300A. Name of Health institution: -……..
300B. Date: -…….. 300C. Time.
300D. Department /unit: -…….
300E. Code Number of the checklist……

No	Question	Choice	Skip to
301	Type of ownership of the health institution	**1.** Government health center **2.** NGO Health center **3.** Government health station **4.** NGO health station 5. Private health station	
302	Environment of the dressing area,	1. Clean and no potential contamination of equipment exists 2. Dirty and potential contamination of equipment exists Comment:……	
303	Any observed reuse of forceps that contacts open tissue for more than one patient?	1. Yes 2. No ……. ⇒. 3. Interrupted by the observer	306
304	For how many patients did they reuse?		
305	Describe the instrument, and the purpose/reason		
306	Are there any needle, syringe, and sharp collection box?	1. Yes 2. No …… ⇒	308
307	Type of needle, syringe, and sharp collection box?	(Multiple responses are expected) 1. Safety box 2. Liquid proof 3. Open container 4. Puncture proof 5. Others, (specify)…… Comment:……	
308	Are there any dirty sharps in places where they expose health care workers for needle stick injuries?	1. Yes 2. No	
309	What is the observed means of sterilization of the dressing set?	1. Soaked in_____solution ⇒ 2. Incinerating …… ⇒ 3. Boiling 4. Autoclaving 5. Others (Specify)……	312 312

No	Question	Choice	Skip to
309	What is the observed means of sterilization of the dressing set?	6. Soaked in_____solution ⇒ 7. Incinerating …… ⇒ 8. Boiling 9. Autoclaving 10. Others (Specify)……	312 312
310	If the observed sterilization is autoclaving,	310.1 Time -------min 310.2 Pressure ----------mm. Hg 310.3 Temperature……. 310.4 TST Spot color change…	
311	Is the autoclave/steam sterilizer fully functional?	1. Yes 2. No	
312	How are the dressing set put ready?	**1.** Soaked in_____solution **2.** Boiled and packed with clothes **3.** Autoclaved and packed with clothes **4.** Others (specify)_____ Comment……	
313	Are there readily prepared and put suturing needles?	1. Yes 2. No	
314	Number of observed suturing needles prepared ready		
315	Number of suturing done today		
316	Number of suturing done in the past six months		
317	Observed injection equipments available		
318	Number of dressings observed by the observer during this data collection		
319	Is tooth extraction performed in the health institution?	1. Yes 2. No…… ⇒	326
320	Total number of tooth extraction sets observed		

No	Equipment	Number
317.1	Artery forceps	
317.2	Suturing forceps	
317.3	Scissors	
317.4	Suturing needles	

No	Question	Choice	Skip to
321	How is the tooth extraction set stored (Put ready)?	**1.** Soaked in_____solution **2.** Boiled and packed with clothes **3.** Autoclaved and packed with clothes **4.** Others (specify)_____ Comment……	
322	What is the means of sterilization for the tooth extraction sets?	**1.** Soaked in_____solution. ⇒ **2.** Incinerating.....…. ⇒ **3.** Boiling **4.** Autoclaving **5.** Others (Specify)…….	324 324
323	If the observed sterilization is autoclaving,	323.1 Time -------min 323.2 Pressure ----------mm. Hg 323.3 Temperature……. 323.4 TST Spot color change…	
324	How much prepared tooth extraction set did you observe?		
325	How much tooth extractions are performed in the past six month?		
326	Is there any percutanous procedure involving sharps, performed during the data collection?	1. Yes 2. No…… ⇒	End
327	What is the observed percutanous procedure?	1. Draining abscess 2. Circumcision 3. Tarsatomy 4. Tooth extraction 5. Others, (specify)	
328	Comment on the sterility of the equipments		
329	Qualification of the health care worker working in the dressing room?	1. Nurse 2. Health Assistant 3. Cleaner 4. Guard 5. Junior Nurse 6. Others, (specify	

Questionnaire I.
For Health Care Workers

400A. Name of Health institution: -……..
400B. Date: -…….. 400C. Time.
400D. Department /unit: -…….
400E. Code Number of the checklist……

No.	Question	Choice	Skip/ to
401	Type of ownership of the health institution?	1. Government health center 2. NGO Health center 3. Government health station 4. NGO health station 5. Private health station	
402	Age		
403	Sex	1. Male 2. Female	
404	Profession	1. Physician 2. Health Officer 3. Nurse 4. Health assistant 5. Junior Nurse 6. Others, (specify)……	
405	Year of service after the latest graduation		
406	Responsibility (place of work) in the health institution this week	1. Proscribing 2. Delivery room 3. Injection 4. Laboratory 5. Others, (specify)……	
407	Have you had any injury by needle since the past year	1. Yes 2. No …… ⇒ 3. I don't remember	412
408	How much injury by needle have you sustained?		
409	Type of injury sustained	1. Deep injury 2. Slight skin penetration 3. Superficial 4. Others, (specify)…	

No.	Question	Choice	Skip/ to
410	How did you sustain the injury?	1. During recapping 2. By a sudden movement of a patient 3. During sharp collection 4. Others, (specify)……..	
411	How was the HIV status of the patient/client who used the needle	1. Confermed through laboratory to be HIV positive 2. Clinically suspected AIDS case 3. Yellowish discolourated sclera and known hepatitis patient 4. The patient's health condition is not known 5. Others (specify)……	
412	Have you had any injury by <u>sharps (scissors, blade etc.)</u> since past year?	1. Yes 2. No …… ⇒ 3. I don't remember	415
413	Type of injury sustained	1. Deep injury 2. Slight skin penetration 3. Superficial 4. Others, (specify)…	
414	How was the health status of the source client/patient in relation to blood born pathogens?	1. Known, HIV/AIDS positive 2. Clinically suspected HIV/AIDS case 3. Jaundiced and clinically diagnosed hepatitis patient 4. Unknown status 5. Others, (specify)…	
415	Can diseases be transmitted through dirty needles and sharps?	1. Yes 2. No ……⇒ 3. I don't know 4. I have no idea	417
416	What are the most common diseases that may be transmitted through dirty needles and sharps?	1. HBV 2. HCV 3. HIV 4. Others, (specify)…… 5. I don't know	
417	Is it safe to reuse syringe between patients if the needle is changed?	1. Yes 2. No 3. I don't know	

No.	Question	Choice	Skip/ to
418	Is there any prophylaxis to HIV after exposure to injury by needles or sharps?	1. Yes 2. No ……⇒ 3. I don't know	420
419	When is the appropriate time to take post exposure prophylaxis to HIV after exposure?		
420	When did you take HBV vaccine last?		
421	Do you think that you have acquired HIV through your profession?	1. Yes 2. No ……⇒ 3. Others, specify……	423
422	If you think that you might have acquired the virus, how do you level your status for HIV?	1. Confirmed positive through VCT 2. Likely to be positive 3. Some suspicion of myself to be positive 3. Confirmed negative through VCT 4. I don't totally suspect myself to be a carrier of the virus 5. Others, (specify)	
423	Are needles and needles reused with out sterilization in your health institution?	1. Yes 2. No …… ⇒ 3. I don't know	424
424	What do you think are the main reasons for the reuse of the needles?	1. Shortage of supply of syringes and needles 2. Knowledge deficit 3. Carelessness 4. Others (specify)……..	
425	Do you currently have stocks of new, single use syringes and needles in your facility or at a nearby public or community pharmacy?	1. Yes 2. No 3. I don't know Comment…	
426	Do you have sufficient quantities of sharps boxes to dispose of sharps safely?	1. Yes 2. No 3. I don't know	
427	Do you feel that you over prescribed injections in your health institution?	1. Yes 2. No ……⇒ 3. I don't know 4. Others, (specify)…	429

No.	Question	Choice	Skip/ to
428	What are the reasons for the over prescription of injections?	1. Knowledge deficit on the risk of injection 2. Client/patient request/demand 3. Because injections are more effective than other forms of drugs 4. To maintain social acceptance and recognition 5. In availability of alternative drugs 6. Others, (specify)…	
429	What are the common injectable medications you prescribe?	1. Antibiotics 2. Antipyretics 3. Others, (specify)…… 4. I don't know	
430	What kind of medications do patients prefer when they present at an out patient clinic with a febrile illness?	1. Injection 2. Oral medications or other non-injectable medications 3. Both injectable and oral or non injectable medications 4. I don't know	
431	When you prescribe an injection, who usually gives the injection to the patients?	1. A Nurse 2. A Health assistant 3. Others, (specify)… ……	
432	How many patients do you usually on average see in one day in your current work place?		
433	What is the source of needles and syringes for patients?	1. Patients buy from the health institutions 2. Patients bring from outside/drug venders 3. Sterilized in the health institution for reuse 4. Others, (specify)…	
434	How is the delivery set stored (put ready) in your health institution?	1. Soaked in_____solution 2. Boiled and packed with clothes 3. Autoclaved and packed with clothes 4. Others (specify)	
435	How are the delivery sets sterilized in your health institution?	1. Soaked in_____solution 2. Boiled and packed with clothes 3. Autoclaved and packed with clothes 4. Others (specify)… Comment……	

No.	Question	Choice	Skip/ to
436	How are the delivery forceps put ready in your health institution?	1. Soaked in_____solution 2. Boiled and packed with clothes 3. Autoclaved and packed with clothes 4. Others (specify)…	
437	How are the delivery forceps sets sterilized in your health institution?	1. Soaked in_____solution 2. Boiled 3. Autoclaved 4. Incinerated 5. Others (specify)	
438	How are the vacuum cups sterilized in your health institution?	5. Soaked in_____solution 6. Boiled 7. Autoclaved 8. Incinerated 9. Others (specify)…	
439	How are dressing sets sterilized in your health institution?	1. Soaked in_____solution 2. Boiled 3. Autoclaved 4. Incinerated 5. Others (specify)…	
440	Are sharp equipments used without sterilization in your health institution?	1. Yes 2. No 3. I don't know	
441	Do you sterilize equipments in your assigned place of work?	1. Yes 2. No……⇒	446
442	What type of medical equipment do you sterilize?	1. Syringes and needles 2. Dressing set 3. Delivery set 4. MVA set 5. E and C set 6. Others (specify).....	
443	How frequent do you sterilize the equipments?	1. Always 2. Usually 3. Sometimes 4. Occasionally	
444	Do you use the TST control spot indicator on autoclaving/steam sterilizing equipments?	1. Yes 2. No 3. I don't know	

No.	Question	Choice	Skip/ to
445	How frequent do you use the TST indicator?	1. Always 2. Usually 3. Sometimes 4. Occasionally	
446	Are needles, syringes, and sharps immediately discarded after use in sharps containers in your health institution?	1. Yes 2. No 3. I don't know 4. Others (specify)……..	
447	Are syringes and needles appropriately disposed of in your health institution?	1. Yes 2. No 3. I don't know 4. Others (specify)……..	

Interviewer's name=……..Sign…
Date……
Supervisor's name=…… Sign……

Questionnaire II
For adult Clients/patients

500A. Name of Health institution: -……..
500B. Date: -…….. 500C. Time.
500D. Department /unit: -…….
500E. Code Number of the checklist……

No	Question	Choice	Skip to
501	Age		
502	Sex	1. Male 2. Female	
503	Address		
504	Reason of visit for the health institution	1. Because of ……..sickness 2. For wound dressing 3. For family planning service 4. Others (specify)……	
505	Can you remember the last time that you received an injection?	1. Yes 2. No ……..⇒	510
506	When was the time you received the injection?		
507	Who gave you this last injection?	1. A Junior Nurse 2. A Health assistant 3. A Nurse 4. A health officer 5. A physician 6. Others, (specify)….	
508	Where was the place you received the injection?	1. From government health center 2. From NGO health center 3. From government clinic 4. From private clinic 5. Others (specify)……	
509	Do you remember where the needle and the syringe that were used to give you this last injection came from??	1. From a blister package 2. From a pot of tepid water 3. From a sterilizer 4. I don't remember 5. Others, (specify)……	
510	Have you ever been accidentally stuck by an injection needle that was left in the garbage or in the environment:	1. Yes 2. No ……..⇒ 3. I Don't remember	512
511	When was the time that the dirty needle accidentally stuck you?		

No	Question	Choice	Skip to
512	When you are sick with a febrile illness, what is the treatment that you prefer to receive?	1. An injection 2. A medication by mouth 3. I don't care	
513	Do you think that dirty syringes can transmit diseases?	1. Yes 2. No …… ……⇒ 3. I Don't know	515
514	What are the diseases that can be transmitted?	(Circle when spontaneously mentioned) 1. HIV 2. HCV 3. HBV 4. Abscesses 5. Others, (specify)	
515	Have you ever sustained any abscesses at injection site?	1. Yes 2. No 3. I don't remember	

Interviewer's name=……..Sign…
Date……
Supervisor's name=…… Sign……

Questionnaire III

For Children less than 15 years of age

600A. Name of Health institution: -……..

600B. Date: -…….. 600C. Time.

600D. Department /unit: -…….

600E. Code Number of the checklist……

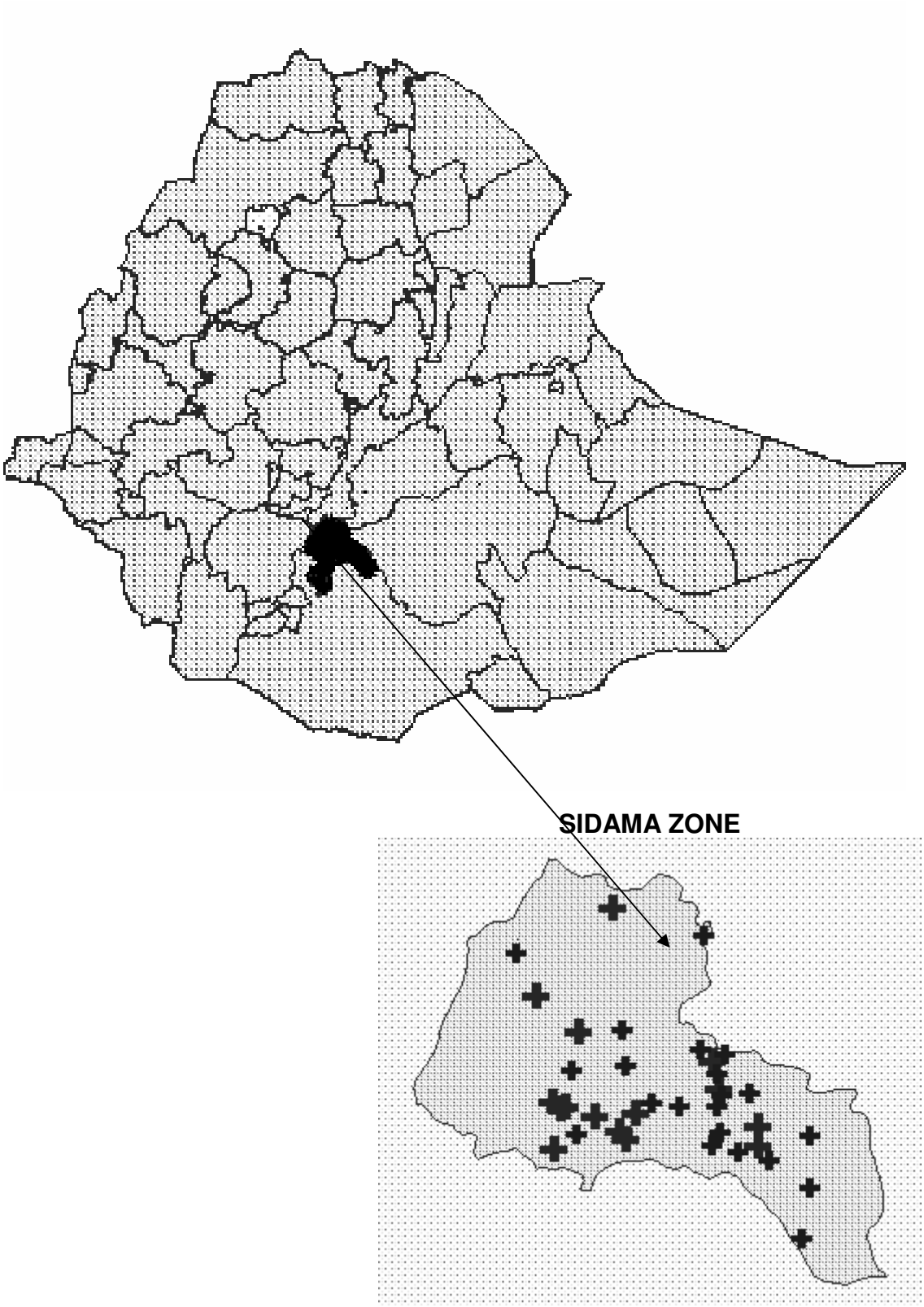
Note: - Adult caretakers should respond to children less than 15 years of age

No	Question	Choice	Skip to
601	Age		
602	Sex	1.Male 2. Female	
603	Address		
604	What is your relationship with the child	1. Mother 2. Father 3. Brother/ Sister 4. Grand mother 5. Others (specify)……..	
605	Reason of visit for the health institution	1. Because of ……..sickness 2. For wound dressing 3. For family planning service 4. Others (specify)……	
606	Can you remember the last time that the child received an injection?	1. Yes 2. No…….. ⇒	610
607	When was the last time that the child received the injection?		
608	Who gave the child this last injection?	1. A Junior Nurse 2. A Health assistant 3. A Nurse 4. A health officer 5. A physician 6. Others, (specify)….	
609	From which health institution did the child take the injection?	1. Government health center 2. NGO health center 3. Governmental clinic 4. Private clinic 5. Others (specify)……..……..	

No	Question	Choice	Skip to
611	Has the child ever been accidentally stuck by an injection needle that was left in the garbage or in the environment:	1. Yes 2. No …… .⇒ 3. I Don't remember	613
612	When was the child stuck with needle accidentally?		
613	When your children are sick with a febrile illness, what is the treatment that you prefer them to receive?	1. An injection 2. A medication by mouth 3. Both injection and medication by mouth 4. I don't care	
614	Do you think that dirty syringes can transmit diseases?	1. Yes 2. No …… .⇒ 3. I Don't know	616
615	What are the diseases that can be transmitted?	(Circle when spontaneously mentioned) 1. HIV 2. HCV 3. HBV 4. Abscesses 5. Others, (specify).....……..	
616	Have your children ever sustained any abscesses at injection site?	1. Yes 2. No 3. I don't remember	

Interviewer's Name= ..... Sign .....
Date .....
Supervisor's Name = ... Sign .....

Annex 2: Map of Study Area



Annex 3: Declaration

I, the undersigned, declared that this is my original work, and has not been presented for a degree in this or any other University. All sources of materials used for this thesis has been fully acknowledged.

Name: Yoseph W/Gebriel Gessesse
Signature:_____
Place:_____
Date of submission:_____
Name of the advisor: Dr. Fikru Tesfaye
Signature:_____
Date: _____