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# Unsafe Injection Practices and Transmission Risk of Infectious Diseases in Pakistan: Perspectives and Practices

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## Background

Unsafe injection practices result in a substantial burden of preventable blood-borne viral (BBV) disease like HCV and HIV, which is an important public health problem world-wide. Perspectives of various types of health care providers about the use of injections in the real clinical and social contexts were studied in urban and rural areas of Sialkot and Lahore, Pakistan. Overall belief, knowledge and policy options for reducing the risk of transmission of hepatitis-C etc by improving comprehensive injection safety were determined.

## Methods

Lakshman and Nichter's study model was used. The qualitative data was collected by using focus group discussion (FGDs), in-depth interviews, and field observation with

homeopathic practitioners, lady health workers, dais and hakeems. Data was analyzed in two parts: 1) collected through FGDs and in-depth interviews; and 2) collected through observations of clinical practices.

## Results

It was found that injection providers were not formally trained hence; were not qualified to run independent clinics. They were frequently using unsafe injections and also performing minor surgical procedures. Unfortunately, some of them had not even a basic understanding of the theory and scientific rational of biomedical system and technology. They were not careful about observing precautionary measures while giving injections. Strict use of disposable syringes and needles, scalpel blades, and other sharp items can improve the situation. Strict action against injection providers having no formal training (Quack dentists, general quacks, dais, ear cleaners, barber who are actively engaged in minor surgeries, Spiritual healers, etc) is badly required. On the part of patients it was found that due to lack of education and other factors like poverty they are interested in early recovery with low cost, so awareness for community is also badly required.

## Introduction

Billions of injections are used worldwide for curative care and for immunization<sup>1</sup>. Majority of the injections are unnecessary and are not used safely<sup>2</sup>. The World Health Organization estimates that 12 billion injections are given annually, 5% of which are administered for immunization and 95% for curative purposes<sup>3</sup>. In developing countries, approximately 16 thousand million injections are administered – at the rate of 3.4 (range 1.7-11.3) injections per person per year<sup>4</sup>. Even in developed countries, such as the United States, the challenge of consistently providing safe care is not always met, as evidenced by increasing reports of

outbreaks that have been associated with unsafe injection practices and related break downs in basic infection control<sup>5</sup>. The number of injections in Pakistan per-person per-year has been estimated in the range of 9 to 14, one of the highest in the developing countries<sup>6</sup>, and out of these 92.2 percent are technically unnecessary<sup>7</sup> and are mostly administered in unsafe conditions<sup>8</sup>.

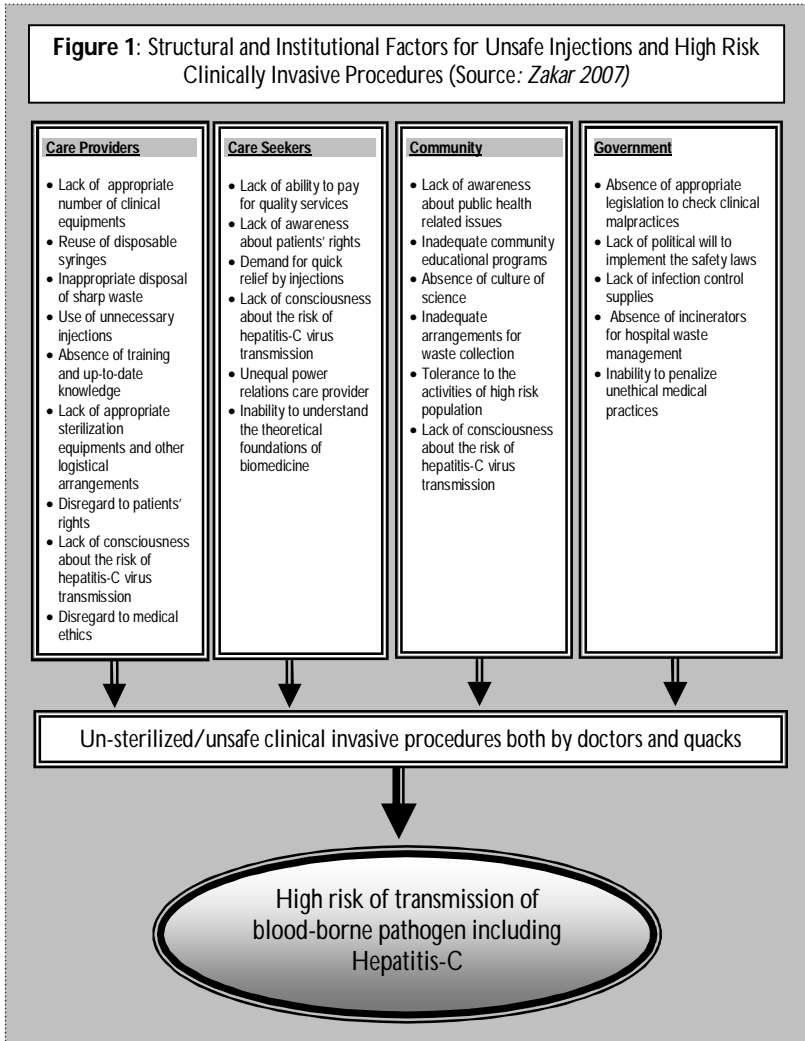
Unsafe injection practices result in a substantial burden of preventable blood-borne viral (BBV) disease<sup>9</sup>. The widespread incidences of blood-borne diseases, which are often the result of infection due to unsafe injection practices, have been an important public health problem worldwide<sup>10</sup>. The safe injection practices by the health care providers, including the proper disposal of used injection equipment, are therefore a concern for the entire healthcare sector<sup>11</sup>. Theoretical knowledge and technical competency of health care providers, medical conditions and management policies of the health facility are important indirect influences on safe injection practices<sup>12</sup>. Interventions are needed to obtain a reduction of injection prescription among private health care providers who prescribe most of the injections received by the population<sup>13</sup>. Sterilization techniques are poor and the final disposal of used injection materials present a problem that increases the risk of transmitting diseases to the entire community<sup>14</sup>.

Pakistani health care market is plural, complex and multi-layered. There is a huge "under-world" of health care provision services. And the government has limited capacity to monitor or regulate this market. For example, there is countless number of hakeems, homeopaths, quack dentists, ear cleaners, spiritual healers, dais, paramedical personnel and "sex-specialists" who are administering injections and are involved in minor surgeries without proper training, equipment and resources to ensure sterilization. Unfortunately majority of the patients are also not aware about the health implications of unsafe injections<sup>15</sup>. In clinical set up, there are many routine practices which render

injections unsafe. For example, in many clinics (especially of quacks), 'injection cabin' is not clean and there is insufficient space to operate. Clinics are situated in poorly constructed buildings; having no proper light and ventilation. Some clinics have no proper windows, hence dust, flies and mosquitoes enters in the clinics. Even some "clinics" of quacks are used for multi-purpose activities; people sit there, drink tea, chat and smoke cigarette, chew *paan* and spit around. Injection safety can never be ensured in such an environment<sup>16</sup>

In the early twentieth century, safe injection initiatives began in developed countries when it was proved that non-sterile injections transmitted a pathogen that caused jaundice. The safe injection initiatives have been very effective in developed countries but have not received the required attention in developing countries<sup>17</sup>. Unsafe injection practices which can transmit Hepatitis B, Hepatitis C, Human immunodeficiency virus (HIV) and other blood borne pathogens have resulted in substantial burden of preventable blood borne viral diseases (BBVDs)<sup>18</sup>. Needle stick injury (NSI) is commonly encountered by the provider especially during recapping.

The structural and institutional factors responsible for the unsafe injections and high risk clinically invasive procedures are shown in figure No. 1.



About thirty infectious diseases may be transmitted by NSI but chances of acquiring hepatitis B infection are much higher than other infections<sup>19</sup>. Unsafe practice is under reported. Some health workers are aware about safe practices but are unable to translate it into practice, one of the important reasons being the heavy work load<sup>20</sup>.

Currently, the greatest risk for the spread of HIV in Pakistan stems from IDUs. The study reported that, HIV/AIDS prevalence among IDUs has jumped from 0.4% in 2003 to 7.6% in 2004<sup>21</sup>. In 2000, contaminated injections caused an estimated 21 million HBV infection, 2 million HCV infections and 260000 HIV infections<sup>22</sup>.

The study tested a simple low cost community education program to see if it could improve injection safety among the training recipients. It was concluded that this low cost health communication effort significantly reduced the study participants from unsafe injections<sup>23</sup>. The above mentioned studies have demonstrated that many incidence of hepatitis-C virus transmission are occurred in the health care setting especially due to reuse of disposable syringes. The risk of transmission of virus is not restricted to injection needles, but it can also be carried out through major or minor surgeries without properly sterilized instruments, unhygienic dental care, circumcision with contaminated instruments, unintended mixing of body products and body fluids, and during clinical procedures.

This study attempted to investigate:

- 1) the perspective of various types of health care providers about the use of injections;
- 2) the real clinical and social contexts where in the injections are administered;
- 3) the overall cleanliness environment of the clinic and sterilization conditions of the designated area where injection is prepared;
- 4) the beliefs and knowledge under which unsafe and risky practices are routinely carried out; and policy options for reducing the risk of transmission of hepatitis-C by improving comprehensive injection safety;

## Methodology

In order to get holistic understanding of the situation, Lakshman and Nichter's study model was used, who checked the contamination of injection used by medical practitioners<sup>24</sup>. It is relatively difficult and complex to study the injection paraphernalia in Pakistan because of two reasons, first quacks talk about their knowledge and not the actual practice; and second, most of them knew that their business is not legally permitted so they do not want to participate in any study in the fear of legal sanctions. To overcome these limitations, it was decided to use multiple techniques for getting information that include observational study, informal talks, and in-depth interviews with the care providers.

Prior to the study, each practitioner was visited and told about the purposes of the study. Permission to make observations in the clinic was obtained. Practitioners were visited one or two times before structured observations of their injection practices. This was done as a means of reducing reactivity bias to the extent possible. Once some level of trust and rapport was established, the observational study was initiated. The focus of the study was on the following points:

- Their knowledge of injection sterilization procedures
- Their knowledge of the types of diseases which could be transmitted through improper sterilization of injection equipment
- Patients' demand for and willingness to pay the extra cost of using fresh disposable needles, and
- Ways of sterilizing disposable needles for reuse (if they do so)
- Sterilization method of surgical instruments

Quite expectedly, the study generated a huge volume of information. The relevant information related to doctors and quacks was placed into separate columns for the purposes of clarity, comparison and better readability. It may also be noted here that despite initial willingness, many of the respondents did not provide the full access to their clinical practices.

**Study settings nature of data:** Both rural and urban areas of the district Lahore and Sialkot were selected for this study. The qualitative were collected by using Focus Group Discussion (FGDs), In-depth Interviews, and Field Observation.

## Respondents

The following categories of respondents were selected for the collection of data.

- Homeopathic practitioners
- Lady health workers (LHWs), lady health visitors (LHVs) and Dias
- Hakeems
- Quacks (Nurses, dispensers, dressers, dental quacks, laboratory technicians)

Homeopathic practice is phenomenon, which is getting popularity in Pakistan day by day. Many people are involved in the business of providing medical care through homeopathic medicines. However, for this research only those homeopaths were selected who run their own independent clinics on a fee-for-service basis. A total of 30 homeopaths were selected through simple random sampling method.



LHVs/LHWs were the most difficult group to interview. They were hesitating to give interview and some of them took permission from high authorities. Their unwillingness and suspicion may be gauged from the fact that they were interviewed on the basis of snowball sampling. Twenty LHVs/LHWs were interviewed for this study. This was most difficult group to locate. Most of them worked in lower-socio-economic status localities and to obtain information about them was very difficult task. By using snowball sampling 20 Dias were selected for in-depth interviews. Dai was initially contacted with help of some person then she was asked to give reference to others. The process continued until the desired size was achieved.

### Focus group discussions

To handle the issue that could not be appropriately captured through a structured interview and to get insight into group consensus and dynamics, it was decided to have focus group discussions (FGDs) with people in all of the categories of the respondents. While selecting the respondents for FGDs, an effort was made to give appropriate representation to the socio-economic and racial diversity within each category. Subject to the availability of space, the FGDs were conducted in a separate room to minimize undue interference and interruptions. Where possible, proceedings were tape-recorded. In some cases, initially, it was difficult to get started, as the topic touched upon sensitive issues such as sexual beliefs and activities. The size of the FGDs ranged from 6 to 8 participants per group. The discussions were stimulated and controlled by a moderator in the line with the principles of conducting FGDs. On the average each FGD lasted took 70 minutes. Transcripts of discussions were later written by a team member in order to facilitate the synthesis of collected information. Two moderators were used in this study to conduct the FGDs. A male moderator conducted all FGDs involving male participants, and a female moderator conducted FGDs with females. The purpose of using same moderator for a gender/sex

group was to assure consistency and reliability across focus groups. The moderator had extensive experience in conducting FGDs, and they were fully familiarized with the proposed methodology and objective of this study.

## Ethnographic study

Structured interviews usually provide quantitative information, which may not depict the entire social reality. It was therefore, necessary to observe the reality through qualitative methods and ethnographic study was one way to approach the social reality, so, the health care seekers and health care providers were keenly observed in the study areas.

## Data collection Tools

### 1. *Guide for in-depth interviews*

The nature of the study was such that it needed some in-depth and informal interviews. Sometimes, it was not possible to record anything during the course of interview. Any such activity may lead to the abrupt termination of the interview process.

### 2. *Checklist for focus group discussion*

A separate checklist was developed for conducting focus-group discussions with each category of respondents. The purpose of this list is to maintain some structure in the discussion. Such a list was also advisable to ensure that all the topics had been covered thoroughly.

### 3. *Observational study*

Field researchers were placed in various clinics and shops of the quacks to observe the nature of interaction between health care provider and health care seeker with special reference to the possibility of transmission of infection during various body invasive procedures (e.g. injections, minor surgeries, dental care, and so on). A checklist was prepared to facilitate note taking.

### *Confidentiality, anonymity, and privacy*

To guarantee the protection of basic rights of the participants in this study, no personal information such as names, addresses and phone numbers was obtained through any of the data collection methods. If a participant volunteered such information during the focus group discussions or any other data collection techniques, or during other encounters with the researchers, it was deleted from the records.

### *Qualitative Data Analysis*

Information from focus group discussions was recorded on audiotapes. Subsequently it was turned into transcripts. Senior researchers thoroughly read the transcripts to identify information that was relevant to the phenomenon under study. Trends emerging during the review of these transcripts were reported. The field observations were recorded in a free format using a word processor. They were later rearranged around various topics central to this study. Qualitative information was used to supplement the quantitative data.

### *Limitations of the Study*

Although medical quackery is illegal yet it is a reality. Quite expectedly, some of the respondents were not willing to report their true practices nor were they allowed to have a random observation of their 'clinical practices'. Hence their responses might have the element of social desirability. So the self-reported data may have problem of reliability.

Some quacks were also not willing to allow the researchers to observe their day-to-day clinical practices. Some of them were visibly embarrassed on the poor standards of cleanliness and compromised quality of patient care. So they wanted pre-informed and scheduled observation and not random and unrestricted observation.

Quite expectedly, care providers altered their injection related practices in the presence of researcher. While under observation, they might have been exercising their very best clinical practices. Hence the recorded observations may reflect their best practices and not the routine clinical practices. This study is limited by design and resources.

### *Findings*

This section has been divided into two parts: 1) analysis of qualitative data collected through FGDs and in-depth interviews; and 2) analysis of observations of clinical practices. In the FGDs, in-depth interviews and observational study, following were the;

#### Main beliefs/reason behind the overuse of injections

- Some care providers believed that;
  - Injections are necessary for speedy recovery and immediate relief.
  - Injections are always more effective than oral medications.
  - Injections were said to be cheaper than oral drugs.
- Some care providers reported that;
  - Patients insisted for injection,
  - They had some economic incentives for giving injections (In local culture, patient is willing to give additional money for injection).
  - Patients believed that injections are “powerful” and a fit remedy for the cure of ‘weaknesses. (In the local culture, there was elaborated cultural concept of ‘power’ and weakness)

- Patients believed that injections are harmful for stomach and other organs as it introduces medicine directly into blood/body.

### Main observations of work place

- Most of the care providers were not aware about;
  - Working environment wherein they were working, not to speak of precautionary measures.
  - Safety from insect's contamination and using net on windows to avoid flies and mosquitoes etc in the clinics.
  - Dust and dirt attached with the tiers of bike spoiling cleanliness of the clinics.
  - Clinics usage for multi purposes like real estate consultancy (as part time job) or politics. In many clinics, friends of the care provider routinely sit and drink tea, discuss politics and smoke cigarettes and sometimes chew pans and spit around. There is no arrangement of patient privacy.
  - Handling currency, they did not wash their hands and started preparing injection for the next patient after receiving money from patient. It was highly risky as the currency bills are highly contaminated with multiple types of pathogens.
- After use, the disposable syringes were put in normal waste bins thus allowing public access to discarded syringes and needles. It not only encouraged the re-use of syringes but also expose children and scavengers to needle-stick injuries. It was observed in the field that some children were playing with the used syringes and throwing water on each other. This was highly dangerous

practice and could transmit infection to the children through needle-prick.

- Many care providers just dip piece of cotton wool in warm water and clean the injection site. This posed some risk because blood from one patient on the care provider's fingers may transmit infection to another patient.
- Generally, there was no culture of washing hands between injections. One care provider remarked that it was not possible to wash hands after every injection. He believed that washing hands in the morning was enough for the whole day.
- Some care providers reused needles after cleaning with spirited swab. There was a belief that spirited-swab can sterilize the needle. They did not realize that pathogen may exist inside the barrel of the needle and can transmit infection to the next patient.

## Multi-dose-vials

It is important to use single-dose vials rather than multi-dose vials whenever possible. Although preservatives may reduce the survival of bacteria but multi-dose vials remain prone to bacterial contamination. It is reported (though not empirically confirmed) that some of the quacks used same syringe for drawing medicine from the vial and used it for injection. This practice may lead to vial contamination and infections among subsequent patients.

## Breaking ampoules

Injuries to injection providers can be another source of infection. While opening glass ampoules, providers may get their hands lacerated, which can bleed and may have a chance of transmission of infections (care providers to care seeker).

## Compromised packaging

Cracks and leaks in vials are a potential source of contamination. Although it is not known how effective visual examination of a vial is in preventing infections, yet if it is visibly broken (e.g. cracks or leaks) or medication seemed contaminated, vial should be discarded forthwith and must not be used. So, as a rule, it is necessary to properly inspect the vial before use. It was noted that not even a single quack was aware of the harmful consequences of leaked/cracked/broken vials. It was taken for granted that all vials are sealed and ready for use. While debating such detailed protocols of injection one respondent observed: We are living in Pakistan, where poverty and unhygienic conditions are rampant. Poor people are living in filth and drinking dirty water. They have very strong resistance to all sorts of infections.

## Aseptic techniques

Medical devices might become contaminated if they are touched with unwashed hands or placed on unclean space. Thus, it is advisable that a disposable needle should not be touched by fingers. In the field, it was noted that no such precaution/care was observed. Touching the needle with finger (not properly washed) was a matter of routine. One dispenser (running a full-fledged clinic in the suburbs observed: "It is rather essential to 'support' the needle with Shahdut (Index) finger especially while giving injection to children. In case of sudden movement, the needle does not break inside the body." When asked about the possible contamination from the unclean finger to needle surface, the dispenser replied: "I do not believe in such 'superstitions.'"

Provider's hand hygiene and skin integrity: Washing or disinfecting hands is a standard procedure that is carried out before preparing injection material. FGDs and observational studies revealed that injection-givers (who are usually dispensers, both in the clinics of qualified practitioners as well as in quacks

shops) were performing multiple functions like cleaning infected wounds, stitching minor injuries, changing bandages, removing pus/blood from fresh and old wound/injuries, preparing medicines/mixtures, opening cans, cleaning ear, checking temperature and blood pressure, assisting doctor in medical check up and even ordering tea for the guests.

## Minor Surgeries

Almost all respondents used to perform minor surgeries and took care of the wounds commonly inflicted by kitchen knives, minor work injuries and the like. Some reported that they properly sterilized the surgical instruments for each patient by keeping the instruments in boiling water. While explaining the rationale of not sterilizing instruments, one respondent said; "Only poor people come to us for treatment". They live a very unhygienic life, and they live in very dangerous conditions. Their bodies get immunity from certain diseases. There is no need to sterilize instruments for such people. It is useless and thankless as well.

It was observed that while performing minor surgeries, many of the care providers involved in the following risky practices which could potentially transmit various infections including HIV/AIDS.

- a) Sterilization of surgical instruments without supervision or monitoring of time, steam, and temperature.
- b) For minor surgeries, some left over surgical stuff (e.g. suture needle and suture material like catgut, blades, etc.) of one patient was routinely used for other patient
- c) No culture of wearing gloves while performing minor surgeries



- d) Attempting to sterilize surgical equipments without prior cleaning.
- e) Boiling surgical equipment in an open pan
- f) Using only disinfectants on contaminated surgical equipments to prepare them for re-use

The summary of observations is placed in the tables 1 to5.

Table 1  
Structured observation/instruments developed for the study of  
injection hygiene

Sr. No	Parameter of Observation	Actual Situation at the clinic
1	Did asks patient to purchase disposal syringe?	Mostly they did not ask the patient to purchase disposable syringe except in the case where they asked the patient to purchase injection. The injection prescription included disposable syringe.
2	Disposal syringes are visible to the patient—on tray/in the box	Not visible to the patients. Injection preparation is done in a small cabin
3	Have they stock of disposable syringe and asks patients if they would like a disposable syringe to be used for an extra-charge	Many claimed that they had stock of disposal syringes. They used disposable syringes according to the status of patient (though all claimed that they used disposable syringes, but it was observed many reused the disposable syringes on poor patients)
4	Patient directly asks for disposable syringe from practitioner	Very few patients asked for this. (In the local culture, asking such questions is considered impolite and distrust in doctors. Such questions are not welcomed or politely responded)
5	Patient asks how needle is sterilized/cleaned or looks to see where needle comes from.	Rarely asked by patients (patients were not concerned about such details).

6	Practitioner offers patient an injection, but patient says "No, I prefer pills/capsules, etc "	Rarely happened. Mostly patient asked for injection for speedy recovery. However it depends on nature of disease, severity of symptoms and social class of patient.
7	Patient indicates to practitioner that he/she expects an injection	Many patients desired to have injection. It was noted that many daily wagers could not afford absence from work, so the demand injection for speedy recovery.

**Table 2**  
**Observation Related to Sterile Procedure of Injection/Surgical equipment prior to Injection/operation**

Sr. No	Observation	Non qualified Care Providers (NQCP)
1	Taken from sterilizer which is on ---boiling water and steam (note how long water is allowed to boil before switched off.)	Most of the dispensers working in the doctors clinics had poor knowledge about sterilization (Sterilizer was not always on; it was switched off after once equipments were boiled)
2	Taken from sterilizer which is not presently on and is dry (no water is inside)	Dispensers and nurses usually had sterilizers while others (Dias, some Hakeems, and dental quacks) do not have sterilizers. One dispenser of the doctor observed that it is risky to use on sterilizer as it might cause electric shock.
3	Taken from sterilizer which is not presently on (there is water inside)	Many care providers confused the sterilization equivalent with "washing with warm water".
4	Taken from a pan of boiling water	Sometimes happened (some care providers sterilized their instruments by putting them in boiling water because they do not have sterilizer.
5	Taken from a pan of hot, but not boiling, water	Mostly happened, especially for dressing/cleaning of minor wounds, they took their

		instruments for pan of hot water.
7	Taken from a pan of soapy water	Routine clinical equipments were sometimes dipped in soapy water
8	Uses rubbing spirit or Dettol to clean needle by wiping	Sometimes happened (e.g. for dressing, scissors, forceps, were routinely rubbed with dettol swab).

Table 3  
What Happened During the Injection Process?

Sr. No	Observation	Non qualified Care Providers (NQCP)
1	Does the injection provider take medicines from a multi-dose bottle?	Yes, some did.
2	Does the injection provider draw a little blood from the patient to make sure he has a vein (for IV only)?	Yes, it was a standard practice for IV injections
3	Does the injection provider use the same needle to draw the medicine out of the bottle and to inject in the patient?	Sometimes happened
4	If a separate needle is used to draw the medicine into the syringe, does this involve a multi-dose bottle of Medicine?	Sometimes happened
5	If a multi-dose bottle is being used, is the drawing needle kept inside the multi-dose bottle or is a separate needle kept aside for specific type of medicine	Needle was not usually kept in the multi-dose vial

Table 4  
After the Injection is given or minor surgery is done what happened to the equipment

Sr. No	Observation	Non qualified Care Providers (NQCP)
1	Put into sterilizer which is on: boiling water and steam	Few respondents did that

2	Put into sterilizer which is not presently on	Rarely observed
3	Put into pan of boiling water	In some situations it happened
4	Put into a pan of hot but not boiling water	Did not observe
5	Put into a pan of water -- not hot	Did not observe
6	Put into a pan of soapy water	Put daily clinical equipments in soapy water
7	Wiped clean with rubbing alcohol	Most of them used spirit or dettol to clean the surgical instruments

**Note:** the following questions were asked once rapport was established with a practitioner through a conversation about patient health care seeking behaviour and preferred forms of medication.

**Table 5**  
Practitioner interview after structured observation of 10 injections

Sr. No	Question	Non qualified Care Providers (NQCP)
1	Who trained you to inject?	Majority was trained as dispenser of qualified doctors. Few reported that they learnt through senior quacks
2	Based on your experience, have you changed your procedure of injecting in any way that is different from what you originally learned?	Changed procedures by getting more experience (did not tell what exactly the change)
3	Does your procedure of injecting vary with the type of medicines being injected?	For injecting the medicine which could cause allergic reaction, they were said to be more careful
4	Do you have different types of needles? What do you use them for?	Did not answer (Question was not applicable to most of the respondents)
5	Do you keep special needles aside just to draw 'load' particular types of medicines from the bottle and others to inject the patient?	Did not answer (Question was not applicable to most of the respondents)

6	How many times do you think needle (non-disposable needles) can be used before to get dull?	It was reused two to three times
7	What kinds of things make needles dull quickly: (probe about boiling them too long as something which renders them dull?)	Poor quality of needles, boiling too long, rusty pots, etc.
8	Have you found any ways of keeping needles very sharp?	Did not answer/Not applicable
9	Is it economical to throw disposable needles away after using them only once, or is this a waste?	Some care providers argued that many poor patients had very meagre capacity to pay. So it is not possible for them to use disposable needle for very poor patients.
10	Were there any problems sterilizing a disposable needle after it has been used once? (Probe how long you can boil the needle before the plastic base fitting gets melted or soft?)	Not more than two times

## Discussion

The filed data indicate that Injectable treatment is very popular among patients of study areas. Different kinds of medicines like multi-vitamins, anti-biotics and painkillers were routinely given by injections with observing safety and rationale. It was noted that syringes/needles were openly reused without proper sterilization. Unsafe injection practices and other risky invasive procedures posed a very serious threat of spread of different types of infections including HIV/HCV. World Health Organization reported that due to contaminated injections 250,000 persons are getting HIV infections due to unsafe injection practices<sup>25</sup>. Investigator estimated the same amount of problem gravity in study area for HCV infection.

Authors noted very poor waste management of used syringes in study areas and found large number of dumped syringes in municipal waste sites and scavengers, waste dealers were found to collect these used syringes for selling to use these syringes, this finding was supported in earlier study conducted by Mujeeb et al. in Karachi which recorded that sharp-waste was dumped in municipal waste and not in the specialized places for the hospital waste. Further, it was argued that such improper disposal of syringes entailed various risks like they are repacked and resold after cleaning and not sterilizing<sup>26</sup>.

During present study practitioner were asked ten structured questions about injection practices unfortunately they were not aware even about types of needles and syringes are available in local market for different age group patients. It was noted that practitioners rarely used gloves or took other precautionary measures to save themselves from needle-stick injuries. Hence, this finding signify the risk of transmission of any infection as documented by Hutin et al. who reported that needle-stick injuries might have caused 1000 HIV infections among injection providers world-wide<sup>27</sup>.

This study noted that just use of disposable syringe may not be sufficient to make the clinically invasive procedures safe from transmission of infection. It was found that all the body invasive procedures including injection needed proper sterilization and overall cleanliness of the clinical setup. It is further argued that sterilization cannot be maintained in isolation; it needs overall clean and controlled environment of the clinic. Further, infection free injection is dependent on various factors like the type of injection package (multi-dose vials or single dose ampoule) quality and integrity/intactness of its packing, method of opening of ampoules, washing hands, cleaning the injection site, cleanliness of place for injection preparation, method of injecting, quality of syringes, and other procedures which make the injection safe or unsafe.

Injections have saved many lives but at the same time carry the risk of infections. So the current concern is how to make this practice more safe and beneficial in developing nations? Various strategies such as educational, managerial and regulatory have been discussed but challenges have to be overcome for their successful implementation. Rational use of injections, proper management and disposal of injectable products can lead to safe injection practice and for this honest commitment and participation is required from service provider, recipient and community with support from policy makers. More research to understand the problem in individual countries and regions is required to develop evidence based interventions. Keeping in view the current scenario in study areas, there is strong need of awareness about new sterile disposable syringe and a repackaged syringe, maximum use of disposable syringes, avoid unnecessary injection practice, give messages through electronic media about Injection safety, ensure appropriate quality of injection equipments.

Proper waste management of disposable syringes and needles, scalpel blades, and other sharp items is strictly required.

## Acknowledgement

The authors gratefully acknowledge the support of staff and all people contributed to conduct this study from study areas of district Lahore and Sialkot.

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