

Baseline assessment of therapeutic injection practices in Pakistan in 2020: A cross-sectional study

Syed Sharaf Ali Shah,¹ Safdar Pasha,² Nikhat Iftikar,³ Altaf Ahmed Soomro,⁴ Nazia Farrukh,⁵ Arshad Altaf⁶

Abstract

Objective: To assess the magnitude of the problem of injection safety in public and private health facilities in two districts of Sindh and Punjab provinces of Pakistan.

Methods: A cross-sectional observational study was conducted between October and December 2020 among public and private health facilities of two districts of Pakistan: Gujarat in Punjab and Larkana in Sindh provinces. A convenient sample size of 60 healthcare facilities (30 from each district) was taken due to time and resource constraint. Six data collection tools were used which included structured observations and interviews with injection prescribers and providers based on WHO Revised Tool C, which were finalised after piloting.

Results: Reuse of injection equipment was not observed in any of the 60 health facilities. In exit interviews of 120 patients, it was found that 27 (22.5%) patients reported receiving an injection, while 11 (9.2%) were prescribed intravenous (IV) drips. More injections and drips were prescribed in the private sector (n=15; 25.0%) in comparison with the public sector (n=12; 20.0%). Slightly higher proportion of IV drips were prescribed by the private providers when compared to public sector healthcare providers: 6 (10.0%) vs 5 (8.3%) respectively. Most of the prescribers (n=58; 96.7%) reported that patients who attended public and private health facilities demanded injectable medicines. Used syringes and drips were noted to be visible in open containers and buckets for final disposal in 20 (33.3%) assessed health facilities.

Conclusion: No reuse of injectable equipment was found in this assessment which is encouraging. However, irrational prescription of injectable medicines and waste management of sharps needs urgent attention.

Keywords: Pakistan, Unsafe injection, Injection demand, Injection safety, Syringe reuse, Therapeutic injections, Injection prescription, Injection prescriber, Injection provider. (JPMA 71: S-16 [Suppl. 4]; 2021)

DOI: <https://doi.org/10.47391/JPMA.0003>

Introduction

The World Health Organization (WHO) defines a safe injection that "does not harm the recipient, does not expose the health worker to any risk and does not result in waste that puts the community at risk."¹ WHO had estimated that 16 billion injections are provided every year in the world. Of these, only 5% are given for immunisation purposes among children and adults, and another 5% for injectable contraceptives and other procedures. The majority (90%) are given for therapeutic purpose. In many cases these injections are unnecessary and can be replaced with oral medicines.² This has become a vicious cycle as patients prefer injections, believing that it provides better relief than oral medicines, while prescribers prescribe injections believing that it satisfies the patients. Moreover, private practitioners in many settings add an injection because they fear that if they do not they will lose the clientele, while an injection

including an intravenous (IV) drip also allows the prescribers to charge higher fee for service.²

Pakistan has been facing the problem of unsafe injections for a long time. In 2018, WHO reviewed the results of Demographic and Health Surveys (DHS) to describe injection practices worldwide from 2011 to 2015.³ Out of 92 countries, 42 (43%) had reported on injection practices since 2011. The annual number of unsafe injections reduced in 81% of countries except in Pakistan, where the number of unsafe injections was the highest and did not decrease between 2006 and 2012.³ Khan et al explored factors associated with reuse of syringe in a survey of 319 healthcare providers in two diverse districts along with 625 patients in Pakistan, and reported that 38% providers likely reused syringes two to three times.⁴ Physicians and non-physicians were equally likely to reuse and majority of the patients were unaware when a syringe was reused.

In April 2019, a massive paediatric human immunodeficiency virus (HIV) outbreak was reported from a rural town in Sindh province of Pakistan.⁵ Following the outbreak, a screening camp was established at Ratodero, Sindh between April and July 31,

.....
^{1,3,4,5}Bridge Consultants Foundation, Karachi, ²World Health Organization, Islamabad, ⁶Independent Consultant, Karachi, Pakistan, (Staff member in the WHO Eastern Mediterranean Regional Office in Cairo, Egypt).

Correspondence: Syed Sharaf Ali Shah. Email: drsharafshah@yahoo.com

where 31,239 individuals were tested for HIV out of whom 930 (3%) were confirmed HIV positive. Of these, 763 (82%) were children under 16 years, and 604 (79%) of these were less than five years old. The estimated overall prevalence was 3%.⁵ The international investigation team of experts from the WHO, locally supported by the Pakistan Field Epidemiology Training Program (PFETP) and Sindh Acquired Immunodeficiency Syndrome (AIDS) Control Programme identified iatrogenic transmission via unsafe injection practices and poor infection control as the most likely driver of the outbreak.⁶

The Ministry of National Health Services Regulation and Coordination developed a national action plan to address unsafe injections in the country and one of the targeted actions was conducting a baseline assessment of injection safety in two provinces.⁷ The current study was commissioned by WHO Country Office in Pakistan to assess the magnitude of the problem of injection safety in public and private health facilities in two districts of Sindh and Punjab provinces.

Methods

A cross-sectional observational study was conducted between October and December 2020 using quantitative and qualitative methods, among public and private health facilities. These two districts included Gujarat in Punjab and Larkana in Sindh. The districts were selected as they had both experienced HIV outbreaks which was linked to unsafe injection practices in 2008 and 2019.^{6,8}

Study sites

Larkana is located in north west Sindh and is about 450 kilometres away from Karachi. The economy is agricultural, and sugar cane, rice and guava are the main products. According to the 2017 census the population of the district is slightly above 1.5 million persons.⁹

Gujrat is one of the districts of Punjab located between Chenab and Jehlum rivers. According to a State Bank of Pakistan report, 70-75% of fan industry of Pakistan is in Gujrat district.¹⁰ The population of this district according to the 2017 census is 2.7 million.¹¹

Sample size

A convenient sample of 60 healthcare facilities (30 from each district) was decided as the sample size due to time and financial constraints. Of these, 10 were from public health sector including primary, secondary, and tertiary health facilities while 20 healthcare facilities were taken from private health sector including general practitioner (GP) clinics and private hospitals, from each district. The sampling unit was health facility and representative

sample was drawn through stratified random sampling method. All levels of public sector health facilities (primary, secondary and tertiary) and private sector health facilities (GP clinics and private hospitals) were represented in the study sample. The study population was divided in two sub-populations (strata): public health facilities and private health facilities.

Data collection tools

Six data collection tools based on WHO Revised Injection Safety Assessment Tool-C were developed and piloted.¹² The tools were revised after going through one round of iteration based on the pilot results. The tools included:

1. Structured observation of health facilities/workstation checklist
2. Structured observation of injection practices checklist
3. Interview of injection prescriber (physicians)
4. Interview of injection provider (para-medical)
5. Interview of health facility manager
6. Exit interview of patient

Data collection process

The field teams in both districts comprising of experienced field workers were provided one full day of training on the tools. These included mock exercise to administer the questionnaires and to edit them for clarity and missing information. The training also covered other important topics such as communication and taking informed consent.

The observational tools for health facility and injection practices included indicators such as separate room for administering injections and IV drips, the lighting of the area, availability of hand sanitiser or running water, and presence of used syringes and blood-stained swabs on the counter or in the trash bin. Indication of reuse was also noted by checking presence of syringes in the steriliser. Other things to note included the type of syringe(s) used to administer injections and whether the injection provider was only changing the needle and reusing the barrel of the syringe multiple times. After completing the injection or drip, it was noted whether sharps were disposed in regular trash or in puncture-proof containers. Availability and functionality of incinerator in large healthcare facilities were also documented.

The interview of injection prescriber and provider included basic demographic details such as age, educational qualification and years of experience. This was followed by questions which focused on average number of patients seen in a day and common symptoms

in which an injection or an IV drip was prescribed. The respondents' views about common reasons for unnecessary injections, who demands the injections, and adequate availability of stock of syringes and supplies in the health facility were also noted.

The interview of health facility manager was mostly applicable to government health facilities. The questions focused on availability of an infection control programme, training of staff on safe injection practices, hospital waste management and infection prevention and control (IPC). Questions were also asked about the pathway available for healthcare workers who experienced a needlestick injury, the system of sharps collection and disposal, and availability and functionality of an incinerator.

The exit interview of patients focused on the complain they presented with at the health facility, and if the patient was administered an injection or an IV drip and if so, who suggested the injection or the IV drip. The patients were also questioned if they noticed or remembered whether the syringe used was new or used to give the last injection received during the visit. There were also questions related to perception of efficacy and importance of injection for minor ailments.

The field workers administered the questionnaires to respondents on one-to-one basis within each health facility. The observations were also documented in the checklist which was part of the assessment tool. In the observation process, the field worker would introduce and take permission, stay in the health facility and observed practices, and filled the tool immediately after exiting the health facility.

Focus group discussion (FGD)

Focus group discussions were conducted with injection prescribers and providers in both districts. The purpose of FGDs was to collect qualitative perspective from healthcare providers about injection safety, rational prescription of injections, and IPC practices. A guide for FGD was developed based on the objectives of the assessment. There was a moderator and a note taker. The sessions were recorded after seeking permission from the participants.

The category of injection prescribers included physicians who wrote prescriptions whereas injection providers included health workers in public and private health facilities responsible for dispensing medicines, providing injections and IV drips.

Ethics

All respondents provided informed consent before

interview. Confidentiality and privacy of respondents was ensured. Research protocol was reviewed and approved by ethical committee of Bridge Consultants Foundation (BCF).

Data management

Data collected on structured questionnaires was edited the same evening by the field teams for any corrections and missing information. Data entry was done by a single operator. Statistical Package for the Social Sciences (SPSS) version 23 was used for data analysis. Descriptive frequencies were generated using the SPSS software.

One team member listened to the recordings and produced transcripts of the FGD sessions. Data was collated and content analysis was performed to generate themes from the FGDs.

Results

A total of 60 health facilities were assessed in two districts; Larkana in Sindh and Gujrat in Punjab. One injection administration in each health facility was also observed. A hundred and twenty exit interviews of patients were conducted. Ten facility managers of government healthcare facilities were interviewed and four FGD sessions were conducted with injection prescribers and providers in both districts.

Unnecessary injections

Overall, 27 (22.5%) of the 120 patients attending public and private health facilities reported receiving an injection, while 11 (9.2%) were prescribed IV drips as informed by the injection prescribers. When comparing private to public sector healthcare facilities, more injections and drips were prescribed in the private sector (n=15/60; 25.0%) compared to the public sector (n=12/60;

Table-1: Comparison of practices between public and private health facilities (N=60).

Indicator	Public	Private
Percentage of patients prescribed injections	12 (20.0%)	15 (25.0%)
Percentage of patients prescribed intravenous drips	5 (8.3%)	6 (10.0%)
Percentage of patients administered an injection for fever, headache, cough or pain	45 (75.0%)	47 (78.3%)
Use of disposable syringes	51 (85.0%)	60 (100.0%)
Health facilities with puncture-proof safety box	54 (90.0%)	0 (0.0%)
Health facilities disposing syringes and sharps in open containers or buckets	25 (41.6%)	14 (23.3%)
Health facilities with running water and soap	30 (50.0%)	2 (3.3%)
Provider practicing recapping after giving the injection	49 (81.5%)	17 (28.3%)
Providers practicing hand hygiene prior to administration of an injection	25 (41.7%)	29 (48.3%)

20.0%), while the percentage of IV drips was also higher for the private provider (n=6/60; 10.0%) compared to public sector (n=5/60; 8.3%) (Table-1).

Most of the healthcare providers (n=58/60; 96.7%) reported that patients demand injections, while 92 (76.7%) of the 120 patients informed in the exit interview that it was the doctor who prescribed the injection.

Reuse of injection equipment

None of the injection providers admitted the re-use of syringes and IV drip sets (Table-2). Glass syringes/sterilisable syringes were not used in any of the public and private health facilities. Overall, 83.3% of public and private health facilities (n=50/60) had

Table-2: Key injection practices in public and private sector health facilities as reported by the healthcare providers in the healthcare facilities (N=60).

Indicator	Percentage
Patients prescribed an injection	14 (23.3%)
Patients prescribed intravenous drips	5 (8.3%)
Patients who demanded injections	58 (96.7%)
Patients who were administered injections for fever, headache, cough and pain	46 (76.7%)
Prescribers and providers who admitted reuse of injections	0 (0.0%)

sufficient stock of disposable syringes and drips. Forty percent of the prescribers (n=24/60) reported that re-use of syringes was a common problem, and this issue was further discussed in FGDs conducted separately with prescribers and providers. They were of the opinion that syringes and drips are re-used only in the informal sector by un-qualified/un-licensed healthcare providers.

Proper disposal of used syringes and drips

Less than half (n=18/60; 30.0%) of the assessed public and private health facilities had punctured proof safety boxes available for collection of used syringes and sharps, whereas 20 (33.3%) public and private facilities had colour coded bags/containers for collection of infectious and non-infectious waste and sharps. Three health facilities out of ten had their own incinerator in the facility of which one was non-functional at the time of data collection. These were secondary level health facilities.

Infection prevention and control (IPC) practices

Of all the facilities, 10 out of 60 (16.7%) had running water and soap available for hand washing. Only 12 (20.0%) health managers or hospital administrators of public and private hospitals reported availability of injection safety guidelines/policies, healthcare waste disposal, and needle stick injury reporting policies/guidelines. Overall, 17

Table-3: Injection practices and infection prevention and control (IPC) measures observed during the assessment (N=60).

Indicator	Percentage
Health facilities with sufficient stock of disposable syringes	50 (83.3%)
Use of single use disposable syringe in public and private health facilities	57 (95.0%)
Health facilities with puncture-proof safety box available for collection of sharps	18 (30.0%)
Health facilities disposing syringes and drips in open containers/buckets	20 (33.3%)
Health facilities with running water and soap available	10 (16.7%)
Providers practicing hand hygiene prior to administration of an injection	28 (46.7%)
Provider practicing recapping after administering the injection	38 (63.3%)
Health facilities using auto-disable syringes	3 (5.0%)

(28.3%) health facilities had some system for reporting needle stick injuries. A limited percentage of staff (n=6/60; 10.0%) had received training on safe injection practices, rational drug prescription, hospital waste management and IPC. Table-3 outlines the injection practices and IPC measures observed during the assessment.

Discussion

This assessment has three main findings. First is the unnecessary use of injections reported by injection prescribers and patients. Although is not new as the WHO review has also documented it, it remains a key finding.³ Second, we were not able to document any reuse of injection equipment in private and public health facilities. Although our methodology was observation-based, it is an important point. Our third finding is poor IPC practices including unsafe disposal and management of healthcare and sharps waste.

Pakistan is one of the few countries of the world where unnecessary injections continue to plague the healthcare system especially where the private healthcare providers are concerned. The WHO review had also highlighted this issue.³ This is a long-standing problem and dates back to late nineties and early 2000s where a number of studies have documented unnecessary injections and reuse of injection equipment causing transmission of blood-borne pathogens.¹³⁻¹⁶ Healthcare providers prescribe injections to provide quick relief and often charge extra money for an injection and a higher price for an IV drip. Patients in Pakistan like to receive injections believing that without this the treatment remains incomplete. This practice has turned into a vicious cycle. WHO aide memoire on injection safety recommends behaviour change among patients and healthcare providers to decrease injection overuse and achieve injection safety.¹⁷ Empowering the community is one such behaviour changing strategy in which they can be educated, and awareness can be raised about irrational use of injections and IV drips. This has

been done in the past in Indonesia where prescribers and patients were brought on one forum and a discussion was moderated by a behavioural scientist and a clinician.¹⁸ Results showed a significant decrease in injection use from 69.5 to 42.3% in the intervention group, compared to a decrease from 75.6 to 67.1% among controls. There was also a significant reduction in average number of drugs per prescription [-0.37 drugs prescribed per patient, 95% CI = (-0.04, -0.52), $P < 0.05$], indicating that injections were not substituted with other drugs.¹⁸ A multi-prong approach used in Pakistan a decade and a half later comprising of large scale community gathering, engaging religious leaders and teachers, and use of media such as television and FM radio channel helped in bringing down misconceptions about transmission of hepatitis B and hepatitis C infections. It also empowered the community to ask the prescriber whether she/he is trained and if the syringe was re-used or opened from a new packet.¹⁹ Another solution which needs to be explored is fixing a minimum charge for the general practitioners (GPs) and the state compensation through a mechanism. However, this will also require implementation as well as monitoring and evaluation of the system.

Our study did not find any health facility in the two districts where injection equipment was reused on a patient. The National Action Plan to Address Unsafe Injections recommends using reuse prevention syringes which is also a WHO recommendation of 2015 injection safety guidelines.²⁰ However, many low- and middle-income countries have been struggling because of a number of reasons to implement this and one of them has been higher cost of these syringes.

Poor IPC was evident in the public as well as the private sector in the assessment. Sharps as well as infectious waste management in both districts was poor and requires urgent overhauling of this system from collection to transportation and disposal as per WHO global guidance. WHO core components for infection prevention and control are the foundation for establishing or strengthening effective programmes at the national and facility level.²¹

The findings of our study are not representative of the entire country due to a small sample size as only two districts out of total 154 districts in the country were analysed due to time and financial constraint. Moreover, informal sector comprising of large number of unqualified and unlicensed healthcare providers were not included and this study was health facility-based study; community perspectives were not included.

The findings of this study may be used to build other large scale programmes of injection safety in the country. We

have the following recommendations for stakeholders and policy makers:

- Promote use of oral medications and raise awareness by discouraging use unnecessary injections and IV drips;
- Regulate unlicensed practitioners through effective implementation of laws and regulations;
- Healthcare commissions in the provinces can play a significant role;
- Develop comprehensive plan for safe and appropriate disposal of used syringes, drips and other infectious waste;
- Ensure implementation of IPC programmes at levels of health facilities.

Disclaimer: None.

Conflicts of Interest: None.

Funding Disclosure: None.

References

1. WHO. WHO Injection Safety - A Glossary. [Internet] 2016 [cited on 2021 Feb 20]. Available from: https://www.who.int/infection-prevention/publications/is_glossary.pdf?ua=1.
2. WHO. WHO Injection Safety Factsheet No. 231 [Internet] 2016 [cited on 2021 Feb 20]. Available from: https://www.who.int/infection-prevention/publications/is_fact-sheet.pdf?ua=1.
3. Hayashi T, Hutin YJ, Bulterys M, Altaf A, Allegranzi B. Injection practices in 2011-2015: a review using data from the demographic and health surveys (DHS). *BMC Health Serv Res* 2019;19:600. doi: 10.1186/s12913-019-4366-9.
4. Khan A, Altaf A, Qureshi H, Orakzai M, Khan A. Reuse of syringes for therapeutic injections in Pakistan: rethinking determinants. *East Mediterr Health J* 2020;26:283-9. doi: 10.26719/emhj.19.028.
5. Mir F, Mahmood F, Siddiqui AR, Baqi S, Abidi SH, Kazi AM, et al. HIV infection predominantly affecting children in Sindh, Pakistan, 2019: a cross-sectional study of an outbreak. *Lancet Infect Dis* 2020;20:362-70. doi: 10.1016/S1473-3099(19)30743-1.
6. WHO. Disease outbreak news-HIV cases Pakistan 2019 [Internet] 2019 Jul 03 [cited 2021 Feb 20]. Available from: <https://www.who.int/csr/don/03-july-2019-hiv-cases-pakistan/en/>
7. Ministry of National Health Services Pakistan, WHO. National action plan to address unsafe injection practices in Pakistan. Islamabad, Pakistan: Ministry of National Health Services; 2021.
8. Ansari JA, Salman M, Safdar RM, Ikram N, Mahmood T, Zaheer HA, et al. HIV/AIDS outbreak investigation in Jalalpur Jattan (JPJ), Gujrat, Pakistan. *J Epidemiol Glob Health* 2013;3:261-8. doi: 10.1016/j.jegh.2013.06.001
9. Pakistan Bureau of Statistics. District and tehsil level population of Larkana district. [Internet] 2017 [2021 Mar 11]. Available from: https://www.pbs.gov.pk/sites/default/files/bwpsr/sindh/LARKANA_SUMMARY.pdf.
10. Munir, K, Khan U. Fan Industry in Gujrat and Gujranwalla: SME Cluster Study. Lahore, Pakistan: Lahore University of Management Sciences (LUMS); 2011.
11. Pakistan Bureau of Statistics. District at a glance Gujrat [Internet] 2017 [cited 2021 Apr 16]. Available from:

- <https://www.pbs.gov.pk/content/district-glance-gujrat>.
12. WHO. Revised Injection Safety Assessment Tool - Tool C - Revised [Internet] 2008 [cited 2021 Feb 20]. Available from: <https://www.who.int/infection-prevention/tools/injections/ToolC-revised.pdf?ua=1>.
 13. Luby SP, Qamruddin K, Shah AA, Omair A, Pahsa O, Khan AJ, et al. The relationship between therapeutic injections and high prevalence of hepatitis C infection in Hafizabad, Pakistan. *Epidemiol Infect* 1997;119:349-56. doi: 10.1017/s0950268897007899.
 14. Luby S, Hoodbhoy F, Jan A, Shah A, Hutin Y. Long-term improvement in unsafe injection practices following community intervention. *Int J Infect Dis* 2005;9:52-9. doi: 10.1016/j.ijid.2004.03.007.
 15. Khan AJ, Luby SP, Fikree F, Karim A, Obaid S, Dellawala S, et al. Unsafe injections and the transmission of hepatitis B and C in a periurban community in Pakistan. *Bull World Health Organ* 2000;78:956-63.
 16. Jafri W, Jafri N, Yakoob J, Islam M, Tirmizi SF, Jafar T, et al. Hepatitis B and C: prevalence and risk factors associated with seropositivity among children in Karachi, Pakistan. *BMC Infect Dis* 2006;6:101. doi: 10.1186/1471-2334-6-101.
 17. World Health Organization. Aide-me?moire for a national strategy for the safe and appropriate use of injections [Internet] 2015 [cited 2021 Apr 17]. Available from: <https://www.who.int/infection-prevention/tools/injections/AideMemoire-injection-safety.pdf?ua=1>
 18. Hadiyono JE, Suryawati S, Danu SS, Sunartono, Santoso B. Interactional group discussion: results of a controlled trial using a behavioral intervention to reduce the use of injections in public health facilities. *Soc Sci Med* 1996;42:1177-83. doi: 10.1016/0277-9536(95)00391-6.
 19. Altaf A, Shah SA, Shaikh K, Constable FM, Khamassi S. Lessons learned from a community based intervention to improve injection safety in Pakistan. *BMC Res Notes* 2013;6:159. doi: 10.1186/1756-0500-6-159.
 20. WHO. WHO guideline on the use of safety-engineered syringes for intramuscular, intradermal and subcutaneous injections in health care settings [Internet] 2016 Jan 01 [cited 2021 Mar 13]. Available from: <https://www.who.int/publications/i/item/9789241549820>.
 21. WHO. Guidelines on core components of infection prevention and control programmes at the national and acute health care facility level [Internet] 2016 Nov 01 [cited 2021 Mar 09]. Available from: <https://www.who.int/publications/i/item/9789241549929>.
-