Master of Science in Public Health

Infection Prevention and Control Awareness & Practices among Community Health Workers at Primary Healthcare Settings of Islamabad

By

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I understand that plagiarism is the use or presentation of any work by others, whether published or not, and can include the work of other candidates. I also understand that any quotation from the published or unpublished works of other persons, including other candidates, must be clearly identified as such by being placed inside quotation marks and a full reference to their source must be provided in proper form.

This dissertation is the result of an independent investigation. Where my work is indebted to others, I have made acknowledgments. I declare that this work has not been accepted in substance for any other degree, nor is it currently being submitted in candidature for any other degree.

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ABSTRACT

Background: Infection prevention and control measures include hand hygiene, use of protective gloves, injection safety and waste segregation (i.e. use of color coded bins). Healthcare associated infections continue to spread in Pakistan, as a result of poor awareness and practices of IPC measures among healthcare workers. In this regard community health workers' IPC awareness and practices are critical to avoid infections.

Objectives: The purpose of this study was to assess IPC awareness and practices among community health workers in Islamabad, as well as to identify the associated factors that influence IPC awareness and practice among community health workers.

Methodology: In Islamabad, a cross-sectional study was carried out including community health workers from primary healthcare facilities. The method of non-probability consecutive sampling was used to choose a total of 262 participants. After receiving their consent, participants were given a structured questionnaire to evaluate their awareness and practices regarding IPC. The Chi-squared test and Fisher's exact test were used to assess significant association between awareness, practices and socio demographic characteristics.

Results: Out of 262 respondents, majority were female 63.7% and were with age of 40 years 211 (80.6%). The mostly community health workers were graduate 144(55%). Analysis showed significant association for hand hygiene between level of awareness, age group, and work experience. For protective gloves, education and awareness level were associated. Similarly, injection safety practices and job status showed significant relationship. And for waste segregation, level of education and good awareness were associated with (P-value < 0.05).

Conclusion: The study results also reflect the importance of interventions that can help community health workers to develop and improve their IPC awareness and practices in order to minimize the healthcare associated infections in Pakistan.

Keywords: IPC, Hand Hygiene, Protective gloves, injection safety, Community Health Workers, Islamabad

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Nazia Hassan Khan

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Chapter I:

Introduction

Community Health Workers play an important role in primary health care services worldwide. As frontline workers, they provide health services including health education, promotion of healthy behaviors, preventive care, family planning services, maternal and child health support, HIV/AIDS care, and basic curative care at the community level [1]. In addition, they perform immunization services to the community whether it is COVID-19 vaccination or routine (EPI) immunization. They are being engaged in various awareness activities regarding prevention and control of infectious/non-infectious diseases and personal hygiene measures (Zulliger, 2017). Being at the fore front of patient care community workers are directly involved IPC practices. IPC is a group of activities which prevent risk of infection transmission within healthcare workers and populations (Ekuma & Oridota, 2016). It involves standard precautions and transmission-based precautions i.e. hand hygiene, use of personal protective equipment (PPE), respiratory etiquettes, injection safety, waste management and environmental cleaning (Zulliger, 2017).

According to World Health Organization (WHO), IPC awareness is very important to reduce the risk of healthcare-associated infections, and protects both patients and healthcare providers (B). Infection control practices are standard precautions used to prevent disease transmission from blood, body fluids, non-intact skin, and mucous membranes). These precautions include Hand hygiene, Personal Protective Equipment, Injection safety and safe waste disposal and must be taken when

providing care to all individuals, regardless of whether they appear infectious or symptomatic (Chartier, 2014).

In this context, the awareness of community health workers about IPC practices i.e. Hand hygiene, injection safety and sharps disposal, is very vital to keep community health workers safe from occupational exposure to disease and to protect community from infections (Braimoh & Udeabor, 2013). Compliance with IPC practices are dynamic in preventing and controlling the spread of infections, mostly in areas where the occurrence of infectious diseases is frequent (Vaishnav, Bamanikar, Dasgupta, & Reddy, 2016).

Hand hygiene either with soap and water or using an alcohol-based hand rub (sanitizer) is the most economical public health measure that can avoid healthcare-associated infections (Abalkhail et al., 2021)**.** Although hand hygiene is considered the keystone for the prevention of infectious diseases. However, lack of adequate knowledge, awareness, and attitude towards hand hygiene made compliance deteriorated among community health workers (Al-Wazzan, Salmeen, Al-Amiri, Bouhaimed, & Al-Taiar, 2011). According to the WHO, approximately 1.4 million people are affected by healthcare-associated infections globally(Modi et al., 2017).

In developing countries, 30-50% health care associated infections (Habibi et al., 2008) are observed due to contaminated hands of health care workers and community members (Dwivedi et al., 2009)

In Asia, there is small number of studies have been conducted, which showed the prevalence of health care associated infections is high in the region (Anwar, Anwar,

& Tabassum, 2018). Most of these studies related to the awareness, attitude and practices (KAP) of doctors (Chan, Ho, & Day, 2008).

As far as concerned Pakistan, there are very limited studies to promote and gauge hand hygiene in primary healthcare facilities (Anwar et al., 2018). Therefore, more researches should be conducted to identify gaps regarding awareness and practice of hand hygiene and injection safety so that effective health education programs can be designed (Yaseen, Saif, Khan, & Yaseen, 2022).

The injection is one of the significant health care measures used globally for drug administration. Safe Injection Global Network (SIGN) defines a safe injection as, "the injection that does not harm to the recipient, does not expose the health worker to any risk and does not result in waste that is dangerous for the community" (Organization). Safe injection practices and safe disposal of sharps not only protect community health workers from severe morbidity and mortality but also protect their communities from severe infections (Mahfouz et al., 2009). That's why awareness about injection safety is crucial for safe injection practices among community health workers.

WHO provided policy and guidelines to promote the rational use of injections among healthcare workers(Organization, 2001). These guidelines also suggest that healthcare workers should be aware about the types of healthcare waste and color coding (Chartier, 2014). However, in developing countries, unsafe injection practices are very common among health care staff (Gyawali, Rathore, Shankar, & KC, 2013) and many injections are given with unsafe and reused syringes and equipment in the absence of sterilization (Hutin, Hauri, & Armstrong, 2003). In 2002, WHO reported

that 37.6% of hepatitis B, 39% of hepatitis C, and 4.4% of HIV/AIDS in healthcare workers around the world are infected through needle-stick injuries, which are accounted for respectively, a burden of 9, 177, and 679 disability-adjusted life years (DALY) between 2000 and 203 (Ismail, Mahfouz, & Makeen, 2014). In Pakistan, reuse of syringes is also very common which caused the spread of Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) (Janjua, Butt, Mahmood, & Altaf, 2016) Above 50% of HCV infections in Pakistan are attributed to unsafe injections (Janjua, Akhtar, & Hutin, 2005). Moreover, improper disposal of sharps items (needles and syringes) and low level of awareness also caused the risk of infections among healthcare workers (Khalid et al., 2021). According to a study, about 2 kg of waste/bed/day is produced in Pakistan, out of which 0.1–0.5 kg can be considered as risk waste and their malpractice happens at all levels, from segregation to its final disposal (Hashmi & Shahab, 2003).

As people's first point of contact for seeking health assistance is with community health workers at primary health settings, which include Lady Health Workers (LHWs), Lady Health Supervisors (LHSs), Lady Health Visitors (LHVs), midwives, vaccinators and outreach workers. That’s why, healthcare workers’ awareness and practices regarding IPC is very essential. So the aim of the study is to evaluate awareness and practices of community health workers about IPC. Which are important not only to keep them safe from occupational exposure to disease and also to protect community as well from infections. The current study was done by using a questionnaire which was adapted by WHO hand hygiene knowledge assessment tool and injection safety tool (Modi et al., 2017; Organization, 2001).

Objectives:

1. To assess awareness and routine practices about Infection Prevention and Control measures among community health workers of Islamabad
2. To evaluate the factors associated with awareness and practices to IPC of community health workers

CHAPTER II:

Literature Review

2.1: Context of the study

This study focuses on IPC awareness and practices of community health workers working at primary health care settings who serve as the community's front-line health care providers. Awareness about any infectious agent, its types, modes and way of spread plays vital role in infection control. Insufficient awareness of community health workers can directly affect practices and lead to poor infection control practices, and spread of diseases. There has been little research on infection prevention and control practices in low and middle income countries, especially in primary health care settings. Secondly previous studies often focused on single domains of IPC, such as hand hygiene or injection safety.

The most important aspect of this study is to address the awareness and practices of healthcare workers in basic and rural health units who are easily accessible to the local community. The study's goal is to assess healthcare workers' barriers for non-compliance of IPC practices. The age of community health workers, their education, their experience, gender, and the designation are all important, but most importantly, awareness, training and capacity building of healthcare workers is key to implementation of IPC practices. The study's context is to understand the causes of the poor awareness and practices of IPC through adapted tools of hand hygiene knowledge and injection safety practices by WHO. The hand hygiene knowledge-assessment tool:

a) provided information in a standardized way on the hand hygiene practices among community health workers.
b) highlighted the key issues and compliances regarding hand hygiene

The injection safety assessment tool:

a) determined what the level of awareness about injection administration
b) identified the unsafe practices that may lead to infections.

2.2: Operational Definitions

Infection Prevention & Control (IPC):

According to WHO, "Infection prevention and control (IPC) is a practical, evidence-based approach which prevents patients and health workers from being harmed by avoidable infection and as a result of antimicrobial resistance" (Organization, 2021).

IPC Awareness & Practices:

Awareness can be defining as "when a subject is in the state of awareness, they are aware of information that they can use to guide a variety of activities and that information is readily available to them. While "infection, prevention and control practices are a set of standard precautions used to prevent disease transmission from blood, body fluids, non-intact skin (including rashes), and mucous membranes). These precautions include Hand hygiene, Personal Protective Equipment, Injection safety and safe waste disposal. must be taken when providing care to all individuals, regardless of whether they appear infectious or symptomatic. (Ogoina et al., 2015).

Hand Hygiene:

Centre for Disease Control (CDC) defines hand hygiene as "a way of cleaning one's hands that substantially reduces potential pathogens (harmful microorganisms) on the hands. Hand hygiene is considered a primary measure for reducing the risk of transmitting infection among patients and health care personnel. Hand hygiene

procedures include the use of alcohol-based hand rubs (containing 60%–95% alcohol) and hand washing with soap and water" (Ellingson, 2017). WHO also introduced "My five moments for hand hygiene" approach for health-care workers (Fine; Pittet et al., 2000).

Figure 1: My 5 Moments for Hand Hygiene by WHO 2009

Injection safety:

According to WHO, "a safe injection does not harm the recipient, does not expose the provider to any avoidable risk and does not result in any waste that is dangerous for other people"(Organization, 2016).

Sharps Waste Disposal

FDA defines, "Sharps waste is a subset of infectious waste and includes syringes, needles, lancets, broken glass and any other materials that can puncture or cut the skin"(Perry, Jagger, Parker, Phillips, & Gomaa, 2012).

For waste segregation CDC directs as follows:

- Only put sharps and needles in the sharps disposal bins.

- Do not put anything in sharps disposal containers that can be placed in regular waste containers (such as uncontaminated trash, gauze, alcohol pads, needle caps, and gloves).
- Place non-sharp, contaminated material, such as gauze contaminated with blood or other potentially infectious material, in a red biohazard waste disposal bag.

Community Health Workers:

Community Health workers are public health professionals who act as a link between communities, health care systems, and state health departments. Countries including Pakistan, Afghanistan, the Islamic Republic of Iran, Jordan, Kuwait, Oman, Syria, Yemen, Palestine, Egypt, Morocco, Tunisia, and Sudan have had community health worker programs in some capacity. In Pakistan community health workers include Lady Health Workers (LHWs), Lady Health Supervisors (LHSs) Lady Health Visitors (LHVs), midwives, vaccinators and outreach workers. These workers are affiliated with a local health facility, but their primary focus is to serve the community (Henry et al., 2017).

2.3: Health System of Pakistan

The Pakistani health care system strives to provide healthcare via a three-level healthcare delivery system and a variety of public health interventions. The first level includes Basic Health Units (BHUs) and Rural Health Centers (RHCs), which form the foundation of the primary healthcare model; secondary care includes first and second referral facilities that provide acute, ambulatory, and inpatient care via Tehsil Headquarter Hospitals (THQs) and District Headquarter Hospitals (DHQs); and tertiary care, which includes teaching hospitals. (WHO, EMRO)

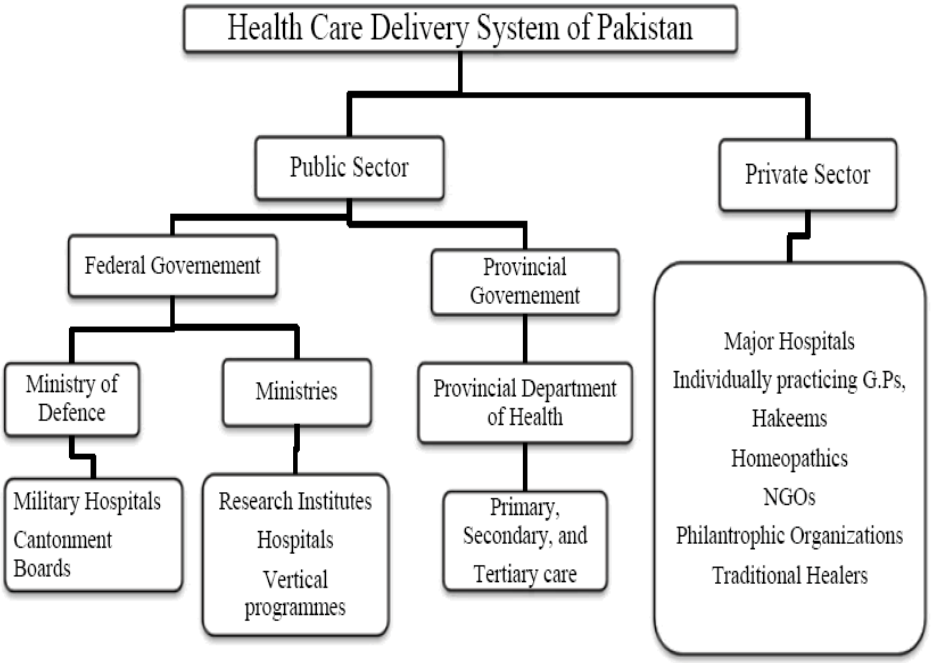

Figure 2: Health care delivery system of Pakistan (S. Kumar & Bano, 2017)

2.4: Primary Health Care Settings:

Primary health care (PHC) is the foundation of any health system providing care that is integrated, responsive, accessible, high-quality, and equitable. Since PHC's significance has been acknowledged in recent years, both developed and developing countries have shown a rising interest in primary care as a means of achieving the objective of universal health coverage. (WHO, 2022). Primary care is a facility that provides instant disease diagnosis and prevention. The curative and rehabilitative services are being provided mainly at the secondary and tertiary care facilities. Preventive and promotive services, on the other hand, are mainly provided through various national programs; and community health workers' interfacing with the communities through primary healthcare facilities and outreach activities.

2.5: Reason for choosing primary health care setting

Healthcare-associated infections (HCAI) are one of the biggest hazards to the safety of patients, healthcare professionals, and visitors in healthcare facilities. The burden of HCAI is knowingly complex in low and middle-income countries (LMICs) as compared to high-income countries (Savul et al., 2020) Infection prevention and control (IPC) is a cost-effective strategy to reduce the incidence of HCAIs (Dick et al., 2015). But many factors, including a lack of IPC, awareness, policies, guidelines, and resources, as well as a lack of education and training, contribute to inadequate infection prevention and control practices in healthcare facilities. As, community health workers are the first point of contact for the local community, deficient awareness and incorrect practices of community health workers can lead to poor infection and spread of diseases. Healthcare system and facilities all over Pakistan often overlook the subject of infection prevention and control (IPC) (Agreli et al., 2019). There has been little research on infection prevention and control awareness & practices in Pakistan, especially in primary health care settings that's why we select primary level of healthcare settings.

2.6: Global view on IPC knowledge and practices of healthcare workers

Multiple studies conducted around the world show that Infection prevention and control (IPC) is a scientific approach to reduce the risk of infection transmission in the healthcare setting. Adequate awareness and effective practices of IPC promote safe and high-quality healthcare. An account from earlier studies is presented, along with some explanations that fit the study. A recent study on the same topic was evaluated the knowledge and practice of IPC as well as its uptake and administrative control among the primary health-care workers in Southeast Nigeria in 2022. Almost three hundred

eligible health-care workers participated in this analytical cross-sectional study. More than a fifth 21.7% of HCWs showed good practice of IPC measures. It was noted that among 95.7% respondents were doing correct practice of handwashing. Majority 74.7% stated recapping of needles and engaged in unsafe disposal of health-care wastes 85.7%. The prevalence of needle stick injuries 3 months prior to the study period was 160 53.3%. The study concluded that poor practices of IPC and poor compliance to administrative control among primary health care workers, in addition to lack of administrative facilities, remains a great challenge. The study suggested capacity building trainings/workshops on IPC and administrative support to reverse this trend (Ochie, et al., 2022).

In 2022, a KAP study was done to explore the influencing factors of occupational safety against the COVID-19 among midwives in China. This online cross-sectional survey included 2663 midwives across the China through a self-reported structured questionnaire. Around 97.4% midwives and 92.9% of them were identified with positive attitude and appropriate practice of IPC, respectively, whereas only 6.4% showed good level of awareness about the occupational safety toward the COVID-19. Midwives with older age, keeping on working during the breakout period, completing the IPC training programs and caring the confirmed COVID-19 cases. The study provided important information not only for policy makers and managers to improve resource allocation and design education programs on IPC for midwives, but also serve as a model for assessing changes in subsequent, post-intervention KAP studies (He et al., 2022).

Another study on the same topic was reviewed in Saudi Arabia in June 2021. The study's goal was to go over the body of literature on Health Care Workers (HCWs)

knowledge of IPC and to highlight potential elements that could affect IPC precautions compliance. A systematic review was done by using a developed protocol based on the Preferred Reporting Items for Systematic reviews and Meta-Analysis [PRISMA] statement. Study revealed different gaps in several HCWs' knowledge concerning occupational vaccinations, the modes of transmission of infectious diseases, and the risk of infection from needle stick and sharps injuries. Study concluded that the numerous factors are involved in noncompliance of IPC guidelines among healthcare workers. The researchers recommended to adopt a comprehensive strategy for enhancing IPC-intervention tactics. It is required to improve HCW compliance with IPC requirements (Alhumaid et al., 2021).

Good level of awareness and practices of IPC with efficient implementation of guidelines is key to achieving a quality healthcare delivery. In this context a study was conducted to determine the knowledge and practices regarding IPC in Bangladesh's primary health care facilities during the pandemic 2021. The study surveyed 312 health care workers in 94 community clinics and 90 family welfare centers (FWCs) in six districts from February to April 2021.Findings showed that on a scale of 100, the mean composite knowledge score was 38.3 (SD: 13.3) overall and 44.0 (SD: 13.1) and 33.8 (SD: 11.6) for FWCs and CCs, respectively. Knowledge score was the highest in personal hygiene and the lowest in medical waste segregation. About practices, one-third of the HCWs or HCFs, followed the recommended protocols, except for wearing face masks while on duty 87.1% and referring potential COVID-19 patients to higher-level facilities 68.3%. The study concluded with the suggestion that the knowledge and practices of health care workers should be improved through formal education and training initiative about IPC (Talukder et al., 2023).

An assessment of IPC implementation in health facilities was conducted in Rivers State Nigeria in 2021. In this cross-sectional study, 99 healthcare facilities were selected out of which 20.2% facilities had IPC programs. In 56.6% facilities, a copy of the IPC guidelines was available, however, only 13.1% were implemented on the IPC guidelines. Forty (40.4%) facilities had IPC trained healthcare workers. Adequate personal protective equipment (PPEs) was available in 29.3% facilities and healthcare waste disposal was practiced in 46.4% facilities. Overall, 56.6% of the facilities had scores within the basic IPC level of practice while 43.4% had scores within the intermediate level of IPC practice. The results of this study suggest that IPC committees should be established in each healthcare facility with the responsibility of executing IPC activities, revising IPC guidelines, and training healthcare staff (Dan-Jumbo, Briggs-Nduye, & Uzosike, 2021).

In 2019, a study was carried out in Nigeria on the subject of assessing knowledge and practices of hand hygiene to prevent infection among healthcare workers. 116 HCW were participated in the study. Around three-quarter (72.4%) of the HCWs had good knowledge and 62.0% showed positive attitude to hand washing practice, according to the World Health Organization recommendations. Generally, 55.2% respondents exposed good adherence to proper hand washing. Their level of knowledge and attitude toward proper hand washing practices were shown to be significantly associated with their adherence to the practice ($P < 0.05$). The study's conclusion was revealed that individual and institution-level factors influenced adherence to proper hand washing practices among the respondents (Garba & Uche, 2019).

In India, a study was conducted to assess the risk factors of COVID-19 infection among health care workers and to evaluate the effectiveness of infection prevention and control measures among them in 2019. The socio-demographic characteristics, history of exposure, IPC measures followed and clinical symptoms were compared between health care workers in COVID and non-COVID areas. Most of the 45% healthcare workers were nurses, followed by hospital/sanitary/technical attendants 30% and doctors 24%. Total number of health care workers were 256, out of them 2% tested positive. About 80% of health care workers had ever attended any IPC training. A statistically significant association was found between posting area of health care workers and their exposure to COVID patients (duration of exposure, PPE has worn by health care workers, direct contact with the patient's stuff) and COVID positivity (P value <.001). In a conclusion, the researchers suggested that if health care workers were trained about IPC practices and take ample precautions then the risk of getting an infection can be minimized (Sharma et al., 2021).

Another study was conducted in 2018 from Bangladesh. The purpose of study was to assess the level of knowledge and attitude towards infection control among the nurses in a selected hospital in Bangladesh. A descriptive cross-sectional study was carried out and the results found that more than seventy percent of the nurses had good level of knowledge regarding IPC and two-thirds of the nurses were found to have positive attitude concerning IPC. Researchers suggested IPC training programs for newly healthcare worker (Akhter, Chowdhury, & Muhammad, 2018).

One of the key personnel responsible for the proper management of healthcare wastes in any health facility is the health worker. This performance, however, will be determined by the level of knowledge and practice in waste management. About 400

healthcare professionals were subjected to a facility-based cross-sectional study design which was conducted in Eastern Ethiopia in 2018. A multivariable logistic regression model was utilized to determine the variables influencing the expertise and performance of healthcare professionals. Of survey participants 47.7% and 42.3% participants had high knowledge and good practice, respectively, of healthcare waste management. Health workers between the ages of 35 and 44, including nurses, midwives, and medical laboratory technicians, were significantly associated with knowledge of health workers. In this study, healthcare professionals' knowledge and actual practice of healthcare waste management were both subpar. On-the-job training is advised by the researchers to improve health workers' knowledge and skills (Doylo, Alemayehu, & Baraki, 2019).

Poor understanding of IPC practices may contribute not only to poorer community workers' safety but also to the perpetuation of infections. A cross-sectional study was conducted in 2017 among 300 healthcare workers of three regional hospitals in Trinidad and Tobago regarding their awareness and practice towards infection prevention in the country. The results showed that only 20.3% respondents were knowledgeable, 46.7% had good attitude and 44% had good practices toward infection prevention, which suggested less than satisfactory scores in this study. The results concluded with poor knowledge, attitudes and practices towards infection prevention in the three hospitals in Trinidad and Tobago. The researchers recommended that regular training programs about IPC should be in place for healthcare workers in the country (Unakal et al., 2017).

Safe injection practice is an important component of IPC. Poor practices regarding injection safety can transmit various blood borne infections among healthcare providers. In Nepal, a study was conducted with injection providers working at primary

health care facilities within Kaski district, in 2016. The study's goal was to measure the knowledge and safe injection practices among injection providers and also to get information about injectable devices disposal. The study included 96 healthcare workers from 69 primary health care facilities and 132 injection events were observed. It was observed that injection providers knew of at least one pathogen transmitted through use/re-use of unsterile syringes. Proportion of injection providers naming hepatitis/jaundice as one of the diseases transmitted by unsafe injection practice was significantly higher 75.6%. Two handed recapping by injection providers was significantly higher in urban area 33.3% than in rural areas 21.6%. Most providers were not aware of the post exposure prophylaxis guideline. Gaps in infection control practices, poor healthcare worker safety, training on safe injection practice, and the lack of a proper waste management infrastructure, are the key areas found in the study which need to be addressed to improve injection practice (Gyawali et al., 2016).

In the Marathwada area of Maharashtra, India, a study was released in 2016 to evaluate nurses' knowledge and practices about IPC related to injection safety. In this study, 82.86% of respondents were female, and 52.86% had less than 5 years working experience, and 91.4% of the respondents had good knowledge of HIV, hepatitis B and C virus transmission through unsafe injection. While practicing, only 40% of nurses segregated sharp waste and 81.43% of nurses did not use protective gloves while administering injections, despite the fact that the majority of nurses 92.15% were aware that sharp waste should be disposed of in a blue container. The study found that nurses had an average level of knowledge about injection safety and inadequate practices; as a result, regular training sessions and strict supervision of the nurses are required (Kulkarni, Giri, & Gangwal, 2016).

Healthcare wastes are extremely important due to their hazardous nature. Unfortunately, there is a scarcity of practical information on this critical aspect of healthcare administration. A study was conducted in 2015 to investigate the perceptions and practices of healthcare workers in south-western Nigeria regarding healthcare waste management. This cross-sectional survey was conducted among medical professionals in Osun State, southwest Nigeria. Findings showed that the majority of respondents 89.0% were aware of the significance of healthcare waste management, while only 37.2% were aware of the segregation of healthcare waste. Just 45% of people had good knowledge overall, 45.5% had a positive attitude, and 54.5% had negative attitudes. According to the study the awareness, outlook, and practices of healthcare professionals about waste management were unsatisfactory. Despite the fact that only half of them had good level of awareness, they were all motivated to be trained. The study concluded with recommendations to enhance present procedures, frequent training and update sessions on healthcare waste management (Sabageh et al., 2015).

Another study was carried out to assess compliance with infection prevention and control practices in primary health care in Kenya, 2015. Compliance was assessed in five domains: hand hygiene; protective glove use; injections and blood sampling; disinfection of reusable equipment; and waste segregation. Findings showed that the mean for IPC compliance was 0.318 (95% confidence interval, CI: 0.315 to 0.321). The compliance ranged from 0.023 (95% CI: 0.021 to 0.024) for hand hygiene to 0.871 (95% CI: 0.866 to 0.876) for injection and blood sampling safety. Compliance was weakly associated with the facility's characteristics (e.g. public or private, or level of specialization) and the health-care worker's knowledge of, and training in, infection prevention and control practices. The weak correlations between compliance and

factors like knowledge of healthcare workers and availability of supplies in health facilities indicated that behavioral modification should be given more attention (Bedoya et al., 2017).

2.6.1: IPC awareness and practices situation in Pakistan

Pakistan is one of lower middle income country where the burden of health care associated infections remains unknown. Infection Prevention and Control (IPC) is a commonly overlooked area in Pakistan's healthcare systems and health facilities. A number of factors, including a lack of awareness IPC policies, guidelines, and resources, as well as lack of educational and training programs also contribute to insufficient infection prevention and control practices in healthcare facilities. The effectiveness of infection prevention and control measures during outbreaks in healthcare settings depends on their rapid implementation. In 2023, a study was conducted with the aim to evaluate infection prevention and control practices and adherence to IPC measures among healthcare workers at COVID-19 treatment centers. A total of 414 healthcare workers completed the survey, response rate was 67.8%, and majority of them were males 56.3%. Most of the healthcare workers were nurses 39.6% followed by medical doctors 27.3%. About 53% reported insufficiency of personal protective equipment (PPE). The majority of healthcare workers 90% used disposable gloves and facemasks while interacting with patients. Hand hygiene practices while touching, and performing any aseptic procedure was adopted by 70.5% and 74.1% of healthcare workers respectively. It was concluded that healthcare workers' practices can be optimized by establishing institutional IPC teams, periodic provision of IPC training, and necessary PPE (Mustafa et al., 2023).

In healthcare settings, hand hygiene as an element of IPC is regarded as one of the most important strategies for limiting infections and healthcare associated infections. Adopting an optimal and scientifically validated technique for maintaining hand hygiene in healthcare facilities is viewed as the most secure and cost-effective method of preventing infection transmission to and from patients. Another study was conducted in Wah Cantonment Pakistan in 2022 with aimed to assess healthcare workers' knowledge of hand hygiene using a standard questionnaire in a local tertiary care hospital. This cross sectional survey observed that only 6.6% healthcare workers had good knowledge of hand hygiene according to the standard guidelines, while majority of the participants 58.2% had a moderate level of knowledge according to the WHO criteria. There was no statistical difference in the scores among medical doctors and nurses. The researchers recommended repeated trainings and awareness seminars as part of routine work to foster this practice for better infection control in hospital settings (Ahmed, Khan, Ilyas, & Nadeem, 2022).

Another cross-sectional study was conducted from November and December 2019 at five public sector hospitals of Islamabad. The World Health Organization's Infection Prevention and Control Assessment Framework (IPCAF) was used to evaluate hospitals' infection prevention and control strengths and weaknesses. For detailed assessment of various departments, tools adapted from the Centers for Disease Control and Prevention and the Infection Prevention Society were used. Microsoft Excel 2016 was used to perform data analysis. The total IPCAF score in all five hospitals was less than 200, indicating that infection prevention and control implementation is inadequate and significant improvement is required to improve the existent situation of IPC in public sector hospitals of Islamabad (Savul et al., 2020).

One of the most crucial methods for preventing infections in the healthcare system is hand washing. In order to determine the causes of the failure of this practice, a study was carried out to examine the baseline knowledge, attitude, and practice of hand hygiene. This study conducted among 116 medical staff of different departments of Jinnah Hospital, Lahore in 2018. It was discovered that while 100% of participants were aware of all hygiene methods (hand washing, scrubbing, and glove use), but only 42.2% considered hand washing to be the most important hand hygiene method, and 41.4% were unaware of the recommended hand washing steps. When compared to their knowledge, actual compliance for hand washing was lower, at 40.5% before contact with patients and 59.5% after contact with patients. The research highlighted the importance of further strengthening the current health care training program in order to address these gaps in hand hygiene knowledge and practices (Anwar et al., 2018).

A cross sectional study aimed at assessing the knowledge of healthcare providers and identifying the factors affecting knowledge about safe injection practices was done in 2013 at Gujjar Khan, Pakistan. In this study 37 health care facilities (72.7% private and 27.3% public) were selected conveniently. 110 Health Care Providers (HCP's) were selected on the basis of availability. The knowledge of the HCPs was assessed through specifically developed scoring scheme and was categorized into good, fair and poor, while the factors affecting knowledge were assessed by applying Chi-square tests. ($p \leq 0.05$). About 70% of the HCPs had fair, 20.1% had poor and only 9.1% had good knowledge. Good knowledge was seen in doctors and graduate nurses. Poor knowledge was observed in non-certified HCP's. 57.3% had never heard about the use of Personal protective equipment (PPE), 57.3% had never heard of safe injection policy guidelines. HCPs 55.5 % had ever received any needle prick injuries. The overall

knowledge of the HCPs was above average, non-certified HCP's had poor knowledge. Cadre (p= 0.000) and Professional education/trainings (p=0.002) were significant factors affecting knowledge (Attiya et al., 2013).

2.7: Conceptual framework for study:

Healthcare associated infections (HAIs) are big health challenge in low middle income countries including Pakistan. It has a significant impact on morbidity, mortality, and quality of life, as well as a societal economic burden. Comprehensive assessments of IPC awareness of healthcare workers in low-resource settings are essential for improving their IPC practices. Therefore, a baseline assessment regarding awareness and practices of IPC was conducted by using the adapted questionnaire. The method of evaluating existing IPC awareness and practices will provide relevant data for addressing current gaps. The following conceptual framework can be used to measure IPC awareness and practices among community health workers.

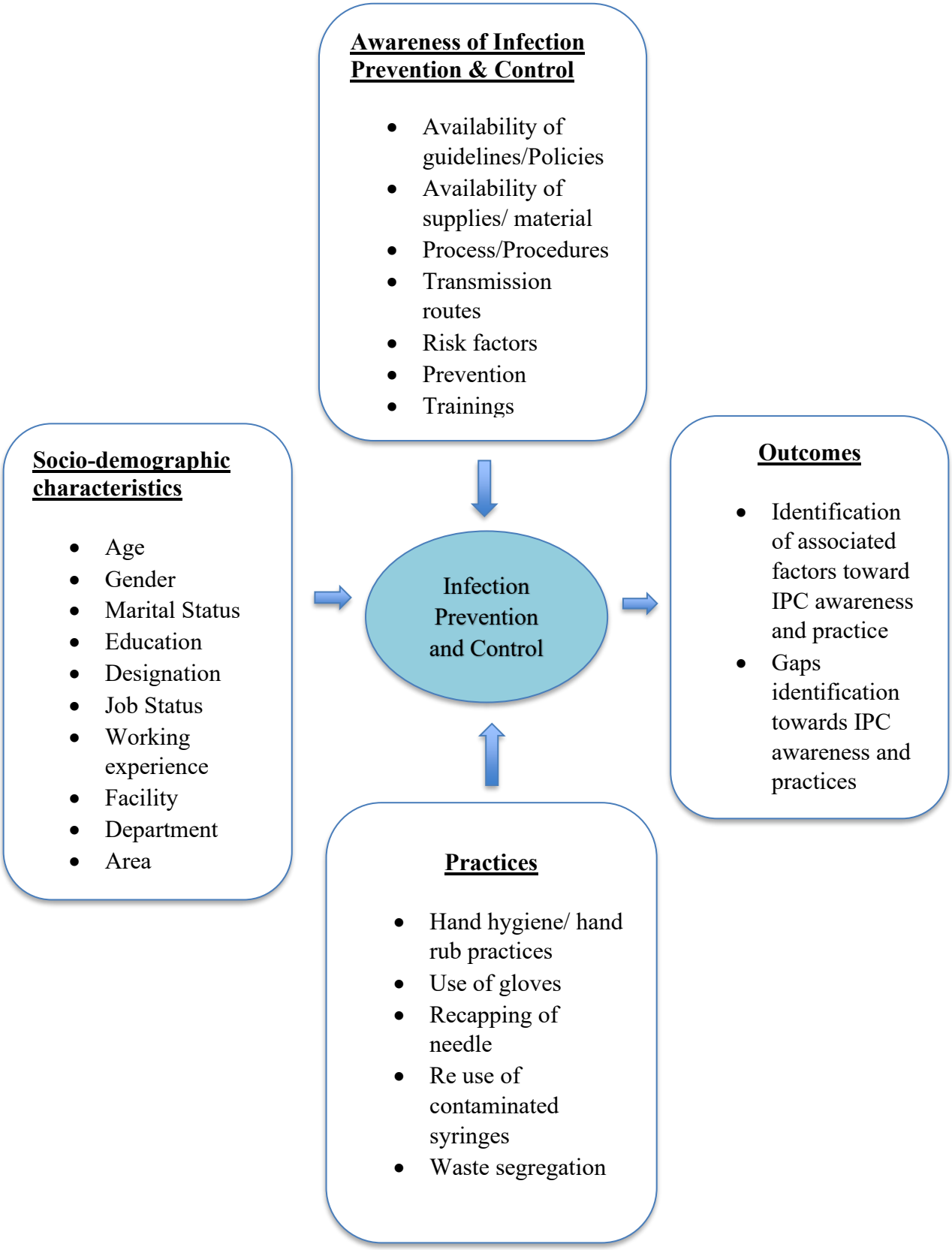

Figure 3: Conceptual framework

2.8: Rationale:

Healthcare-associated infections continue to spread in Pakistan due to a lack of IPC awareness among community health workers, which affects their IPC practices and posing a significant risk of HIV and other blood-borne disease transmission. These occupational infections are largely avoidable if infection prevention and control (IPC) awareness and practices are followed. The study's goal is to assess the level of IPC awareness and practice among community health workers in primary healthcare settings of Islamabad. To the best of our knowledge, no research has been conducted in Pakistan on IPC awareness and practices among primary healthcare workers. The study will also aid in the planning of future awareness and education campaigns regarding IPC.

CHAPTER III:

RESEARCH METHODOLOGY

3.1: Study Design

A cross sectional study was conducted over a period of six months from September 2022 to February 2023 in order to assess the Infection prevention and control (IPC) practices of community health workers from primary health care settings of Islamabad.

3.2: Study setting

The study was conducted at Primary Healthcare Settings (RHCs, BHUs) of Islamabad. District Islamabad was created under the Presidential Orders No. 18 of 1980. The Health Department of Islamabad was established in 1981-82 which includes Rural Health Center (RHCs) and 72 Basic Health Units (BHUs) in the rural area of Islamabad Capital Territory (ICT). There are 19 health facilities (3 RHCs, 15 BHUs, and 1 dispensary under the control of health department ICT while 64 dispensaries are working under Capital Development Authority (CDA). We visited all functional health facilities to collect data. There are 932 primary healthcare workers including LHWs, LHSs, LHVs, Midwives, Vaccinators, and outreach workers are working at primary health settings. (Islamabad Capital Territory Health Strategy 2019-23MoNHSRC 2018)

3.3: Study population

The study population consisted of community health workers of primary care setting including

- Lady Health Workers
- Lady Health Supervisors
- Lady Health Visitors
- Midwives
- Vaccinators

3.4: Eligibility criteria for the study population

Community health workers (LHWs, LHSs, LHVs, Midwives and Vaccinators) involved in routine healthcare services since last 2 years and willing to participate in the study.

3.4.1: Inclusion Criteria:

- Community Health workers working at Primary Health Care settings (RHCs, BHUs, Dispensaries) of Islamabad
- Community Health workers with 2 years' work experience in primary health services.
- Both male and female health workers.

3.4.2: Exclusion Criteria:

- Healthcare workers besides primary health care
- Those who refused to take part.

3.5: Study Duration:

This study is completed in six months from September 2022 to February 2023 started after IRB approval from department.

3.6: Sampling technique:

List of all primary healthcare facilities of Islamabad was obtained from District Health office. Then study participants were selected through Non-Probability Consecutive sampling technique at the study settings.

Figures of Islamabad	#
Total population	2006572 (2017 census)
Number of BHUs	15
Number of RHCs	03
Number of Dispensaries/ Health Centers	64
Total number of Healthcare workers including LHSs, LHWs, LHVs, Midwives and Vaccinators	932

Table 1: Figure of Primary Healthcare Settings of Islamabad

3.7: Sample size calculation

According to obtained information from DHO and existing literature, there are 932 total healthcare workers working in District Islamabad's primary healthcare facilities, including LHWs, LHSs, LHVs, midwives, vaccinators and outreach workers. We calculated the sample size with help of Epi-Info version 7.2.5.0.

- Population size: 932
- Expected frequency: 59.5% (Anwar et al.,2018)
- Acceptable Margin of Error: 5%
- Confidence level: 95%
- Design effect: 1.0
- Cluster:1
- Population size 932 so the calculated sample size was 262.

3.8: Data Collection Procedure:

Pilot study: A pilot research with 20 participants was conducted to evaluate the questions' validity and determine any changes that might enhance the questionnaire's quality. To guarantee that each question's true intent is communicated, the questions were carefully evaluated before being distributed.

Informed Consent: Consent was taken from each participant after giving them a piece of information about the research and right to confidentiality and getting it signed on the consent form. The tool was originally written in English but later translated into Urdu for participants. It is divided into two parts: the first contains 08 socio-demographic questions, and the second part contains 36 questions (with 23 questions

about hand hygiene, 05 for protective gloves, 03 for injection safety, 05 for waste segregation). The questions are divided in awareness and practice questions.

Reliability of Tool:

Reliability Statistics

Cronbach's Alpha	N of Items
.757	35

3.9: Data Collection Tool:

We adapted WHO tools for hand hygiene knowledge and Injection safety for data collection.

3.9.1 Socio-demographics:

Section A included socio-demographic which includes Age

- Age
- Gender
- Marital Status
- Education
- Designation
- Job Status
- Work experience
- Previous training
- And one question regarding if anyone of them have received any IPC related training

3.9.2: Awareness and Practices:

There were four domains included in questionnaire to gauge awareness and Practice about IPC. For hand hygiene domain, 14 questions included related to

awareness and 09 questions were about practices. Second domain was assessed regarding protective gloves use, 03 questions were about awareness and 02 for practice. Third domain i.e. injection safety contained 02 questions for awareness and 01 for practice. While for waste segregation, 04 questions were about awareness and 01 about practice. For hand hygiene domain awareness, score above 75% were considered good, 50-74% were considered moderate and less than 50% were considered poor (Zia, Cheema, Sheikh, & Ashraf, 2022). (Mathur, 2011). The other domains awareness and practice considered good when the sum of the score were greater than average and considered poor when the score less than average.

3.9.3: Plan of Analysis:

Data was entered in SPSS version 22 and Excel was used to manage the data before entering to SPSS. Data was in form of paper questionnaire so it's kept carefully. The results were examined using descriptive and inferential statistics and assessed how community health workers reacted to each independent variable and the two dependent variables in each domain. For the inferential component, bivariate analyses using the Chi-square test and Fisher's exact test were performed based on the conditions of applicability. These tests were used to look for pairwise associations and had an alpha risk of 5%. The following comparisons were made for each domain:

Awareness and practice as dependent variable and socio-demographic characteristics as independent variable.

Practices as dependent variable and socio-demographic characteristics

3.9.4: Ethical Consideration:

Every aspect of ethical consideration was met. Before the entire process began, permission was obtained from the Al-shifa Eye Trust's ethical review board. At each step following the introduction of the researcher, the participants were informed about the scope and purpose of the study during data collection. They were informed that they had the option of participating, and only those who expressed an interest were included. They consented by signing the consent form, after which the questionnaires were completed. It was assured to them that confidentiality would be maintained and that the responses would not be used for purposes other than research.

CHAPTER IV:

RESULTS

4.1: Descriptive results

4.1.1: Socio-demographic:

In the study, a total of 262 participants with a 100% response rate were included. The community health workers who participated in the study, 63.70% were female. Participants were divided into four age groups i.e. less than or equal to 30, 31-40, 41-50 and more than 50 years of age. The majority of participants 80.6% were less than or equal to 40 years of age. The community health workers had work experience for less than ten years 79.40% and for more than 10 years 20.60%. Among participants 50.70% were regular employees and out of them 55% were graduate. In addition, 62.60% of the workers were vaccinators and 90.10% had undergone IPC training related to hand hygiene, injection safety and waste segregation. **(Table 2).**

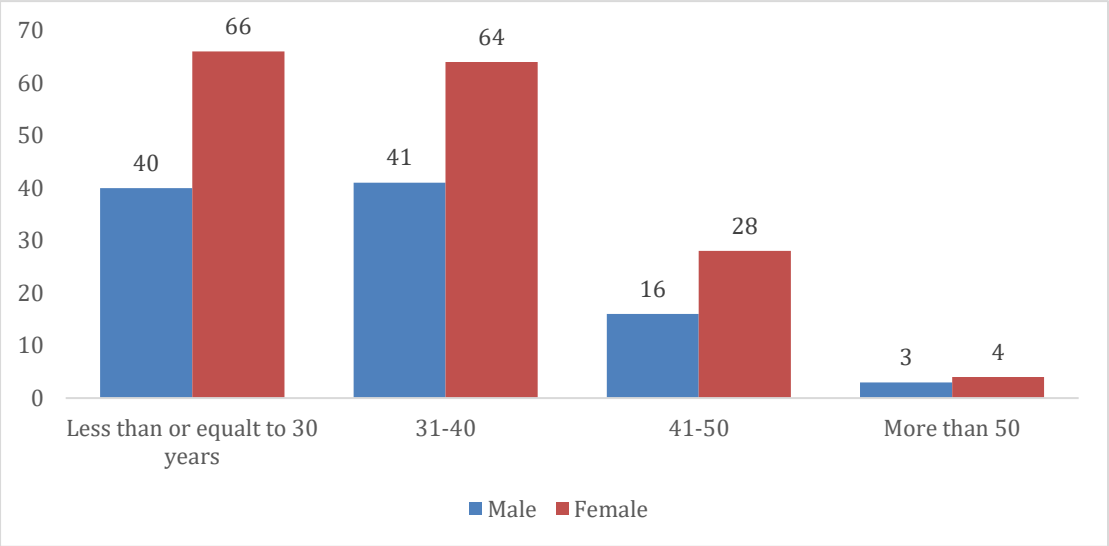

Figure 4: Gender wise age group distribution of community health workers

There were more than 60% of the female community health worker in the age group of less than or equal to 30 years and maximum of the male (more than 40) were in 31 to 40 years of age group **(Figure 4).**

Table 2: Distribution of Community Health Workers by socio-demographic characteristics (n = 262)

Characteristics	Frequency	Percentage
Gender		
Male	95	36.30%
Female	167	63.70%
Age Group		
Less than or equal to 30 years	106	40.50%
31-40	105	40.10%
41-50	44	16.80%
More than 50	7	2.70%
Marital Status		
Married	163	62.20%
Single	99	37.80%
Designation		
LHS	1	0.40%
LHW	35	13.40%
LHV	25	9.50%
Midwife	37	14.10%
Vaccinator	164	62.60%
Job Status		
Regular	146	55.70%
Contractual	107	40.80%
Daily Wages	9	3.40%
Work Experience		
≤10 Years	208	79.40%
>10 Years	54	20.60%
Education		
Matric	14	5.30%
Intermediate	82	31.30%
Graduate	144	55%
Post Graduate	22	8.40%
Previous Training		
Yes	236	90.10%
No	26	9.90%

4.1.2: Hand Hygiene Awareness

According to the data, 72.5% of community health workers had good awareness about hand hygiene actions. Community health workers were aware about hand hygiene method, actions that prevents transmission of germs to patients and healthcare workers, source of germs responsible for health care associated infection (50.8%), “my 5 movements of hand hygiene” and associated factors that increased likelihood of colonization of hands with harmful germs. On the other hand, community health workers had poor awareness about factors which increased likelihood of colonization of hands with harmful germs i.e. use of hand cream (41.6%), skin dryness (49.2%) and hand hygiene sequence (73.7%). **(Table 3).**

Table 3: Distribution of Community Health Workers according to Hand Hygiene awareness characteristics (n = 262)

Characteristics	Frequency	Percentage
1. Do you know what are Hand hygiene actions?		
Use of alcohol-based hand rubs (containing 60%–95% alcohol)	23	8.8%
Hand washing with soap and water	49	18.7%
Above both	190	72.5%
None of above	0	0.0%
2. Which type of hand hygiene method is required in after visible exposure to blood?		
Hand rubbing	27	10.3%
Hand washing with soap and water	233	88.9%
None	2	0.8%
3. Hand hygiene actions that prevent transmission of germs to the patient are done immediately after risk of body fluid exposure?		
Yes	211	80.5%
No	11	4.2%
Don't know	40	15.3%
4. Artificial fingernails are associated with increased likelihood of colonization of hands with harmful germs?		
Yes	185	70.6%
No	11	4.2%
Don't know	66	25.2%
5. Damaged skin is associated with increased likelihood of colonization of hands with harmful germs?		
Yes	229	87.4%
No	13	5.0%
Don't know	20	7.6%
6. Wearing jewelry is associated with increased likelihood of colonization of hands with harmful germs?		
Yes	143	54.6%
No	23	8.8%
Don't know	96	36.6%
7. Hand hygiene actions that prevent transmission of germs to the health care workers are done after exposure to the immediate surroundings of a patient?		
Yes	218	83.2%
No	29	11.1%

Don't know	15	5.7%
8. Which of the following is the main route of cross-transmission of potentially harmful germs between patients in a health-care facility?		
Health-care workers' hands when not clean	166	63.4%
Air circulating in the hospital	15	5.7%
Patients' exposure to colonized surfaces (i.e., beds, chairs, tables, floors)	36	13.7%
Sharing non-invasive objects (i.e., stethoscopes, pressure cuffs, etc.) between patients	45	17.2%
9. Hand rubbing is more rapid for hand cleansing than handwashing?		
True	195	74.4%
False	51	19.5%
Don't know	16	6.1%
10. Regular use of a hand cream is associated with increased likelihood of colonization of hands with harmful germs?		
Yes	109	41.6%
No	45	17.2%
Don't know	108	41.2%
11. Hand rubbing is more effective against germs than hand washing?		
True	129	49.2%
False	115	43.9%
Don't know	18	6.9%
12. What is the most frequent source of germs responsible for health care-associated infections?		
The hospital's water system	30	11.5%
The hospital air	20	7.6%
Germs already present on or within the patient	133	50.8%
The hospital environment (surfaces)	79	30.2%
13. Handwashing and hand rubbing are recommended to be performed in sequence		
True	193	73.7%
False	18	6.9%
Don't know	51	19.5%
14. Hand rubbing causes skin dryness more than handwashing		
True	178	67.9%
False	39	14.9%
Don't know	45	17.2%

4.1.3: Hand Hygiene Practice

According to the study, 72.5% community health workers used an alcohol-based hand rub for hand hygiene. Out of study participants 82.8% practiced hand hygiene actions (that prevent transmission of germs) before touching a patient. About 53.1% practiced hand rubbing before giving an injection. Participants had good practice regarding hand hygiene actions (that prevent transmission of germs to the healthcare workers) immediately after a risk of body fluid exposure (94.3%), after touching the patients (91.2%) and their surroundings (80.9%), and before a clean aseptic procedure (78.6%). While, community health workers' practice regarding hand hygiene action after removing gloves were poor. **(Table 4).**

Table 4: Distribution of Community Health workers according to Hand Hygiene Practice characteristics (n = 262)

Characteristics	Frequency	Percentage
1. Do you routinely use an alcohol-based hand rub for hand hygiene?		
Yes	190	72.5%
No	70	26.7%
Don't know	2	0.8%
2. Do you practice Hand hygiene actions (that prevent transmission of germs to the patient) before touching a patient?		
Yes	217	82.8%
No	37	14.1%
Don't know	8	3.1%
3. Which type of hand hygiene action method do you practice after removing examination gloves?		
Hand rubbing	69	26.3%
Hand washing	190	72.5%
None	3	1.1%
4. Which type of hand hygiene method do you practice before giving an injection?		
Hand rubbing	139	53.1%
Hand washing	114	43.5%
None	9	3.4%
5. Do you practice hand hygiene actions (that prevent transmission of germs to the healthcare workers) immediately after a risk of body fluid exposure?		
Yes	247	94.3%
No	6	2.3%
Don't know	9	3.4%
6. Do you practice hand hygiene actions (that prevent transmission of germs to the healthcare workers) after touching a patient?		
Yes	239	91.2%
No	15	5.7%
Don't know	8	3.1%
7. Do you practice hand hygiene actions (that prevent transmission of germs to the patient) immediately before a clean/aseptic procedure?		
Yes	206	78.6%
No	18	6.9%
Don't know	38	14.5%
8. Do you practice hand hygiene actions (that prevents transmission of germs to the patient) after exposure to immediate surroundings of a patient?		
Yes	212	80.9%
No	31	11.8%

Don’t know	19	7.3%
9. How much time do you take for alcohol-based hand rub to kill most germs on your hands?		
20 seconds	207	79.0%
3 seconds	10	3.8%
1 minute	36	13.7%
10 seconds	9	3.4%

4.1.4: Protective Gloves Awareness

Study reveals that 66.8% of community health workers were disagreed with the statement that hand washing is not necessary after examining a patient while 80.9% were agreed with the statement about gloves removal in the area where patient was seen. This response shown good awareness about the use of protective gloves. Community health workers also had a good awareness regarding the standard protocol for removing the gloves **(Table 5).**

Table 5: Distribution of Community Health Workers according to Protective Gloves Awareness characteristics (n = 262)

Characteristics	Frequency	Percentage
1. Do you agree or disagree with the following statement? "When using gloves, washing hands is not necessary after examining a patient"?		
Agree	83	31.7%
Disagree	175	66.8%
Don't know	4	1.5%
2. Do you agree or disagree with the following statement: "Gloves should always be removed before leaving the area where the patient was seen"?		0.0%
Agree	212	80.9%
Disagree	37	14.1%
Don't know	13	5.0%
3. What is the standard protocol removing the gloves?		0.0%
Pinch one glove at the wrist level to remove it, without touching the skin of the forearm	208	79.4%
Pinch one glove at the wrist level to remove it, with touching the skin of the forearm	43	16.4%
Don't know	11	4.2%

4.1.5: Protective Gloves Practice

According to the study, 54.6% of participants were using gloves before administering injection and 53.1% were not using same gloves for more than one patient which indicates good practices among community health workers. **(Table 6).**

Table 6: Distribution of Community Health Workers according to Protective Gloves Practice characteristics (n = 262)

Characteristics	Frequency	Percentage
1. Do you wear gloves before administering injection?		
Yes	143	54.6%
No	112	42.7%
Don't know	7	2.7%
2. Do you use gloves for more than one patient as long as they have not been exposed to blood or other body fluids"?		
Yes	117	44.7%
No	139	53.1%
Don't know	6	2.3%

4.1.6: Injection Safety Awareness

Study showed that 96.6% of community health workers were agreed with the statement about the use of needle only for one patient. While 81.3% participants were disagreed with the statement about the use of contaminated syringes. This showed good level of awareness about injection safety among community health workers **(Table 7).**

Table 7: Distribution of Community Health Workers according to Injection Safety Awareness characteristics (n = 262)

Characteristics	Frequency	Percentage
1. Do you agree or disagree with the following statement: "Needles should be used for only one patient"?		
Agree	253	96.6%
Disagree	7	2.7%
Don't know	2	0.8%
2. Do you agree or disagree with the following statement: "Syringes can be reused on more than one patient since they do not come into contact with the patient's body fluids"?		
Agree	40	15.3%
Disagree	213	81.3%
Don't know	9	3.4%

4.1.7: Injection Safety Practice

According to the data, 50.4% of participants were recapping the syringes while 45.8% were avoiding recapping or bending the syringes. These response shows poor practice about injection safety. **(Table 8).**

Table 8: Distribution of Community Health Workers according to Injection Safety Practice characteristics (n = 262)

Characteristics	Frequency	Percentage
1. Do you re-capped or bent the needles?		
Yes	132	50.4%
No	120	45.8%
Don't know	10	3.8%

4.1.8: Waste Segregation Awareness

According to the study, community health workers had good awareness about waste segregation (color coded bin) for highly infectious waste (60.7%), for infectious waste (61.8%) and for non-infectious waste (66.8%) was good. On the other hand, poor awareness regarding hazardous healthcare waste was indicated in the data. **(Table 9).**

Table 9: Distribution of Community Health Workers according to Waste Segregation Awareness characteristics (n = 262)

Characteristics	Frequency	Percentage
1. Highly infectious waste goes into each of the following color-coded bins?		
Yellow	86	32.8%
Red	159	60.7%
Blue	17	6.5%
2. Infectious waste goes into each of the following color-coded bins?		
Yellow	162	61.8%
Red	76	29.0%
Blue	24	9.2%
3. Hazardous health-care waste goes into each of the following color-coded bins?		
Yellow	65	24.8%
Red	139	53.1%
Blue	58	22.1%
4. Non-infectious waste goes into each of the following color-coded bins?		
Yellow	57	21.8%
Red	30	11.5%
Blue	175	66.8%

4.1.9: Waste Segregation Practice

According to the study, 96.6% of community health workers were using sharps disposal container for needles to put in, which showed good practice among participants **(Table 10).**

Table 10: Distribution of Community Health Workers according to Waste Segregation Practice characteristics (n = 262)

Characteristics	Frequency	Percentage
1. Do you use sharps disposal container to put needles in?		
Yes	253	96.6%
No	3	1.1%
Don't know	6	2.3%

4.2: Bivariate Analysis

4.2.1: Hand Hygiene Awareness

The proportion of community health workers out of professionals surveyed in the study, who had good awareness about hand hygiene was 14.9%, while the proportion was 51.8% among vaccinators. Level of awareness and age group (31-40) years of the participants were significantly associated with (P-value = 0.003). The proportion of community health workers with less than or equal to 10 years of service and who had good awareness about hand hygiene was significantly associated (P-value = 0.023). Similarly, level of knowledge and job status of community health workers were significantly associated with (P-value = 0.004). **(Table 11).**

Table 11: Distribution of Community Health Workers according to their Awareness about Hand Hygiene and Socio-demographic characteristics

Characteristics	†Poor	Moderate	Good	P-value
Gender				
Male	43 (45.3%)	47 (49.5%)	5 (5.3%)	0.121
Female	56 (33.5%)	95 (56.9%)	16 (9.6%)	
Age Group				
Less than or equal to 30 years	43 (40.6%)	61 (57.5%)	2 (1.9%)	0.003*
31-40	45 (42.9%)	49 (46.7%)	11 (10.5%)	
41-50	8 (18.2%)	29 (65.9%)	7 (15.9%)	
More than 50	3 (42.9%)	3 (42.9%)	1 (14.3%)	
Marital Status				
Single	38 (38.4%)	53 (53.5%)	8 (8.1%)	0.986
Married	61 (37.4%)	89 (54.6%)	13 (8.0)	
Designation				
LHS	1 (100%)	0 (0.0%)	0 (0.0%)	0.832
LHW	13 (37.1%)	20 (57.1%)	2 (5.7%)	
LHV	8 (32.0%)	15 (60.0%)	2 (8.0%)	
Midwife	11 (29.7%)	22 (59.5%)	4 (10.8%)	
Vaccinator	66 (40.2%)	85 (51.8%)	13 (7.9%)	
Job Status				
Regular	44 (30.1%)	85 (58.2%)	17 (11.6%)	0.004*
Contractual	53 (49.5%)	51 (47.7%)	3 (2.8%)	
Daily Wages	2 (22.2%)	6 (66.7%)	1 (11.1%)	
Work Experience				
≤10 Years	83 (39.9%)	113 (54.3%)	12 (5.8%)	0.023*
>10 Years	16 (29.6%)	29 (53.7%)	9 (16.7%)	
Education				
Matric	6 (42.9%)	8 (57.1%)	0 (0.0%)	0.121
Intermediate	35 (42.7%)	43 (52.4%)	4 (4.9%)	
Graduate	55 (38.2%)	76 (52.8%)	13 (9.0%)	
Post-Graduation	3 (13.6%)	15 (68.2%)	4 (18.2%)	
Previous Training				
Yes	89 (37.7%)	128 (54.2%)	19 (8.1%)	0.996
No	10 (38.5%)	14 (53.8%)	2 (7.7%)	

***P-value < 0.05 i.e., there is significant association**

†Awareness score above 75% were considered good, 50-74% were considered moderate and less than 50% were considered poor

4.2.2: Hand Hygiene Practice

The proportion of vaccinators among study participants were 36% and their practice level regarding hand hygiene was significantly associated with (P-value<0.001). Among community health workers 38.3% had contractual job and their hand hygiene practices were significantly associated with (P-value <0.05). The proportion of participants with graduate qualification who practiced good hand hygiene was 37.5%. Graduate qualification and practice level were significantly associated with (P-value < 0.01). Community health workers who previously attended hand hygiene trainings and practiced good hand hygiene were 31.8% while the proportion was 68.2% among those who did not receive training. There was association among good level of practice and those who previously attended hand hygiene trainings i.e., (P-value = 0.05). **(Table 12).**

Table 12: Distribution of Community Health Workers according to their Practice about Hand Hygiene and Socio-demographic characteristics

Characteristics	Poor Practice	Good Practice	P-value
Gender			
Male	67 (70.5%)	28 (29.5%)	0.819
Female	120 (71.9%)	47 (28.1%)	
Age Group			
Less than or equal to 30 years	79 (74.5%)	27 (25.5%)	0.117
31-40	68 (64.8%)	37 (35.2%)	
41-50	36 (81.8%)	8 (18.2%)	
More than 50	4 (57.1%)	3 (42.9%)	
Marital Status			
Single	71 (71.7%)	28 (28.3%)	0.924
Married	116 (71.2%)	47 (28.8%)	
Designation			
LHS	1 (100.0%)	0 (0.0%)	< 0.001*
LHW	23 (65.7%)	12 (34.3%)	
LHV	23 (92.0%)	2 (8.0%)	
Midwife	35 (94.6%)	2 (5.4%)	
Vaccinator	105 (64.0%)	59 (36.0%)	
Job Status			
Regular	113 (77.4%)	33 (22.6%)	0.012*
Contractual	66 (61.7%)	41 (38.3%)	
Daily Wages	8 (88.9%)	1 (11.1%)	
Work Experience			
≤10 Years	144 (69.2%)	64 (30.8%)	0.132
>10 Years	43 (79.6%)	11 (20.4%)	
Education			
Matric	14 (100.0%)	0 (0.0%)	< 0.001*
Intermediate	61 (74.4%)	21 (25.6%)	
Graduate	90 (62.5%)	54 (37.5%)	
Post-Graduate	22 (100.0%)	0 (0.0%)	
Previous Training			
Yes	161 (68.2%)	75 (31.8%)	0.001*
No	26 (100.0%)	0 (0.0%)	

***P-value < 0.05 i.e., there is significant association**

4.2.3: Protective Gloves Awareness

The proportion of community health workers surveyed in the study who were with age group (31-40) years and who had good awareness about the use of protective gloves was 70.5%. Level of awareness and age group were significantly associated with (P-value < 0.001). The proportion of community health workers who were graduates and had good awareness about the use of protective gloves was 62.5%, education and awareness level were associated with (P-value = 0.001). Similarly, there was association found between awareness and those who previously attended trainings about protective gloves i.e., (P-value = 0.005). Community health workers who previously attended trainings and had good awareness were 55.9% while the proportion was 26.9% among those who did not receive training regarding the use of protective gloves **(Table 13).**

Table 13: Distribution of Community Health Workers according to their Awareness about Protective Gloves and Socio-demographic characteristics

Characteristics	Poor Awareness	Good Awareness	P-value
Gender			
Male	49 (51.6%)	46 (48.4%)	0.257
Female	74 (44.3%)	93 (55.7%)	
Age Group			
Less than or equal to 30 years	64 (60.4%)	42 (39.6%)	< 0.001*
31-40	31 (29.5%)	74 (70.5%)	
41-50	23 (52.3%)	21 (47.7%)	
More than 50	5 (71.4%)	2 (28.6%)	
Marital Status			
Single	52 (52.5%)	47 (47.5%)	0.159
Married	71 (43.6%)	92 (56.4%)	
Designation			
LHS	1 (100.0%)	0 (0.0%)	0.253
LHW	13 (37.1%)	22 (62.9%)	
LHV	14 (56.0%)	11 (44.0%)	
Midwife	21 (56.8%)	16 (43.2%)	
Vaccinator	74 (45.1%)	90 (54.9%)	
Job Status			
Regular	74 (50.7%)	72 (49.3%)	0.121
Contractual	43 (40.2%)	64 (59.8%)	
Daily Wages	6 (66.7%)	3 (33.3%)	
Work Experience			
≤10 Years	94 (45.2%)	114 (54.8%)	0.264
>10 Years	29 (53.7%)	25 (46.3%)	
Education			
Matric	12 (85.7%)	2 (14.3%)	0.001*
Intermediate	47 (57.3%)	35 (42.7%)	
Graduate	54 (37.5%)	90 (62.5%)	
Post-Graduate	10 (45.5%)	12 (54.5%)	
Previous Training			
Yes	104 (44.1%)	132 (55.9%)	0.005*
No	19 (73.1%)	7 (26.9%)	

***P-value < 0.05 i.e., there is significant association**

4.2.4: Protective Gloves Practice

The proportion of community health workers with gender who gave good response regarding the use of protective gloves was female 31.7%. Gender and good practice level were significantly associated with (P-value = 0.041). The proportion of participants who were with age group (more than 50) years and who were doing good practice about the use of protective gloves was 71.4%. Level of practice and age group were significantly associated with (P-value = 0.002). The proportion of community health workers who were LHVs and had good practice about the use of protective gloves were 52.0%, designation and practice level were associated with (P-value < 0.001). Among community health workers 39.7% who had regular job, their practice about the use of protective gloves and job status were significantly associated with (P-value <0.001). The proportion of participants with less than or equal to 10 years of service and who had good practice about protective gloves was also significantly associated (P-value < 0.001). Similarly, the proportion of community health workers who had education with intermediate and had good practice about the use of protective gloves was 40.2%, education and practice level were associated with (P-value = 0.006). **(Table 14).**

Table 14: Distribution of Community Health Workers according to their Practice about Protective Gloves and Socio-demographic characteristics

Characteristics	Poor Practice	Good Practice	P-value
Gender			
Male	76 (80.0%)	19 (20.0%)	0.041*
Female	114 (68.3%)	53 (31.7%)	
Age Group			
Less than or equal to 30 years	82 (77.4%)	24 (22.6%)	0.002*
31-40	81 (77.1%)	24 (22.9%)	
41-50	25 (56.8%)	19 (43.2%)	
More than 50	2 (28.6%)	5 (71.4%)	
Marital Status			
Single	75 (75.8%)	24 (24.2%)	0.36
Married	115 (70.6%)	48 (29.4%)	
Designation			
LHS	0 (0.0%)	1 (100.0%)	< 0.001*
LHW	32 (91.4%0	3 (8.6%)	
LHV	12 (48.0%)	13 (52.0%)	
Midwife	22 (59.5%)	15 (40.5%)	
Vaccinator	124 (75.6%)	40 (24.4%)	
Job Status			
Regular	88 (60.3%)	58 (39.7%)	< 0.001*
Contractual	94 (87.9%)	13 (12.1%)	
Daily Wages	8 (88.9%)	1 (11.1%)	
Work Experience			
≤10 Years	166 (79.8%)	42 (20.2%)	< 0.001*
>10 Years	24 (44.4%)	30 (55.6%)	
Education			
Matric	13 (92.9%)	1 (7.1%)	0.006*
Intermediate	49 (59.8%)	33 (40.2%)	
Graduate	113 (78.5%)	31 (21.5%)	
Post-Graduate	15 (68.2%)	7 (31.8%)	
Previous Training			
Yes	171 (72.5%)	65 (27.5%)	0.946
No	19 (73.1%)	7 (26.9%)	

***P-value < 0.05 i.e., there is significant association**

4.2.5: Injection Safety Awareness

The proportion of community health workers with 31-40 years of age group was aware (89.5%) about injection safety. The level of awareness and age group of participants were significantly associated with (P-value = 0.002). **(Table 15).**

Table 15: Distribution of Community Health Workers according to their Awareness about Injection Safety and Socio-demographic characteristics

Characteristics	Poor Awareness	Good Awareness	P-value
Gender			
Male	24 (25.3%)	71 (74.7%)	0.074
Female	27 (16.2%)	140 (83.8%)	
Age Group			
Less than or equal to 30 years	32 (30.2%)	74 (69.8%)	0.002*
31-40	11(10.5%)	94 (89.5%)	
41-50	8 (18.2%)	36 (81.8%)	
More than 50	0 (0.0%)	7 (100.0%)	
Marital Status			
Single	23 (23.2%)	76 (76.8%)	0.23
Married	28 (17.2%)	135 (82.8%)	
Designation			
LHS	0 (0.0%)	1 (100.0%)	0.104
LHW	3 (8.6%)	32 (91.4%)	
LHV	2 (8.0%)	23 (92.0%)	
Midwife	8 (21.6%)	29 (78.4%)	
Vaccinator	38 (23.2%)	126 (76.8%)	
Job Status			
Regular	32 (21.9%)	114 (78.1%)	0.231
Contractual	19 (17.8%)	88 (82.2%)	
Daily Wages	0 (0.0%)	9 (100.0%)	
Work Experience			
≤10 Years	44 (21.2%)	164 (78.8%)	0.176
>10 Years	7 (13.0%)	47 (87.0	
Education			
Matric	3 (21.4%)	11 (78.6%)	0.657
Intermediate	19 (23.2%)	63 (76.8%)	
Graduate	24 (16.7%)	120 (83.3%)	
Post-Graduate	5 (22.7%)	17 (77.3%)	
Previous Training			
Yes	48 (20.3%)	188 (79.7%)	0.282
No	3 (11.5%)	23 (88.5%)	

***P-value < 0.05 i.e., there is significant association**

4.2.6: Injection Safety Practice

The proportion of study participants who were with age group (31-40) years and who were doing good practice about injection safety was 57.1%. Level of practice and age group were significantly associated with (P-value < 0.001). The proportion of community health workers who had regular job was 50.7%. Level of good practice about the injection safety and job status were significantly associated with (P-value <0.05). Similarly, the proportion of community health workers who were graduate and had good practice about injection safety was 57.6%, level of education and good practice were associated with (P-value < 0.001). **(Table 16).**

Table 16: Distribution of Community Health Workers according to their Practice about Injection Safety and Socio-demographic characteristics

Characteristics	Poor Practice	Good Practice	P-value
Gender			
Male	54 (56.8%)	41 (43.2%)	0.517
Female	88 (52.7%)	79 (47.3%)	
Age Group			
Less than or equal to 30 years	73 (68.9%)	33 (31.1%)	< 0.001*
31-40	45 (42.9%)	60 (57.1%)	
41-50	23 (52.3%)	21 (47.7%)	
More than 50	1 (14.3%)	6 (85.7%)	
Marital Status			
Single	53 (53.5%)	46 (46.5%)	0.867
Married	89 (54.6%)	74 (45.4%)	
Designation			
LHS	1 (100.0%)	0 (0.0%)	0.318
LHW	15 (42.9%)	20 (57.1%)	
LHV	16 (64.0%)	9 (36.0%)	
Midwife	18 (48.6%)	19 (51.4%)	
Vaccinator	92 (56.1%)	72 (43.9%)	
Job Status			
Regular	72 (49.3%)	74 (50.7%)	0.029*
Contractual	62 (57.9%)	45 (42.1%)	
Daily Wages	8 (88.9%)	1 (11.1%)	
Work Experience			
≤10 Years	117 (56.3%)	91 (43.8%)	0.191
>10 Years	25 (46.3%)	29 (53.7%)	
Education			
Matric	11 (78.6%)	3 (21.4%)	< 0.001*
Intermediate	59 (72.0%)	23 (28.0%)	
Graduate	61 (42.4%)	83 (57.6%)	
Post-Graduate	11 (50.0%)	11 (50.0%)	
Previous Training			
Yes	122 (51.7%)	114 (48.3%)	0.014
No	20 (76.9%)	6 (23.1%)	

***P-value < 0.05 i.e., there is significant association**

4.2.7: Waste Segregation Awareness

The proportion of study participants who were with age group (31-40) years and who had good awareness about waste segregation (i.e. use of color coded bins) was 53.3%. Level of awareness and age group were significantly associated with (P-value < 0.05). The proportion of community health workers with less than or equal to 10 years of service and who had good awareness about waste segregation was 50.5%. This proportion was 27.8% among community health workers with experience of more than 10 years. Awareness and work experience of community health workers were significantly associated with (P-value < 0.05). Similarly, the proportion of community health workers who were graduate and had good awareness about waste segregation was 54.2%, so the level of education and awareness were associated with (P-value < 0.007). **(Table 17).**

Table 17: Distribution of Community Health Workers according to their Awareness about Waste Segregation and Socio-demographic characteristics

Characteristics	Poor Awareness	Good Awareness	P-value
Gender			
Male	52 (54.7%)	43 (45.3%)	0.895
Female	90 (53.9%)	77 (46.1%)	
Age Group			
Less than or equal to 30 years	58 (54.7%)	48 (45.3%)	0.006*
31-40	49 (46.7%)	56 (53.3%)	
41-50	28 (63.6%)	16 (36.4%)	
More than 50	7 (100.0%)	0 (0.0%)	
Marital Status			
Single	55 (55.6%)	44 (44.4%)	0.731
Married	87 (53.4%)	76 (46.6%)	
Designation			
LHS	1 (100.0%)	0 (0.0%)	0.76
LHW	18 (51.4%)	17 (48.6%)	
LHV	14 (56.0%)	11 (44.0%)	
Midwife	22 (59.5%)	15 (40.5%)	
Vaccinator	87 (53.0%)	77 (47.0%)	
Job Status			
Regular			0.601
Contractual	54 (50.5%)	53 (49.5%)	
Daily Wages	5 (55.6%)	4 (44.4%)	
Work Experience			
≤10 Years	103 (49.5%)	105 (50.5%)	0.003*
>10 Years	39 (72.2%)	15 (27.8%)	
Education			
Matric	12 (85.7%)	2 (14.3%)	0.007*
Intermediate	50 (61.0%)	32 (39.0%)	
Graduate	66 (45.8%)	78 (54.2%)	
Post-Graduate	14 (63.6%)	8 (36.4%)	
Previous Training			
Yes	127 (53.8%)	109 (46.2%)	0.706
No	15 (57.7%)	11 (42.3%)	

***P-value < 0.05 i.e., there is significant association**

4.2.8: Waste Segregation Practice

The level of practice and socio-demographic of community health workers regarding waste segregation were not significantly associated **(Table 18).**

Table 18: Distribution of Community Health Workers according to their Practice about Waste Segregation and Socio-demographic characteristics

Characteristics	Poor Practice	Good Practice	P-value
Gender			
Male	5 (5.3%)	90 (94.7%)	0.292
Female	4 (2.4%)	163 (97.6%)	
Age Group			
Less than or equal to 30 years	7 (6.6%)	99 (93.4%)	0.072
31-40	2 (1.9%)	103 (98.1%)	
41-50	0 (0.0%)	44 (100.0%)	
More than 50	0 (0.0%)	7 (100.0%)	
Marital Status			
Single	6 (6.1%)	93 (93.9%)	0.086
Married	3 (1.8%)	160 (98.2%)	
Designation			
LHS	0 (0.0%)	1 (100.0%)	0.605
LHW	2 (5.7%)	33 (94.3%)	
LHV	0 (0.0%)	25 (100.0%)	
Midwife	2 (5.4%)	35 (94.6%)	
Vaccinator	5 (3.0%)	159 (97.0%)	
Job Status			
Regular	5 (3.4%)	141 (96.6%)	0.72
Contractual	4 (3.7%)	103 (96.3%)	
Daily Wages	0 (0.0%)	9 (100.0%)	
Work Experience			
≤10 Years	9 (4.3%)	199 (95.7%)	0.211
>10 Years			
Education			
Matric	1 (7.1%)	13 (92.9%)	0.45
Intermediate	4 (4.9%)	78 (95.1%)	
Graduate	4 (2.8%)	140 (97.2%)	
Post-Graduate	0 (0.0%)	22 (100.0%)	
Previous Training			
Yes	7 (3.0%)	229 (97.0%)	0.221
No	2 (7.7%)	24 (92.3%)	

CHAPTER V:

DISCUSSION

This was a Cross-sectional study design an assessment of IPC awareness and practices among community health workers who work as frontline workers within community. The study aims were to examine community health workers' awareness and routine practices regarding IPC domains (i.e. hand hygiene, use of protective glove, injection safety and waste segregation) at primary healthcare settings of Islamabad, Pakistan.

Healthcare associated infection a major risk to patient safety, can be avoided by appropriate hand hygiene awareness and practice (Zia et al., 2022). The study's results showed that 72.5% community health workers had good awareness about hand hygiene actions and knew when to perform it (Table 2), despite limitations in some areas, the similar result was observed in previous study conducted in India showed good awareness scores among healthcare worker (Goyal et al., 2020; Onyedibe et al., 2020). This might be due to the COVID-19 Pandemic, as the health departments had taken measures to limit transmission of infection therefore many trainings were conducted regarding the hand hygiene among community health workers which improved their level of awareness (Maude et al., 2021). Secondly, this could be explained by the awareness program, policy, and procedures that are in place in healthcare institutions. The Kingdom of Saudi Arabia is one of the 42 countries actively participating in a hand hygiene promotion campaigns (Boyce & Pittet, 2002).

The results of the bivariate analysis showed that level of awareness and age group of the community health workers were significantly associated with (P-value =

0.003). A previous study also showed same results that the older participants had notably better knowledge, conducted in the United States and Canada (Maude et al., 2021). It can be further explained by their amount of experience and thus the learning opportunities. Our study noted that work experience and level of awareness about hand hygiene was also significantly associated. This is because community health workers are continuously involved in different activities i.e. immunization, health promotion campaigns and mother and child healthcare activities etc. which increased their work experience. Similarly, awareness and job status were also significantly associated, this might be due to the job satisfaction and security. Conversely, reported that regular job holders had a positive impact on maintenance of knowledge about hand hygiene (Zakeri, Ahmadi, Rafeemanesh, & Saleh, 2017).

Practice toward hand hygiene is very important as it is associated with healthcare associated infection (Mathur, 2011). According to the finding, majority of the participants responded good practices in relevance to 'My 5 Moments of Hand Hygiene' (Fine), more than 90% of respondents practiced hand hygiene 'before' and 'after' touching patients [Table 12]. This is a positive finding as it shows community health workers understanding of hand hygiene for self-protection. Supporting this statement, a qualitative study in Canada reported self-protection as the primary reason for performing hand hygiene (Jang et al., 2010). Another previous study which demonstrated same practice among healthcare workers in Punjab, Pakistan (Zia et al., 2022).

In our study those who were agreed to wash their hands after removing gloves and practiced the removal of gloves in patient area, indicated good awareness of protective gloves (Table 5). Some previous studies have shown that healthcare workers

have sufficient awareness about protective gloves and believe that unclean hands are an essential route of cross-infection (Alhumaid et al., 2021). The statistical data of our study revealed that good practice and proportion of gender were significant. These results are comparable with other studies which reported significantly positive response of female staff than male staff (Cruz, Cruz, & Al-Otaibi, 2015).

Healthcare workers in developing countries are at high risk of infection from blood borne diseases like Hepatitis B & C virus, and HIV because of the poor practices of IPC particularly regarding injection safety (Janjua et al., 2016). According to our study results 96.6% of community health workers had good awareness regarding the use of one needle and the reuse of contaminated syringes. This showed community health workers were aware about injection safety. Although community workers have good awareness regarding injection safety and they know that recap a needle have serious risk to health, but our findings revealed that 50.4% of community health workers were doing recapping the syringes which directed poor practice about injection safety. In contrast to this gap between awareness and practice a study conducted in India (M. Kumar, Kushwaha, Maurya, Singh, & Kumari, 2017). Moreover, administrative challenges such as non-availability of sharp disposal container or safety box may have contributed to the low level of compliance to injection safety. Our findings therefore suggest measures to improve injection safety compliance such as implementing the WHO guideline, more trainings, provision of sharp disposal containers, are needed in healthcare settings.

A health care facility certainly produces medical wastes (MW) that may be hazardous to health (Chartier, 2014). Our study assessed that awareness and work experience of community health workers regarding waste segregation particularly

about color coded bins were significantly associated. This finding consistent with earlier studies conducted on the knowledge about waste segregation in India and Nigeria (M. Kumar et al., 2017). On the other hand, poor awareness regarding hazardous healthcare waste was also indicated in our study. This might be due to the lack of quality training programs. The study suggests intensive training and orientation classes about waste segregation among community health workers for the improvement of knowledge and practices.

Strengths

This study was a success in terms of assessing IPC awareness and practices among primary health care workers with reference to their socio-demographic characteristics. The study is covering multi domains of IPC i.e. hand hygiene, protective gloves, injection safety and waste segregation practices and knowledge of community health workers. This is the first of its kind in primary healthcare settings in Islamabad. This study can provide valuable reference not only for policy makers and administrators to enhance resource allocation and design training programs for community health workers in order to promote their occupational safety and health, but also serve as a baseline for later studies to explore detailed insights about the topic.

Limitations

Due to the resources and time constraints, a non-probability consecutive sampling was employed to select the study population because a sample frame was not available. This would increase the possibility of selection bias. Furthermore, since this study only covered primary healthcare settings in Islamabad, we cannot generalize the findings to the entire population because of the small sample size. As the study is totally

quantitative in nature, a qualitative investigation is necessary to evaluate the study population's level of training and practice.

Conclusion

In conclusion, our study assessed infection prevention and control awareness and practices across multiple IPC domains among community health workers. This study sheds light on the IPC awareness and practices of Islamabad's primary health care workforce. The study also revealed gaps in community workers' awareness and practices in primary healthcare settings, which highlighted the importance of capacity building of community health workers. The results showed that practice about waste segregation was not associated with socio-demographic characteristics, which highlighted the importance of interventions that can assist community health workers in developing and improving their IPC awareness and practices in order to reduce healthcare-associated infections. The study also found that community health workers' socio-demographics play a significant role in their IPC awareness and practices.

Recommendation

The study’s findings suggest that although many of the respondents had good awareness about IPC measures but still there is a need to sensitize the community health workers pertaining to the standard precaution to avoid healthcare associated infection. As poor practices about injection safety increased the burden of Hepatitis B & C viruses and HIV among healthcare workers, the study concluded that awareness about preventive measures should be provided on regular basis in different ways. This can be generated positive signs of decreasing the poor practices of injection safety. Moreover, there is also an urgent need to develop policies to enhance capacity-building initiatives such as training programs, seminars, workshops and orientation courses for community health workers regarding infection prevention and control measures. Our study also

recommends future studies which should focus on new strategies which can influence the awareness level of community health workers and also their compliance. A qualitative investigation is also recommended to evaluate the level of training and practice of community health workers.

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Annexure A – Data Collection Tool

Questionnaire

Socio-demographic profile

1) Name of the participant: _____
2) Gender:
   - Male
   - Female
3) Age of the respondent:
   - Less than or equal to 30 years
   - 31___40
   - 41___50
   - More than 50
4) Marital Status:
   - Married
   - Single
5) Designation: _____
6) Job status:
   - Regular
   - Contractual
   - Daily Wages
7) Work experience in years: _____
8) Education:
   - Matric
   - Intermediate
   - Gradate
   - Post graduate
9) Previously attended IPC practices:
   - Yes
   - No

Hand Hygiene Awareness

1) Do you know what are Hand hygiene actions?
   - Use of alcohol-based hand rubs (containing 60%–95% alcohol)
   - Hand washing with soap and water
   - Above both
   - Don't know
2) Which type of hand hygiene method is required in after visible exposure to blood??
   - Hand rubbing
   - Hand washing

- Don’t know

3) Hand hygiene actions that prevent transmission of germs to the patient are done immediately after risk of body fluid exposure?
   - Yes
   - No
   - Don’t know
4) Artificial fingernails are associated with increased likelihood of colonization of hands with harmful germs?
   - Yes
   - No
   - Don’t know
5) Damaged skin is associated with increased likelihood of colonization of hands with harmful germs?
   - Yes
   - No
   - Don’t know
6) Wearing jewelry is associated with increased likelihood of colonization of hands with harmful germs??
   - Yes
   - No
   - Don’t know
7) Hand hygiene actions that prevent transmission of germs to the health care workers are done after exposure to the immediate surroundings of a patient?
   - Yes
   - No
   - Don’t know
8) Which of the following is the main route of cross-transmission of potentially harmful germs between patients in a health-care facility?
   - Health-care workers’ hands when not clean
   - Air circulating in the hospital
   - Patients’ exposure to colonized surfaces (i.e., beds, chairs, tables, floors)
   - Sharing non-invasive objects (i.e., stethoscopes, pressure cuffs etc.) between patients

9) Hand rubbing is more rapid for hand cleansing than handwashing?
   - True
   - False
   - Don’t know
10) Regular use of a hand cream is associated with increased likelihood of
   - Yes
   - No
   - Don’t know
11) Hand rubbing is more effective against germs than hand washing?
   - True
   - False
   - Don’t know

12) What is the most frequent source of germs responsible for health care-associated infections?
    - The hospital's water system
    - The hospital air
    - Germs already present on or within the patient
    - The hospital environment (surfaces)
13) Handwashing and hand rubbing are recommended to be performed in sequence?
    - True
    - False
    - Don't know
14) Hand rubbing causes skin dryness more than handwashing?
    - True
    - False
    - Don't know

Hand Hygiene Practice

15) Do you routinely use an alcohol-based hand rub for hand hygiene?
    - Yes
    - No
16) Do you practice Hand hygiene actions (that prevent transmission of germs to the patient) before touching a patient?
    - Yes
    - No
    - Don't know
17) Which type of hand hygiene action method do you practice after removing examination gloves?
    - Hand rubbing
    - Hand washing
    - None
18) Which type of hand hygiene method do you practice before giving an injection?
    - Hand rubbing
    - Hand washing
    - None
19) Do you practice hand hygiene actions (that prevent transmission of germs to the healthcare workers) immediately after a risk of body fluid exposure?
    - Yes
    - No
    - Don't know
20) Do you practice hand hygiene actions (that prevent transmission of germs to the healthcare workers) after touching a patient?
    - Yes
    - No
    - Don't know

21) Do you practice hand hygiene actions (that prevents transmission of germs to the patient) after exposure to immediate surroundings of a patient?
    - Yes
    - No

- Don’t know

22) Hand How much time do you take for alcohol-based hand rub to kill most germs on your hands?

- 20 seconds
- 3 seconds
- 1 minute
- 10 seconds

Protective Gloves Awareness

23) Do you agree or disagree with the following statement? “When using gloves, washing hands is not necessary after examining a patient”?

- Agree
- Disagree
- Don’t know

24) Do you agree or disagree with the following statement: “Gloves should always be removed before leaving the area where the patient was seen”?

- Agree
- Disagree
- Don’t know

25) Wearing jewelry is associated with increased likelihood of colonization of hands with harmful germs??

- Yes
- No
- Don’t know

26) What is the standard protocol removing the gloves?

- Pinch one glove at the wrist level to remove it, without touching the skin of the forearm
- Pinch one glove at the wrist level to remove it, with touching the skin of the forearm
- Don’t know

Protective Gloves Practice

27) Do you wear gloves before administering injection?

- Yes
- No
- Don’t know

28) Do you use gloves for more than one patient as long as they have not been exposed to blood or other body fluids”?

- Yes
- No
- Don’t know

Injection Safety Awareness

29) Do you agree or disagree with the following statement: “Needles should be used for only one patient”?
    - o Agree
    - o Disagree
    - o Don’t know
30) Do you agree or disagree with the following statement: “Syringes can be reused on more than one patient since they do not come into contact with the patient’s body fluids”?
    - o Agree
    - o Disagree
    - o Don’t know

Injection Safety Practice

31) Do you re-capped or bent the used needles?
    - o Yes
    - o No
    - o Don’t know

Waste Segregation Awareness

32) Highly infectious waste goes into each of the following color-coded bins?
    - o Yellow
    - o Red
    - o Blue
33) Infectious waste goes into each of the following color-coded bins?
    - o Yellow
    - o Red
    - o Blue
34) Hazardous healthcare waste goes into each of the following color-coded bins?
    - o Yellow
    - o Red
    - o Blue
35) Non-infectious waste goes into each of the following color-coded bins?
    - o Yellow
    - o Red
    - o Blue

Waste Segregation Practice

36) Do you use sharps disposal container to put needles in?
    - o Yes
    - o No
    - o Don’t know

Annexure B-Consent Form

Informed Consent Form

My name is Nazia Hassan Khan and I am a student of MSPH at Alshifa School of Public Health Rawalpindi Pakistan. Currently, I am going to conduct a study on **"Infection Prevention and Control Awareness & Practices of Primary Healthcare workers of Islamabad"**. The aim of the study is to assess awareness and practices of community health workers about IPC measures which keep community health workers safe from occupational exposure to disease and protect community from infections. The research has been approved by the IRB committee from the Alshifa School of Public Health. The study will be done by using of semi structured questionnaire. It is anticipated that it will take approximately 15-20 minutes to complete the questionnaire. All information will be kept strictly confidential. Data from the surveys will be completely anonymous and reported in aggregate form. After data collection, the interview and demographic responses will be password-protected. Once submitted the researcher will not be able to withdraw responses due to anonymity and de-identified data. There are no anticipated risks and direct benefits associated with participation in this study. Participation in this study is voluntary. You have the right to not open or complete the survey.

If you have questions about the study, please contact: Ms. Nazia Hassan Khan (naziakhakwani@gmail.com)

میرا نام نازیہ حسن خان اور میں الشفاء اسکول آف پبلک ہیلتھ راولپنڈی میں ایم ایس پبلک
ہیلتھ کی طالبہ ہوں۔ حالیہ طور پر میں پرائمری ہیلتھ کیئر لیول پر ہیلتھ ورکرز کی
انفیکشن پریوینشن کنٹرول پریکٹسز اور آگاہی پر تحقیق کر رہی ہوں۔ میں آپکو اس تحقیقی
سٹڈی میں شامل کرنے کی اجازت چاہتی ہوں۔ اگر آپ متفق ہیں تو آپ سے ضروری
معلومات ایک معیاری فارم پر لی جائے گی۔ اس کے لئے آپ سے 15 تا 20 منٹ کا
وقت درکار ہے۔ آپ سے حاصل کردہ معلومات کو مکمل صیغہ راز میں رکھا جائے گا
اور اس کو کسی بھی کاروباری یا تجارتی مقاصد کے لئے استعمال نہیں کیا جائے گا۔ اس

سٹڈی کی مدد سے انفیکشن پریوینشن اینڈ کنٹرول پریکٹسز کے بارے میں ضروری معلومات ملے گی جو کہ پرائمری ہیلتھ لیول پر کام کرنے والے ہیلتھ ورکرز اور کمیونٹی کی انفیکشن سے بچاؤ کو روکنے میں مدد دے گی۔ اس سٹڈی میں آپکی شرکت رضاکارانہ ہے اور کسی بھی وجہ سے، کسی بھی نتائج کے بغیر اور کسی بھی وقت آپ اس سٹڈی میں شرکت سے دستبردار ہو سکتے ہیں۔ اگر آپ کوئی سوال پوچھنا چاہتے ہیں تو آپ پوچھ سکتے ہیں۔

CONSENT

I have read and understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

میں نے جاری کردہ معلومات کو پڑھ / سن لیا ہے۔ ریسرچر نے اس سٹڈی کے بارے میں جو معلومات مجھے دی ہیں وہ مجھے سمجھ آگئی ہے۔ میں تصدیق کرتا / کرتی ہوں کہ مجھے سٹڈی کے بارے میں سوالات کرنے کا موقع ملا ہے اور محقق نے میرے سوالات کا تسلی بخش جواب دیا ہے۔ اس سٹڈی میں میری شرکت رضاکارانہ ہے اور میں کسی بھی وجہ سے، کسی بھی نتائج کے بغیر اور کسی بھی وقت اس سٹڈی میں شرکت سے دستبردار ہونے کا حق رکھتا / رکھتی ہوں۔ میں سمجھتا ہوں کہ میں کسی بھی وقت اس سٹڈی سے اپنے ڈیٹا کو واپس لینے کا حق رکھتا / رکھتی ہوں۔

Name of Participant_________________

Signature of Participant______________

Date___________________

Gantt Chart

Task	Sep 2022- Feb 2023																							
	Sep				Oct				Nov				Dec				Jan				Feb			
	Week																							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Approval, Permission and Health Facility Selection																								
IPC awareness & practices assessment																								
Data Collection and analysis																								
Write up																								
Thesis finalization																								
Thesis Printing																								
Presentation and approvals																								

Table 19: Gantt Chart

Budget Details

Activity	Transport	Printing	Stationary
Survey tool		20,000	
Data collection	15,000		10,000
Data analysis		15,000	
Write up		5000	5000
Total	15,000	40,000	10,000
Grand Total	Rs. 65,000		

Table 20: Budget breakdown for the activities

Annexure C- Institutional Review Board Letter

AL-SHIFA SCHOOL OF PUBLIC HEALTH
PAKISTAN INSTITUTE OF OPHTHALMOLOGY
AL-SHIFA TRUST, RAWALPINDI

MSPH-IRB/14-25
27th Sep, 2022

TO WHOM IT MAY CONCERN

This is to certify that **Nazia Hassan Khan** D/O **Hassan Mehmood Khan** is a student of Master of Science in Public Health (MSPH) final semester at Al-Shifa School of Public Health, PIO, Al-Shifa Trust Rawalpindi. He/she has to conduct a research project as part of curriculum & compulsory requirement for the award of degree by the Quaid-i-Azam University, Islamabad. His/her research topic which has already been approved by the Institutional Review Board (IRB) is **"Infaction prevention and control practices among community health workers at primary health care settings of Islamabad".**

Please provide his/her necessary help and support in completion of the research project. Thank you.

Sincerely,

Dr. Ayesha Babar Kawish
Head
Al-Shifa School of Public Health, PIO
Al-Shifa Trust, Rawalpindi

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