PREVALENCE AND RISK ASSESSMENT OF INFECTIOUS DISEASES AMONG AFGHAN REFUGEES

Dr. Zobia Noreen[1]

[1]Assistant Professor, Bio Science of CUI Islamabad Campus, Pakistan

ABSTRACT

Pakistan being one of the largest hosts for Afghan refugees has been implicated to endure challenges in all sectors including economy, healthcare, education, and cost of living. However, one area which has suffered significantly is healthcare since it is now burdened by the ailments of a local population and foreign pathogens arriving with the refugees. It is, therefore, important to identify the key prevailing infectious diseases among the refugees and the associated risk factors to prevent outbreaks, thus reducing the burden on the local healthcare system. A cross-sectional survey was carried out in Afghan refugees villages in Peshawar KPK, Pakistan during the months of August, and September, 2023 to collect data regarding the prevalence of infectious diseases (Dengue, Respiratory tract infections, eye infection, Malaria, and Measles) along with the risk factors (sociodemographic, sources of water/food, sanitation, and health care facilities). Our results showed that malaria is the most common disease followed by dengue, strep throat, skin, and eye infections. Waste disposal, low economic status, and lack of proper food and water storage were among the major risk factors associated with infectious diseases. Moreover, access to safe drinking water, language barriers, and lack of balanced diets were also among the major problems faced by refugees. The results of this study will help develop a support system for healthcare workers and policymakers to prevent, control, and effectively treat infectious diseases and associated outbreaks in Afghan refugee camps.

Keywords: *Infectious Diseases, Refugees, Risk Factors, Health Care System*

1. INTRODUCTION

Migration can lead to various infectious diseases due to an unstable life system where individuals may share the same resources leading to overcrowding. In Pakistan, the burden of infectious diseases is more pronounced due to overpopulation, weak healthcare systems, indiscriminate use of antibiotics, poor disease management, limited economic resources, and lack of proper surveillance systems. Not only does the problem lie in the state's lack of focus on the healthcare system where it spends 0.5-0.8 % of GDP in this sector, but also the depilated healthcare infrastructure; according to a 2023 web report World Health Organization recorded 1201 hospitals, 5518 basic healthcare units, and 683 rural and 731 maternity centers; and inadequate workforce where doctor-patient ratio is 1:1300 which is far less than recommended by WHO are contributing factors to Pakistan's weak healthcare system (Muhammad et al., 2023). Moreover, hosting approximately 1.4 million registered Afghan refugees has overstrained the existing weak healthcare facilities, making the country prone to disease outbreaks and epidemics. Refugees are easy targets for not just infectious diseases due to poor sanitation practices, lack of access to basic health care facilities, and poor living standards, but they become carriers of diseases for the locals as well. Outbreaks which spread widely by being in contact with infected persons/surfaces/blood or by air are although preventable, but because of an inadequate doctor/patient ratio, and poor access to healthcare facilities (overcrowding in hospitals thus leading to the spread of communicable diseases) make preventive interventions less effective for not just locals but refugees as well.

Infectious diseases such as acute respiratory tract infections, shigellosis, typhoid, diphtheria, scabies, measles, meningococcal meningitis, hepatitis A, tuberculosis, and malaria are more prevalent among immigrants in European Union countries (ECDC, 2016; Mockenhaupt et al., 2016; Barnett et al., 2013; Gautret et al., 2012). However, there is limited data on prevalent infectious diseases in refugees residing in low or low-middle-income countries. Therefore, this study is designed to explore the impact of the following diseases

i.e., diarrheal infections, dengue, malaria, pneumonia, skin infections, eye infections, measles, and peptic ulcer. In Pakistan, infectious diseases such as measles, watery diarrhea, and dysentery are not just widespread among Afghan refugees but are also associated with their mortality rate (Malik et al., 2019). To prevent and control infectious disease outbreaks, there is a dire need to identify the key prevailing infectious diseases and associated risk factors among the refugees.

2. LITERATURE REVIEW

Forced displacement or migration is a multifaceted, emerging, and significant global concern caused by persecution, conflict, war, generalized violence, or human rights violations. According to the United Nations High Commission for Refugees (UNHCR), 108.4 million people in the world are forcibly displaced, among them, 35.3 million are refugees (UNHCR, 2022). The refugees though are accommodated worldwide by the UN Convention of 1951 and aided by UNHCR, yet not all the countries are signatories to the convention, thus marking the status of refugees in the country as a problem. Moreover, the national laws of the country sometimes hinder the inclusion of refugees in the host countries. For example, Pakistan is a non-signatory to the 1951 Convention, it has no national policy towards refugees for inclusion purposes and thus it treats refugees according to the Foreigners Act of 1946 (UNHCR Pakistan, 2023).

Some countries ensure the physical safety of the refugees but only 1 in 3 countries fully accommodate refugees in their health care system (Fletcher, 2022). Access to healthcare is the major problem faced by refugees and asylum seekers, especially in low-middle income countries due to their economic constraints as well as the host country's own precarious healthcare facilities. Most refugees are employed in the 3Ds jobs (dangerous, dirty, and demanding) which makes them more vulnerable to infectious diseases (Fletcher, 2022). Similarly, access is sometimes hampered by refugees' sanitation tendencies, literacy to healthcare services (Sherif et al., 2022) as well as certain cultural and religious norms. Cultural and religious strain is significant here as many refugees consider discussion about certain body parts as taboo, thus talking about them to physicians becomes impossible (Kang et al., 1998). In a similar strain, linguistic barriers become troublesome in effective healthcare communication where the patient and doctor do not share a common language. From a legal perspective, the unregistered refugees cannot consult doctors due to fear of arrest and deportation (Fletcher, 2022). To ensure health equity and a better understanding of the health needs of refugees, UNHCR, the World Health Assembly (WHA), and the Global Compact for Safe, Orderly, and Regular Migration have recommended strengthening, publishing, and sharing data on the health of the refugees and migrants (WHO, 2018; United Nations. Economic Commission for Africa, 2017; UN General Assembly, 2021). The capacity of the healthcare system to capture and share relevant healthcare data at local, national, and international levels is a challenge since refugees often avail healthcare facilities outside the mainstream health system or are sometimes not eligible for routine care. (Seidler et al., 2019; Lebano et al., 2020). This may also lead to underreporting infectious disease during surveillance, which is alarming, especially in the post-COVID era (Bozorgmehr et al., 2018). Refugees are only more prone to local diseases of the host country as they are not immune to native strains, but they can also function as carriers of infectious pathogens that may affect the local population (Malik et al., 2019). As the locals are new to the strains, their immune system lacks the combating power, thus locals of the host community are hit hard by the new strain brought by the refugees.

Refugees and migrants are at higher risk of developing infectious diseases because of their exposure to infections, interrupted care, and poor living conditions during the migration process. Communicable diseases including acute respiratory tract infections, shigellosis, typhoid, diphtheria, scabies, measles, meningococcal meningitis, hepatitis A, tuberculosis, and malaria been reported to have spread in refugee populations residing in European Union countries (ECDC, 2016; Mockenhaupt et al., 2016; Barnett et al.,

2013; Gautret et al., 2012). However, the data is extremely limited and cannot be generalized to refugees living in low or low-middle-income countries as they have limited resources and are relatively unprepared to manage a large influx of people. Pakistan is host to the largest number of Afghan refugees i.e., 1.3 million, which has a significant impact on its economy, society, politics, security, health care system, and environment (UNHCR Pakistan, 2023; Anwar et al., 2021). Pakistan has the sixth largest population in the world reaching 208 million and 65% of its population resides in rural areas where the healthcare system and sanitation are not good affecting the health of the individuals (Malik et al., 2019). The doctor-patient and nurse-patient ratio is already far less than recommended by WHO in Pakistan. Thus, the addition of refugees has burdened the already fragile health care system. Though comprised of Public and Private hospitals, due to economic constraints, the refugees cannot afford to visit private physicians and only have access to public hospitals in Pakistan. This includes documented and undocumented refugees. The public hospitals lack medical supplies, equipment, and workforce, thus making it difficult to accommodate even the locals. Moreover, the hospitals have poor sanitary environments and are in dire need of upgradation (Aslam, 2022). Apart from this, the country has no national health insurance policy, thus even locals belonging to low strata have limited access to effective healthcare facilities.

The situation is worsening because there is no baseline data of the prevalent infectious pathogens, their virulence potential, and antibiotic resistant profiling in Afghanistan. Moreover, lack of medical screening for entry visa has made it nearly impossible to track the source of infection among Afghan refugees and local population. Global healthcare response to the health issues of Afghan refugees has been severely affected by the pandemic leading to health inequality (Lupieri, 2021; Matlin et al., 2021). A pre-COVID study based on Commissionerate Afghan Refugees (CAR) data in Khyber Pakhtunkhwa (KP) has shown that respiratory tract infections (48.05%) were the most prevalent disease in Afghan Refugees followed by skin diseases and Diarrhea (Malik et al., 2019). However, the risk factors and profile of the associate pathogens, have not been reported to the best of our knowledge. Therefore, the present study is designed to analyze the prevalent infectious diseases among the Afghan refugees and associated risk factors. Moreover, the characterization of causative agents of diarrheal illness will be done. GIS mapping of the diseases (especially Diarrhea and Dengue) will be done to identify hotspots which can in turn help the care givers and policy makers to effectively address the challenges of health emergencies in Refugee camps.

The burden of infectious diseases among migrants may vary on several risk factors which include 1) the pattern of infectious diseases and availability of healthcare system in the country of origin 2) exposure to pathogens and sanitation conditions during the migration journey, 3) Post-migration screening for infectious diseases 4) access to health services in host countries (Castelli & Sulis, 2017). The infectious diseases in Pakistan like measles, watery diarrhea, and dysentery are not just widespread among Afghan refugees but also are factors associated with their mortality rate (Malik et al., 2019). There is a need to identify prevailing infectious diseases needed to prevent and control associated risk factors among refugees. Among the most important diseases that need to be addressed are dengue, malaria, pneumonia, skin, and eye infections.

Dengue is a mosquito-borne viral infection and is listed among the top threats to global health (WHO, 2019). It is caused by four closely related serotypes (DENV1-4) and is transmitted by mosquitoes belonging to Aedes aegypti species (Guzman & Harris, 2015). Dengue infection follows seasonal patterns, and a surge in cases is observed in monsoon season. The major risk factors of dengue are lack of effective vaccine, irrational urbanization, climate changes, insufficient waste management system, and lack of awareness (Guy et al., 2015; WHO, 2023). Refugees are more prone to dengue infections as they live in areas that have open

sewage and waste disposal areas and usually store water in open containers which may function as breeding places for mosquitoes.

Malaria is a life-threatening febrile illness caused majorly by Plasmodium falciparum and Plasmodium vivax. It is a non-communicable disease that requires vectors i.e., Anopheles mosquitoes. The disease is more prevalent in tropical parts of the world. countries. Although it is both a preventable and curable disease but may lead to death due to delayed diagnosis and effective treatment. The risk factors for malarial infection include the presence of malaria-transmitting mosquitoes, climate change, lack of vector control, temperature, rainfall, humidity, altitude, a composition of the vegetation index, the existence of livestock, population density, proximity to breeding stagnant water sites (Graves et al., 2009; Guthmann et al., 2001; Handayani & Darwin, 2006). Refugees are more prone to dengue infections as they live in areas that are more prone to climate change, flooding and lack proper waste management as compared to the host population.

Pneumonia is an acute respiratory tract infection that is most commonly caused by Streptococcus pneumonia and Haemophilus Influenzae type b (HIB). It is recognized as the single largest cause of death among children under the age of 5 globally, leading to deaths of 740,180 children in 2019 (WHO, 2019). Risk factors associated with pneumonia infection are immunocompromised persons, undernourishment, pre-existing HIV infections/ measles, indoor air pollution, overcrowded homes, and parental smoking. Refugees living in temporary housing which are overcrowded making them more vulnerable to pneumonia infections.

Skin infections affect between 30%-70% of people worldwide and are the fourth leading cause of non-fatal burden in terms of loss due to disability. The most common type of skin infection such as psoriasis or atopic eczema (rash) caused by bacteria, viruses, or fungi (Basra & Shahrukh, 2009). Poor sanitation and hygiene conditions in refugees' villages are one of the major factors of skin infections among them.

Ocular infections are one of the major reasons for the increase in morbidity worldwide. These infections and inflammation may also lead to blindness if not diagnosed and treated on time (Wang et al., 2015). External ocular infections (EOIs) include conjunctivitis, blepharitis, keratitis, dacryocystitis, and canaliculitis and are caused commonly by Staphylococcus aureus, Streptococcus pneumoniae, Bacillus, Pseudomonas aeruginosa and Neisseria gonorrhoeae (Miller et al., 2018). Risk factors for infection include poor personal hygiene, poor sanitation, decreased immune status, trauma, and surgery.

Measles is a highly contagious airborne disease transmitted from an infected person through coughing and sneezing. Measles is caused by morbillivirus and leads to complications and even death, especially among children. Despite the availability of an effective measles vaccine, it has led to the death of an estimated 128,000 people in 2021 (WHO, 2022). Major risk factors for measles outbreaks are the unvaccinated population, travel history, contact history, immunological status, and gender (Tariku & Misikir, 2019).

3. METHODOLOGY

A cross-section survey-based study was conducted in Afghan refugee villages/camps and localities of Peshawar KP, Pakistan for the period of 2 months (Aug-Sep 2023). Convenience data collection based on willingness to cooperate was conducted. A structured questionnaire was administered to the head of household and data related to socio-demographics (e.g., age, gender, occupation), sanitation, Dietary intake, and consumption (15 items), child health and infectious diseases (dengue, respiratory tract infections, eye infection, malaria, skin infections and measles).

IBM Statistical Package for the Social Sciences (IBM, New York, USA) version 29 is used for statistical analyses. Descriptive statistics are presented using frequency distribution, percentages, means, and standard deviation. Charts are drawn for graphical descriptive presentations. Cross-tabulations and the chi-square test of association are used to identify the relationship of categorical data. For numerical data correlation analysis is used to identify risk factors. A p-value of less than 0.05 is considered statistically significant.

4. RESULTS

a. Socio-Demographic Data

Socio-demographic data analysis shows that 96.5 % of the households are headed by male members. The average age of head of household and education is calculated to be 43.45± 9.074, and 7.37±3.32 yrs. (formal education). Moreover, the majority (90.03%) of refugees are earning less than PKR 50000 per month per household. The major source of income salary (45.7%), followed by construction labor (19%).

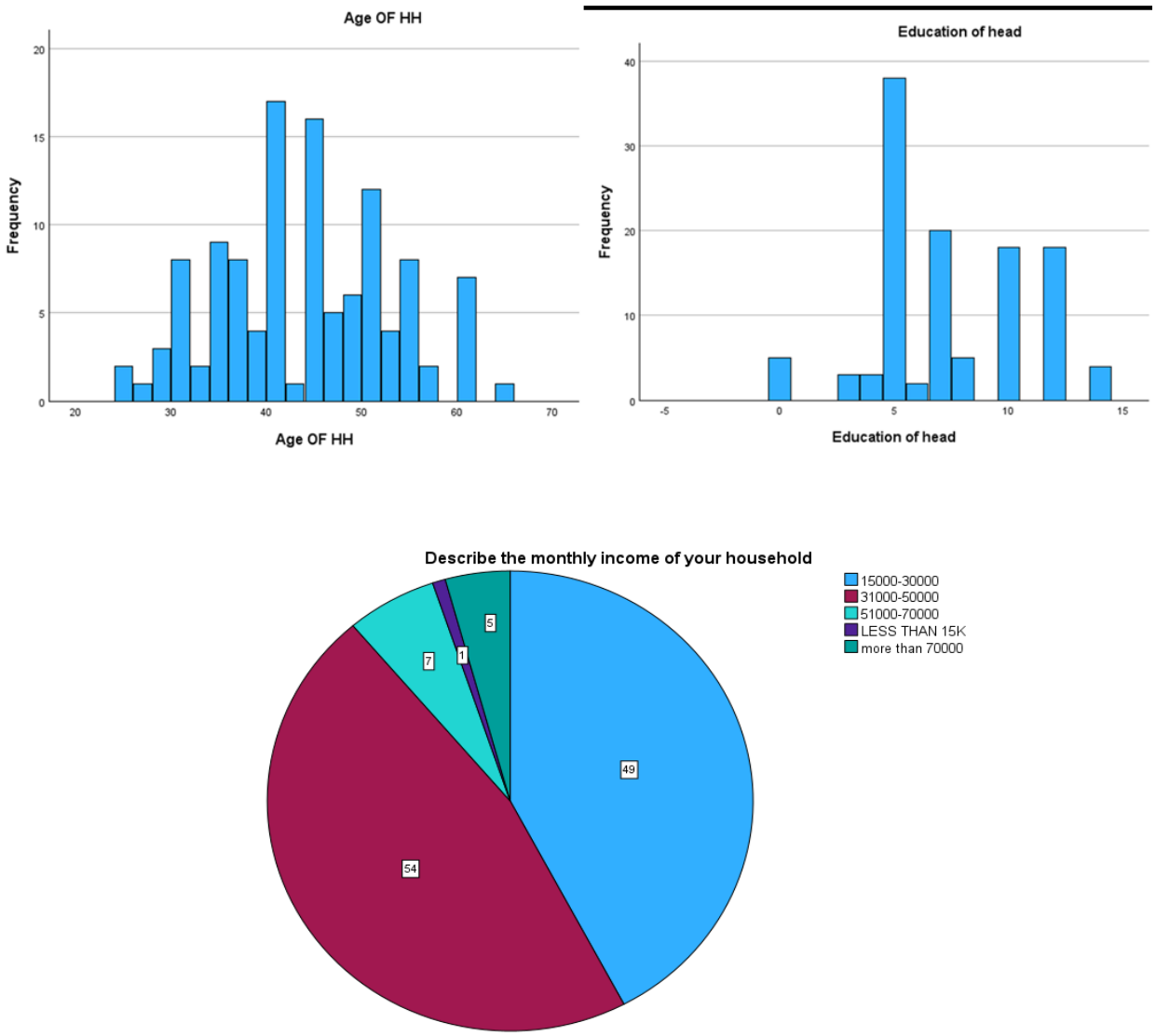

Figure 1: Socio demographic data showing frequency distribution of a) age of the head of household, b) education and c) monthly income

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b. Sources of Household Water

Source analysis of drinking and communal water show that 95% of the people use piped or tap water for drinking and cooking, whereas 78.4% of households use plastic bottles to store drinking water followed by pots (19.8%)

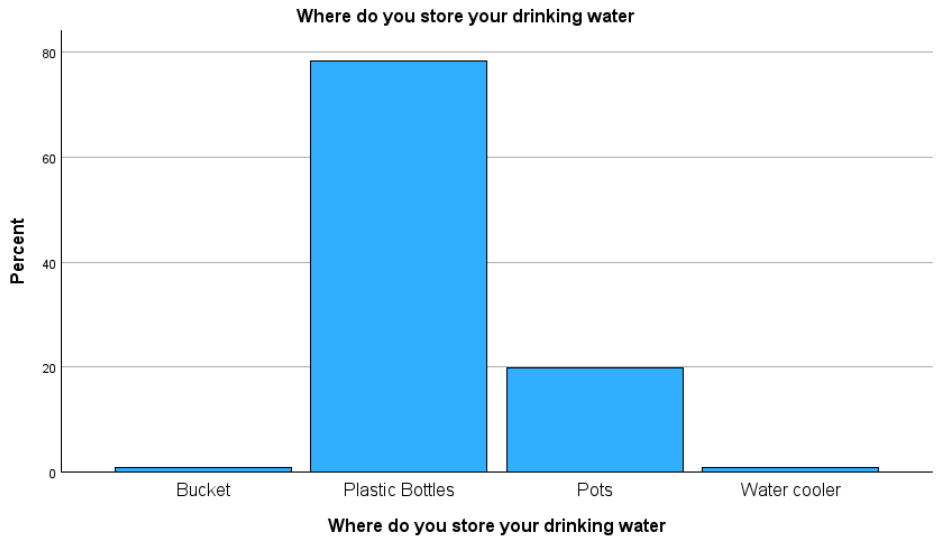

Figure 2: Graph showing the percentage of households using diverse types of water storage.

c. Sanitation, Hygiene, and Exposure to Animals/Vectors

Many of the households (94.8) are using private latrines without flush. Most of the households have waste disposal areas within 500m of their houses. 89.7% of the people use toothpaste to clean their teeth followed by miswaq (6.9%).

d. Food Sources and Consumption

Food consumption is measured using a Likert scale which shows that most refugees consume meat once a week (38%), fruits twice a week (41.4%), eggs (50%), and Milk/dairy products (38.8%) thrice a week. Children under the age of 6 months are fed on mother milk along with powdered milk (52.6%) followed by mother milk only (39.7%). The refugees face a major problem of food storage as 93.1% do not have access to proper food storage.

e. Child Health

All the children between the ages of 5 and 11 are immunized against measles, Polio, DPT3 (diphtheria, tetanus toxoid and pertussis vaccine), Rota vaccine for diarrhea, COVID, BCG, and Hib.

f. Infectious Diseases

Analysis of infection disease prevalence data shows that malaria is the most common disease followed by dengue, peptic ulcer, strep throat, skin infection, eye infection and COVID.

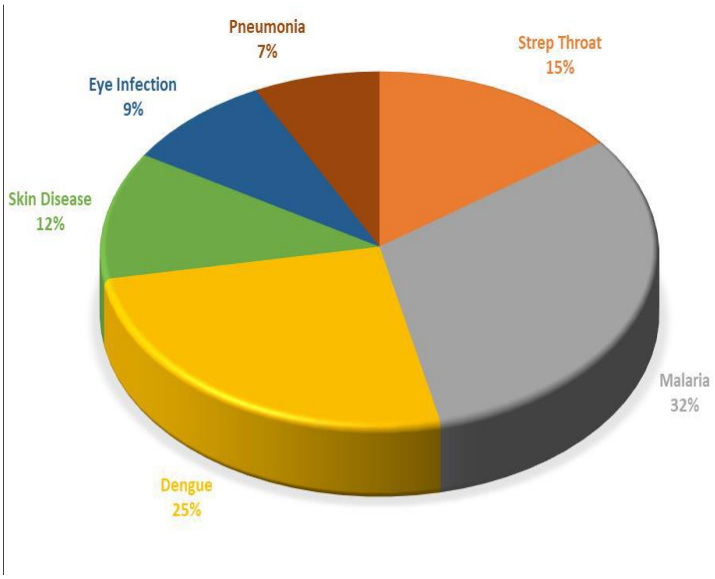

Figure 3: Prevalence of infectious disease among refugees (adult and children combined)

g. Risk Factors

Dengue infection is significantly associated with distance from the waste disposal site (p=0.012). Moreover, dengue infections are more prevalent in people with low income (p=0.007) especially those people whose source of income is salary (p=0.006). Storage of water in plastic bottles is a major risk factor associated with pneumonia (P=0.024). Peptic ulcers are prevalent among people working as construction workers (p=0.001).

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