

A Preliminary Study to find the Pattern of Infectious Diseases in Buner

MUHAMMAD NAEEM¹, FAHAD ULLAH², MUHAMMAD ZAHID³, KHALIDA KOUSAR⁴, FAZAL AKBAR⁵, ZAHID ULLAH KHAN⁶

¹Centre for Biotechnology and Microbiology, University of Swat, Swat, Pakistan.

²M.Phil Scholar, Institute of Basic Medical Sciences, Khyber Medical University, Peshawar

³Centre for Biotechnology and Microbiology, University of Swat, Swat, Pakistan.

⁴Assisant Professor of Microbiology, Department of Pathology, Bacha Khan Medical College, Mardan, Pakistan.

⁵Associate Professor, Centre for Biotechnology and Microbiology, University of Swat, Swat, Pakistan.

⁶Assistant Professor of Microbiology, Department of Pathology, Khyber Girls Medical College, Peshawar, Pakistan.

Corresponding author: Dr. Zahid Ullah Khan, Email: drzahidullah1978@gmail.com, Cell: 0333-9591370

ABSTRACT

Proper education of common men about the life threatening infectious diseases in the surrounding is very much important in the modern therapeutic approaches. This study was carried out to find the most common devastating diseases in Buner region, the incidence and pattern of diseases were also determined. A total of 2354 hospital visited suspected patients were diagnosed for the presence of various infectious diseases in three main laboratories of District Buner (Riaz clinical laboratory, Azeem clinical laboratory and Bilal medical trust hospital laboratory). Out of total 2354 individuals 378 (16.05%) were positive for the infectious diseases. The major pathogenic disease in the studied area were Typhoid (*salmonella typhi*), H. pylori (*helicobacter pylori*), Malaria (*Plasmodium*), hepatitis C (hepatitis C virus) and hepatitis B (hepatitis B virus). Among the 378 patients screened for infectious diseases 243 (64.285%) were females and 135 (35.714%) were males. The incidence of each infections or diseases were maximum in the age group of 21-30 years old infected patients. The month wise distribution of each disease was different than the others. This study will attract the attention of government and non-government organizations towards the major health issues in Buner and would further encourage research work on these devastating diseases. The study will also uncover the involved disease factor and will help to control life threatening diseases in future.

Keywords: Infectious disease, Typhoid, H. pylori, Malaria

INTRODUCTION

Microbiology is the study of microscopic living organisms such as bacteria, viruses, fungi, protozoan and other microorganisms that possess different characters and forms. Millions of microorganisms live with us, in our environment and cause infections/ diseases in humans, animals and plants etc¹. The term "infectious disease" is defined as the disease caused by the entrance of specific infectious agent or their toxic product². These agents include viruses, bacteria, fungi, protozoa etc. The infectious agents/ diseases are transmitted from an infected person, animal or reservoir to a susceptible host either directly or indirectly through vector or inanimate environment³.

Based on the type of infectious agents, infectious diseases can be divided into four major types: (i) viral diseases, (ii) fungal diseases, (iii) parasitic protozoan diseases, and (iv) bacterial diseases. Each pathogen has different disease cycle from the other pathogens⁴. The life threatening viruses in the world include human immunodeficiency virus (HIV), dengue virus, Ebola virus, rabies, chikungunya virus, Hepatitis B virus (HBV) and Hepatitis C virus (HCV) infections⁵. Merely, HIV has infected over 50 million people, and more than 2 million fresh cases and 1.5 deaths happen annually in the world. Similarly, hepatitis A virus (HAV) causes about 1.5 million infections per year. This situation is even worse for HBV and HCV, where approximately 7.8 million deaths and 240 million chronic infections occur annually from HBV infection in the world⁶.

Like other developing countries, Pakistan is also on the list of affected countries whose population has been suffered from several pathogenic diseases. Being a developing country, it's very difficult to allocate funds for all the disease at once, the government has to handle the top most infectious diseases on priority. But, it's not possible until we find the local socioeconomic burden of medically important infectious diseases/ pathogens in particular area and population. This preliminary study was carried to find the pattern of infectious diseases, and also to find the most challenging infectious diseases in Buner region. Though the study is simple in nature but is very informative and may help the local community. The current study will also help the government of

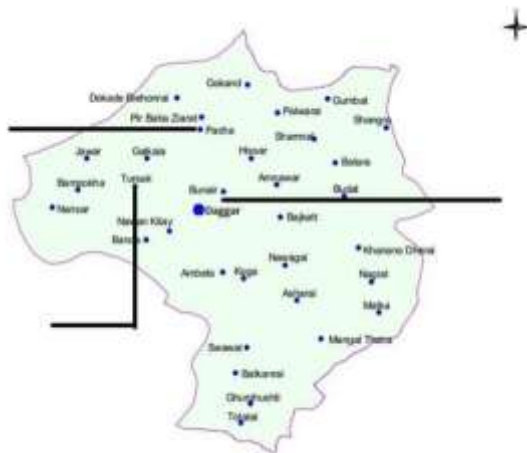
Pakistan for adopting a one-point agenda for the eradication of the most prevalent diseases in the region.

MATERIALS AND METHODS

The secondary data/ information regarding the incidence and clinical epidemiology of infectious diseases/ agents were collected from the three main clinical laboratories of District Buner; 1) Riaz clinical laboratory (RCL) Torwarsak, 2) Azeem clinical laboratory (ACL) Dagger, and 3) Bilal medical trust and laboratory Pir baba (Figure 2.1). The data were collected only from the hospital visited patients who were recommended for the various diagnostic tests based on the signs/ symptoms by the certified practionaires. The patient data were recorded after proper approval of the concerned authorities for seven months time period (June 2017 to December 2017). The data of 2354 visited patients who were proposed to be infected were traced and recorded. The data of only 378 confirmed infected patients were further analyzed for various parameters. The diagnostic tests were performed either by simple immune chromatographic assay method or microscopy. The parameters studied include the incidence of infectious diseases, age, gender, and marital status of patients, month of the disease, demography of patients, and various other epidemiological information's were also considered. District Buner is divided into six tehsils, however the data were collected from the two main tehsils (Tehsil Dagger, and Tehsil Gadezai) (Figure 1).

Finally, the percentage (%) and frequency of each disease were calculated.

The information's collected were properly arranged in excel sheet and statistical package for social sciences (SPSS) software was used for the analysis of data. Disease pattern and the association of each disease with the studied parameters were determined by calculating overall incidences of each disease, age-wise and gender wise distribution of each infectious disease in the patients, marital status of patients, demography of patients, and month-wise distribution of diseases. The % and number of cases (frequency) of each infectious disease was plotted. The interpretation of data was done and finally presented in tabular and graphic forms.



ACL

Figure 1: Map of District Buner showing different regions/ areas. Two main tehsils/ belts (Daggar and Pirbaba regions) were selected for the study. The map also indicates the locations of the three different laboratories from which the secondary data were collected.

ACL: Azeem Clinical laboratory Daggar, Buner
 RCL: Riaz Clinical laboratory Torwarsak, Buner
 BMTHL: Bilal medical trust hospital laboratory

RESULTS

Out of the total 2354 hospital visited/ suspected patients diagnosed for various infectious disease, 378 (16.05%) were positive for the diseases. Thus, overall infection rate was 16% in the studied area/ population (Table 3.1). The diseases pattern showed five major diseases that included typhoid, hepatitis B, H. pylori, hepatitis C and malaria. Out of this 16.05%, typhoid, H. pylori, malaria hepatitis C and hepatitis B virus infections contributed 9.57%, 5.08%, 0.59%, 0.51%, and 0.25%, respectively (Table 1).

Table 1: Pattern of infectious diseases

Disease	Total suspected/ visited person	Total infected person	Percentage
Typhoid	1016	226	9.57%
H. pylori	208	120	5.08 %
Malaria	523	14	0.59%
Hepatitis C	302	12	0.51%
Hepatitis B	305	6	0.25%
Total	2354	378	16.05%

Table 4: Month wise infections / diseases

Month	Typhoid		Helicobacter pylori		Malaria		Hepatitis C		Hepatitis B	
	Count	%	Count	%	Count	%	Count	%	Count	%
June	67	29.6%	10	8.3%	3	21.42%	0	0%	0	0%
July	135	59.7%	48	40%	1	7.14%	2	16.66%	0	0%
August	2	0.884%	5	4.16%	0	0%	0	0%	0	0%
September	1	0.442%	11	9.16%	0	0%	2	16.66%	2	33.33%
October	12	5.30%	15	12.5%	2	14.28%	1	8.333%	2	33.33%
November	7	3.09%	23	19.16%	3	21.42%	4	33.33%	0	0%
December	2	0.884%	8	6.66%	5	35.71%	3	25%	2	33.33%
Total	226	100%	120	100%	14	100%	12	100%	6	100%

Total patients which were screened for infectious diseases was 378, out of which 243 (64.285%) were females and 135 (35.714%) were males. Female patients were more infected as compared to male patients. Out of 226 infected patients of typhoid 58 (25.66%) were males and 168 (74.33%) were females. Total infected patients of H. pylori were 120 in which 63 (52.5%) were males and 57 (47.5%) were females. Among 14 infected patients of malaria in which 6 (42.85%) were males and 8 (57.14%) were females. Among 12 infected patients of hepatitis C in which 4 (33.33%) were males and 8 (66.66%) were females. Among 6 patients of hepatitis B in which 4 (66.66%) were males and 2 (33.33%) were females (Table 5).

The results obtained show that the majority (226, 59.79%) of tested infected patients were positive for typhoid (*Salmonella typhae*), followed by H. pylori (120, 31.75%), malaria (*Plasmodium*) (14, 3.7%), hepatitis C virus (12, 3.17%), and hepatitis B virus (6, 1.58%) infection (Table 2).

Table 2: Overall incidences of each infectious disease

Disease	Frequency/Counts	Percentage (%)
Typhoid	226	59.788%
Helicobacter pylori	120	31.746%
Malaria	14	3.704%
Hepatitis C	12	3.174%
Hepatitis B	6	1.587%
Total	378	100%

The incidence rate of the five major infectious diseases in the suspected/ suggested patients is shown in Table 3. The incidence rate was much higher for H. pylori (57.69%), followed by typhoid (22.24%) in the studied population. The other three diseases had relatively lesser incidence rate, and was collectively less than 10% for all the three remaining diseases.

Table 3: Incidence rate of the prominent diseases in the suspected patients

Disease	Total suspected/ visited person	Total infected person	Incidence rate (%)
Typhoid	1016	226/ 1016	22.24%
H. pylori	208	120/ 208	57.69%
Hepatitis C	302	12/ 302	3.97%
Malaria	523	14/ 523	2.8%
Hepatitis B	305	6/ 305	1.96%
Total	2354	378/ 2354	16.05%

The pattern of the disease in each month showed a distinct percentage for each infectious disease. (Table 4). The maximum percentage for Typhoid was (59.7%) in July and the minimum was (0.44%) in September. The H. pylori percentage was highest in (40%) in July followed by (19.16%) in November however the percentage for other month were lesser than 10%. The percentage for Malaria was highest (35.71%) in December while fewer cases were reported in other months. Hepatitis C percentage was highest (33.33%) in November however the lowest was (0%) or no case reported in June and August. Hepatitis B results are same for 3 months which (33.33%) in September, October and December however the remaining months showed no cases reported.

Table 5: Gender wise infections / diseases

Disease	Frequency & Percentage	Gender		Total
		Male	Female	
Typhoid	Count	58	168	226
	Percentage	25.66%	74.33%	100%
Helicobacter pylori	Count	63	57	120
	Percentage	52.5%	47.5%	100%
Malaria	Count	6	8	14
	Percentage	42.85%	57.14%	100%
Hepatitis C	Count	4	8	12
	Percentage	33.33%	66.66%	100%
Hepatitis B	Count	4	2	6
	Percentage	66.66%	33.33%	100%
Total	Count	135	243	378
	Percentage	35.714%	64.285%	100%

Table 6: Age wise infections / diseases

Age group	Typhoid		Helicobacter pylori		Malar ia		Hepatitis C		Hepatitis B	
	Count	%	Count	%	Count	%	Count	%	Count	%
10-20	51	22.56%	23	19.16%	5	35.71%	3	25%	0	0%
21-30	84	37.16%	34	28.33%	5	35.71%	5	41.66%	2	33.33%
31-40	48	21.23%	21	21.83%	3	21.42%	2	16.66%	1	16.66%
41-50	21	9.29%	22	18.33%	0	0%	1	8.33%	1	16.66%
51-60	14	6.19%	12	10%	1	7.145%	1	8.33%	2	33.33%
61-above	8	3.535%	8	6.66%	0	0%	0	0%	0	0%
Total	226	100%	120	100%	14	100%	12	100%	6	100%

In common, the incidence of each infections or disease were maximum in the age group of 21-30 years old infected patients. The incidence of Typhoid was maximum in age group of 21-30 years old patients (37.16%) followed by age group of 10-20 years (22.56%) and 31-40 years (21.23%) and 51-60 years (6.19%). The incidence of H. pylori was high in age group of 21-30 years old infected patients (28.33%) followed by 31-40 years (21.83%) and 10-20 years (19.16%) and 41-50 years (18.33%) and 51-60 years (10%). The incidence of malaria was maximum in age group of 10-20 and 21-30 years old infected patients (35.71%) followed by 31-40 years (21.42%) and 51-60 years (7.14%) and 61-above age patients showed no incidences. The incidence of Hepatitis C infection was maximum in age group of 21-30 years old patients (41.66%) followed by 10-20 years old patients (25%) and 31-40 years (16.66%) and no case was reported in 61-above age. The incidence of Hepatitis B infectious disease was highest in age group of 21-30 and 51-60 years old patients (33.33%) and 31-40 and 41-50 years (16.66%) and 61-above shows no case (Table 6).

DISCUSSION

Microbial infections are responsible for the great loss to the human life throughout the world especially in the developing countries like Pakistan which account for the highest morbidity and mortality rates⁴. Therefore, positive steps should must be taken to control the increasing death rate worldwide specifically in emerging countries and to prevent the provision of these infectious diseases to safe population. The data collected from different labs at various hospitals of visited patients in District Buner to investigate the incidences of infectious diseases and epidemiological finding. This study aimed to provide information on the spread of infectious diseases, their associated risk, prevention and control of the microbial diseases in Pakistan specifically in the selected population. That will help new researchers in district Buner in future to compare their finding/ observation with the data provided in this thesis and will make their study easy and more fruitful for finding the pattern of infectious diseases.

Different factors that affect the response of host to the infection as well as to their concerned therapy and treatment can play an important role like gender, age, and geography. This study covers five important diseases (Typhoid, Helicobacter pylori, Malaria, Hepatitis C, Hepatitis B) and are investigated the results. The incidence of Typhoid fever among the infectious diseases was (59.78%) in the selected population, whereas the rate of typhoid fever among the total visited persons is (22.24%). The data reported by Sharma and Malakar, 2012 for Typhoid fever in total visited persons was (26%)⁷ that are approximately equal to the current observation for District Buner. The prevalence of H. pylori was (31.74%) in the studied area. In the central and northern parts of Pakistan the H. pylori frequency was 66% to 84%⁸. This showed a decreased in H. pylori infection. Malarial infection frequency in the current study was (3.7%). However, the viral infection frequency was comparatively low in studied population/ area. The occurrences Hepatitis C and Hepatitis B in present analysis were (3.17% and 1.58%) respectively.

The incidences of H. pylori and malaria in the studied population were approximately equal in both sexes⁹. The H. pylori incidence rate in males and females are (52.5% and 47.5%) respectively, while Malarial infection frequency are (42.85% and 57.14%) in males and females respectively. while the previous

observation the incidence of H. pylori, Typhoid fever and Hepatitis B were almost equal in both gender⁹. Wherein Swat region the bacterial infection dominates in females. However, the frequency is greatly affected by the different factors like environmental changes and immunity in a population. In current observation the Typhoid fever was found much more in females that are (74.33%) as compared to males which are (25.66%). These finding are in controversy with previous observation in another region of Pakistan^{10, 11} while Hepatitis C infection were found much more in females in current study.

Generally, the age group 21 to 30 show high incidences of infectious diseases as compared to other groups. These observations are consistent with the previous finding (Farhat-Naz et al., 2013), where they studied in Abbottabad¹². While Malaria are same among age group 10 to 20 and 21 to 30 in current observation. In current study the frequency of Malaria was high in December, however in earlier observation the incidence of Malaria was more in September (Ibrahim et al., 2014) study in Buner^{13, 14}, and according to the (K Hussain et al., 2013) the rate of Malaria was high in July and August¹⁵.

CONCLUSION

The intended outcome of the study is to find out the incidences and epidemiological importance of infectious diseases in the selected region/area that are presently unknown. This study is carried out in District Buner to point out the associated risk factors of the infectious diseases and their economical importance. The aim of the study is to assess the spread of common most infectious diseases, their prevention and control factors in Pakistan. From the current study it was concluded that the typhoid fever was at peak followed by H. pylori, Malaria, Hepatitis C and Hepatitis B respectively.

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