



Prevalence and COVID-19 Associated Risk-factors in District Bannu, Khyber Pakhtunkhwa (KPK), Pakistan

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An RNA virus with a positive sense is known as a Coronavirus, which is single-stranded and encapsulated. It was first discovered by humans in 1965. Coronaviruses are the causative agents for mild respiratory infections in humans which belong to the Corona viridae family. Severe Acute Respiratory Syndrome Coronavirus-2 is responsible to cause coronavirus disease which is a severe respiratory damaging syndrome with significant health implications globally. The coronavirus first case was noted in Pakistan in the late February 2020. A total of 31784 samples were taken through stick swab from different areas of district Bannu for a period from January 2021 to June 2021 and analyzed through real time PCR. Overall prevalence was 5.17% but center-wise, the highest prevalence (13.45%) was recorded in KGNTH (Khalifa Gul Nawaz Teaching Hospital) then DHO (District Health Office) Bannu (3.30%). In month-wise prevalence, the highest prevalence was recorded in April (10.86%) and May (9.25%) whereas, the lowest was seen in the month of June (1.78%). In gender-wise prevalence, the number of males (6.60%) were highly infected with the novel COVID-19 as compared to females (3.23%), with a significant difference of ($P>0.0001$). The COVID-19 was more prevalent in individuals with age<50 years while the lowest was recorded in individuals with age ranges from 25-50 years. It is concluded that COVID-19 pandemic is highly prevalent in the district of Bannu, Khyber Pakhtunkhwa, Pakistan. The people need to follow the SOPs design by the government and get vaccinated as soon as possible to reduce the spread and prevalence of COVID-19.

Keywords: Bannu, COVID-19, Pakistan, Prevalence, Vaccinated

INTRODUCTION

The word 'Corona' is a Latin word which means "crown". Under an electron microscope, the coronavirus has a unique structure like a solar corona with spherical particles surrounded by projections (Sindhuja et al. 2022) Corona virus respiratory infection was first recorded in the city of China named 'Wuhan' in the month of December 2019. The epidemic was caused by a new coronavirus 2 characterized by severe acute respiratory syndrome. The virus has now expanded to 114 nations, because of which a pandemic was declared by WHO, March 11, 2020. In the late February 2020, the coronavirus first case in Pakistan was recorded (Ahmad et al. 2021) According to the Pakistani government, there were 958,408 recorded cases in Pakistan as of

June 30, 2021, with 22,321 deaths and 904,320 cases recovered (Shareef et al. 2022)

Males' infection with a new coronavirus (COVID-19) is more likely than females to develop acute infections after death (Khan et al. 2020). Coronavirus spike (S) glycoproteins aid in cell entrance. Just like SARS-CoV they have high binding affinity ACE2 (angiotensin-converting enzyme 2), they are also the principal target of antibodies (Letko et al. 2020). Constructed with SARS-CoV-2 S glycol protein, has a Furin active site at the S1/S2 subunit junction, these junctions are processed during biogenesis which helps in differentiating this virus from SARS-CoV and SARS-related CoVs (Yan et al. 2020). The COVID-19-infected patients are symptomized by higher plasma pro-

inflammatory cytokine levels, greater leukocyte counts and aberrant respiratory findings (Rothan et al. 2020) According to previous research, the Delta variant to some extent, but not totally, evade neutralizing polyclonal and monoclonal antibodies made by previous COVID-19 infection or vaccination. AstraZeneca and Pfizer vaccines produce antibodies that are efficient against the Delta variant, but 3 to 5 times less efficient than the Alpha type, according to their neutralizing testing (B.1.1.7) (Asad et al.2021). The quick spread of a virus with such a high severity level has become an unparalleled public health danger. Researchers and scientists are trying to figure out how this virus works and how to get rid of it, so they can develop treatments and vaccines. Transmission occurs mostly through droplets and person-to-person contact. Wearing a mask, staying at home, social distancing, and washing hands often are all highly suggested ways to minimize the transmission of infections (Chu et al. 2021). The early cases of COVID-19 were mostly connected to food market (Huanan Seafood Wholesale Market), implying the zoonotic transfer of SARS-CoV-2 from animals to humans. Despite the possibility of transfer from one person to another, genetic study has revealed that the virus was developed and introduced by an unknown source, where it immediately propagated (Harapan et al. 2020)

According to latest studies, the latent period in most individuals is between day 1 and day 14, with a median of 5–6 days, however in some cases it might be as long as 24 days (Guan et al. 2020). We are currently witnessing a worldwide issue, affecting all societies, and it has put billions of people under lockdown due to a lack of adequate treatment and vaccine for COVID-19.

Desperate efforts are being made around the world to stop the pandemic, which has resulted in the failure of health systems and long-term geopolitical and economic consequences (Ramphul et al. 2020). Vaccines are now commonly used to prevent millions of people worldwide from a variety of dangerous diseases. As a result, it was thought that the pandemic would be controlled once a corona vaccine developed. Within 15 weeks of the corona virus outbreak, Russia released the first appropriate vaccination (Sputnik-V) in this hope (Kamran et al. 2021).

This epidemic has a greater effect on global Gross domestic product (GDP) growth. It has been estimated that the worldwide GDP will be affected by 2.3%-4.8% in consequences of the significant epidemic (Shafi et al. 2020). Pakistani businesses are suffering extraordinarily due to COVID-19 epidemic and lockdowns. According to United Nations Conference on Trade and Development, Pakistan would be affected greatly by a worldwide COVID-19 outbreak (Shafi et al. 2020).

MATERIALS AND METHODS

Study Design

This study was conducted at District Bannu, KPK from January 2021 to June 2021. Bannu District is situated in the southern part of Khyber Pakhtunkhwa Province. It is located between 32.9298°N latitude and 70.6693°E longitude. There are four seasons in the area, summer (4th May to 11th September), autumn (12th September to 3rd December), winter (4th December to 2nd March) and spring (3rd March to 3rd May) (<https://weatherspark.com>).

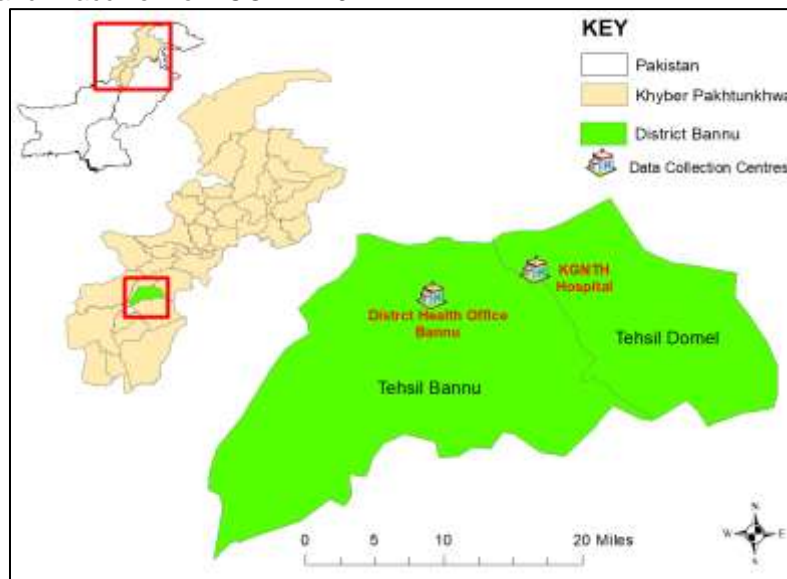


Figure 1: Study area map

Sample Collection

The samples were collected on the basis of clinical symptoms by health department through stick swab from different areas of District Bannu and examine it through rPCR (real time PCR) previously described by (Tahamtan et al. 2020).

Sample size

Totally thirty-one thousand seven hundred eighty-four (n=31784) samples were taken during the study period. This data was collected from DHO Bannu and Corona Diagnostic Laboratory Khalifa Gul Nawaz Teaching Hospital Bannu. The Data was verified and approved from DHO Bannu and Corona Diagnostic Laboratory Khalifa Gul Nawaz Teaching Hospital Bannu.

Statistical analysis

The data entry was done through the Excel 2013 and analyzed it by using SPSS version 22. Below 0.005 p value was considered significant.

RESULTS

Overall and Center wise Data

A total n= 31784 samples were taken, out of which 1646 were COVID-19 positive. Overall, prevalence of COVID-19 at District Bannu was 5.17%, whereas center-wise, the highest prevalence of COVID-19 was found at KGNTH (13.45%) then DHO Bannu (3.30%) and significant (P<0.0001) association was recorded between the total persons examined in both centers and infected persons (Figure 2).

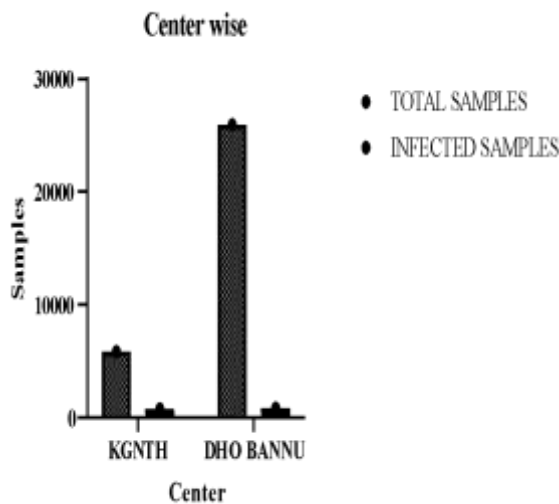


Figure 2: Center wise prevalence of COVID-19

Month-wise Data

The highest month-wise prevalence of COVID-19 was recorded in April (10.86%), followed by May (9.25%) and January (6.16%) while lowest was recorded in June

(1.78%) and March (2.68%) and found significant (P>0.0001) association between the total persons examined during study period and covid-19 infected persons (Figure 3).

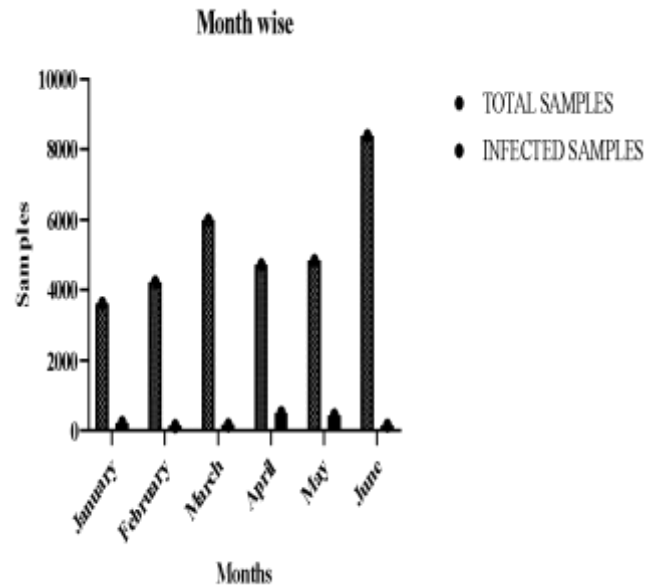


Figure 3: month wise prevalence of COVID-19

Gender-wise Data

The highest gender wise prevalence was recorded in male (6.60%) then female (3.23%) and found significant (P<0.0001) association (Figure 4).

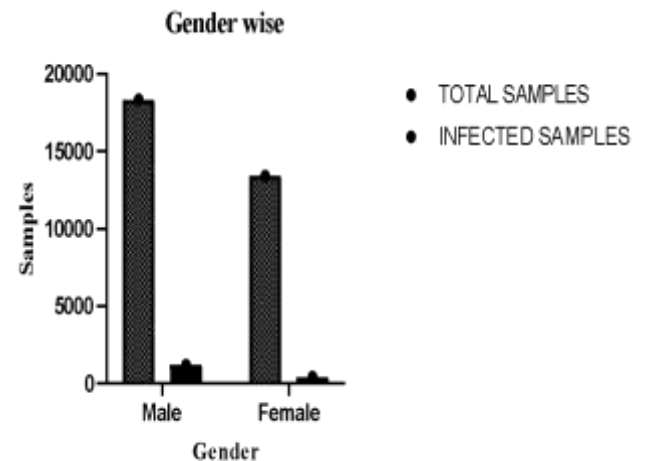


Figure 4: Gender wise prevalence of COVID-19

Age-wise Data

The highest age wise prevalence was noted at the age of greater than 50 years (6.76%), followed by at the age of 25years to 50 years (5%) while lowest was recorded at the age of lower than 25 years (4.09%) and found significant (P<0.0001) association (Figure 5). The detail about result was shown in table1.

Table 1: prevalence and associated risk factors of COVID-19 in district Bannu

Variables	Levels	Total Samples	Positive Samples	Prevalence (%)	P Value
SAMPLE VARIABLES					
Center wise	Overall	31784	1646	5.17%	P>0.0001
	KGNTH	5855	788	13.45%	
	DHO Bannu	25929	858	3.30%	
Month	January	3617	233	6.16%	P>0.0001
	February	4230	141	3.33%	
	March	5990	161	2.68%	
	April	4721	513	10.86%	
	May	4841	448	9.25%	
	June	8385	150	1.78%	
Gender	Male	18354	1212	6.60%	P>0.0001
	Female	13430	434	3.23%	
Age	<25years	8321	341	4.09%	P>0.0001
	25-50years	16025	802	5%	
	<50 years	7438	503	6.76%	

Significant difference $p < 0.05$

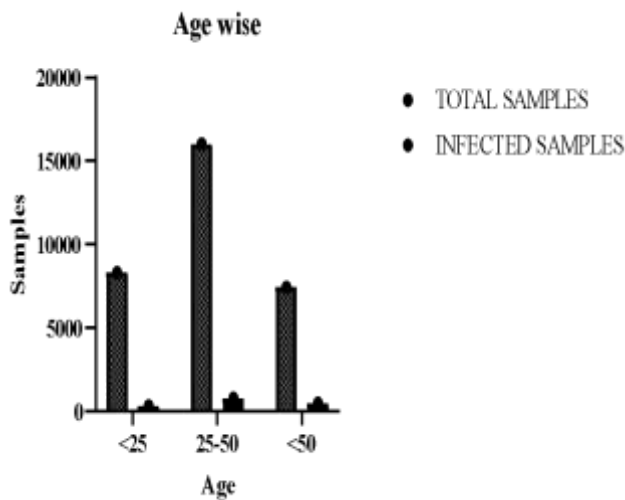


Figure 5: Age wise Prevalence of COVID-19

DISCUSSION

COVID-19 infection was first reported in China city name 'Wuhan' in December 2019. A pandemic was declared on March 11, 2020, by World Health Organization due to the increasing numbers of cases in effected countries (Raimondi et al. 2021). Nearly 1436198 cases of 2019 novel coronavirus were reported on April 9, 2020, with a 5.95 percent of case fatality ratio (CFR) (Reeves et al. 2020). With the epidemic emerging for the first time, Pakistan's neighboring countries, particularly China, were greatly affected. In the west, the

highest number of death due to the Coronavirus-2019 was recorded in Italy, while in north, the highest numbers of lethality of Coronavirus-2019 was recorded in Iran, after Italy.

In Pakistan, February 26, 2020, coronavirus first case was confirmed by the Pakistan's Ministry of Health in the Sindh province which has a population of 204.65 million people while on same day, the coronavirus case in Islamabad was also confirmed by the Federal Health Ministry (Waris et al. 2020). Coronavirus has become epidemic due to their frequently spread into several regions of the state. On April 10, 2020, within 45 days, the confirmed cases of Coronavirus were reached to 4601, in which 727 patients had recovered while 66 patients had died (Government of Pakistan. Coronavirus in Pakistan. <http://covid.gov.pk/>. Accessed March 27, 2020). The rate of Coronavirus attacks in Pakistan is estimated to be 2.3 per 100000 people. About 49% of coronavirus cases recorded from Punjab. Between April 5, 2020 and April 10, 2020, the number of COVID cases recorded in Punjab increased by 53.2 percent (from 1493 cases to 2287 cases). Sindh ranked 2nd on the bases of high number of positive COVID-19 cases (26%) followed by KPK (13.2%). From April 5th to April 10th 2020, the number of reported cases of COVID were increased by 28% in Sindh (881 cases to 1128 cases), in Khyber Pakhtunkhwa from 205 cases to 620 cases. The current study was conducted in District Bannu, KPK. The area is mainly occupied by pukhton populations. In the current study, the total cases of Covid-19 were 5.17%. Amin et al.2020 and Ali et al.2021 reported higher

prevalence 49% and 12.5% than our result respectively. The center wise, highest prevalence was recorded at KGNTN center (13.45%) then DHO Bannu (3.30%) and significant ($p > 0.0001$) association was found. Similar result was also recorded by (Ali et al. 2021) which reported higher cases of corona in SGNH SWAT (36%) then DHO SWAT (30%).

In the current study, the highest corona cases were found in male (6.60%) then female (3.23%) because males have higher levels of angiotensin-converting enzyme-2 than females and recorded significant ($P > 0.0001$) association. Similar result was reported by Amin et al. 2020, whose recorded higher prevalence in male (69%) then female (31%). Khan et al. 2020 also reported higher prevalence of SARS-CoV-2 in male (70.25%) then female (29.8%). 48% of the health care workers out of 138 ranges from 21 years old to 40 years old while 40% were above the age of 41 years (World Health Organization. Pakistan: COVID-19—Situation update as of 7 April 2020.) The majority of infected health care personnel were men.

In present study, the highest month wise was recorded in month of April (10.86%) and May (9.25%) while lowest prevalence was found in month of February (3.33%), March (2.68%) and June (1.78%) and found significant ($p > 0.0001$) association. Similar result was recorded by Bhuiyan et al. 2021 who reported highest prevalence in month of May (91%). The age wise, highest prevalence was recorded at the age of greater than 50 years (6.76%), followed by at the of 25-50 years (5%) then the age of less than 25 years (4.09%) and significant ($p > 0.0001$) association was found between different ages of total person examined and infected persons of different ages. Similar result was reported by Kalantari et al. 2020 who recorded highest prevalence at the age of greater than 80 years in Iran.

CONCLUSIONS

Since the outbreak of COVID-19 in Pakistan, the peoples of Pakistan and their government have diligent work to minimize the spread of disease. These controls include SOPs i.e. limiting and reducing outdoor events, in house isolation, prohibiting get-togethers, public screening and education, spreading awareness, immediate admission and treatment of confirmed patients, increase in the supply of medical commodities, enhancing and strengthening research and development of diagnostic reagents, and mobilizing all citizens to contribute in the epidemic's prevention and control.

Supplementary materials

The supplementary material / supporting for this article can be found online and downloaded at: <https://www.isisn.org/article/10.3390/antiox12081524/s1>,

Author contributions

NK and FB performed the data analysis and write the

first draft of the manuscript, MK, SK, LK and TU edited the manuscript, ELA and PRDLRE arrange funding and performed data analysis, NK and SYS supervised the project, wrote, and edited the final draft of the manuscript. These authors contributed equally.

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Institutional Review Board Statement

Ethical approvals were taken from the Ethical Review Board Committee at Abdul Wali Khan University Mardan, Khyber Pakhtunkhwa, Pakistan.

Informed Consent Statement

Not applicable.

Data Availability Statement

All of the data is included in the article/Supplementary Material.

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Conflict of interest

The authors declare that they have no competing/conflict of interest.

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