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Effect of Covid-19 on Income of the People in District Dir Lower, Khyber-Pakhtunkhwa

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Abstract: *The Covid-19 pandemic affected valuable human lives globally. Its effects on economic life of the people have been devastating. Like other countries, Covid-19 has also severely affected the people in Pakistan. The present study was conducted in district Dir Lower with the objective to investigate the effect of Covid-19 on income of the people. Multistage sampling technique was used to select sample district Dir Lower in the first stage, followed by four tehsils and eight village councils. Yamane formula and proportional allocation technique were used to select 378 households from a total of 7112 households. Pre-tested semi-structured questionnaires and personal interviews were used to collect the cross sectional data during April, 2020 to May, 2021. Descriptive as well as inferential statistics were used to analyse the data. Multiple linear regression model was used to examine the effect of Covid-19 on income of the people. The estimated results of multiple regression model found that Covid-19 had significantly affected income of the people. Finally, the study recommends that in case of any future pandemic, paid sick leave should be provided and job retention schemes should be introduced to preserve employees. The government and private sectors should provide unconditional cash support to the families that are hit hard by Covid-19 pandemic.*

Keywords: Covid-19 pandemic, Covid-19 cases, Income, Dir Lower, Pakistan

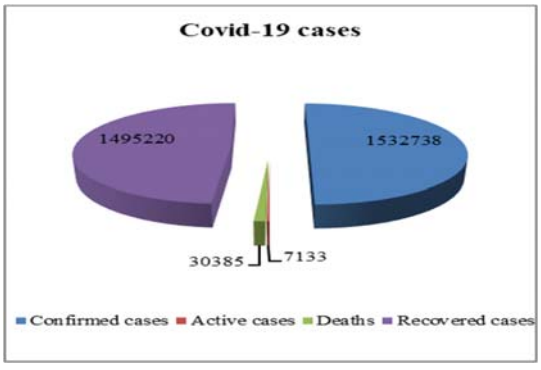
Introduction

The novel coronavirus disease also called as severe acute respiratory syndrome (SARS)-CoV-2 and coronavirus disease 2019 (COVID-19), is developing global health problem. Coronavirus disease 2019 (Covid-19) was first discovered in December, 2019 in the Wuhan city of Hubei province, China and spread rapidly to the other countries of the world (Agarwal et al., 2020). The world Health Organization (WHO) declared the Covid-19 outbreak as a pandemic on 11th March, 2020 (Umakanthan et al., 2020). As of 22 June 2022, more than 536 million Covid-19 confirmed cases along with 18.23 million active cases, 6.34 million deaths and 522 million recovered cases have been reported worldwide (Worldometer, 2022).

In Pakistan, the first case of Covid-19 was reported by Federal Ministry of Health, the government of Pakistan on 26th February 2020, in Karachi, Sindh province. On the same day, another case was diagnosed by the Pakistan Federal Ministry of Health in Islamabad (Waris et al., 2020). In about two weeks, the Covid-19 positive cases touched 20 out of 4721 suspected cases with the maximum number of 14 cases in Sindh, 5 in Gilgit-Baltistan and 1 in Balochistan (Saqlain et al., 2020). Sharing religious, economic and geographical boundaries with initial two hard-hit countries, China and Iran,

Pakistan was extremely vulnerable to the Covid-19 Pandemic. As China was the epicenter of coronavirus while increased traveling activities from Iran because of pilgrims further deteriorated the situation (Ali et al., 2021). On 17th June 2020, each district in Pakistan had recorded at least one positive case of Covid-19 (Worldometer, 2020).

Pakistan is listed as third in South Asian countries with the maximum number of Covid-19 cases after India and Bangladesh (Worldometer, 2022). Up to 22nd June 2022, 1532738 (1.53 million) positive cases were reported around the country with 7133 active cases, 30385 deaths and 1495220 (1.49 million) recovered cases. The highest number of confirmed cases were recorded 37.35% in Sindh, followed by 33.13% in Punjab, 14.34% in Khyber Pakhtunkhwa (KP), 8.86% in Islamabad, 2.86% in Azad Jammu & Kashmir (AJ & K), 2.32% in Balochistan and 0.77% in Gilgit-Baltistan (G-B). The maximum number of active cases were reported 45.28% in Sindh, followed by 34.66% in Punjab, 9.65% in Islamabad, 8.90% in KP, 0.81% in Azad Jammu & Kashmir, 0.36% in Balochistan and 0.24% in Gilgit- Baltistan. Punjab is the leading province in deaths with 44.65%, followed by Sindh with 26.69%, KP with 20.81%, Islamabad with 3.73%, Azad Jammu & Kashmir with 2.61%, Balochistan with 1.24% and Gilgit- Baltistan with 0.63%. Sindh is the leading province in recovered cases with 37.94%, followed by Punjab with 32.89%, KP with 14.24%, Islamabad with 8.97%, Azad Jammu & Kashmir with 2.84%, Balochistan with 2.35% and Gilgit-Baltistan with 0.77% (GoP, 2022). The details of Covid-19 cases are presented in the Figure 1 as under.



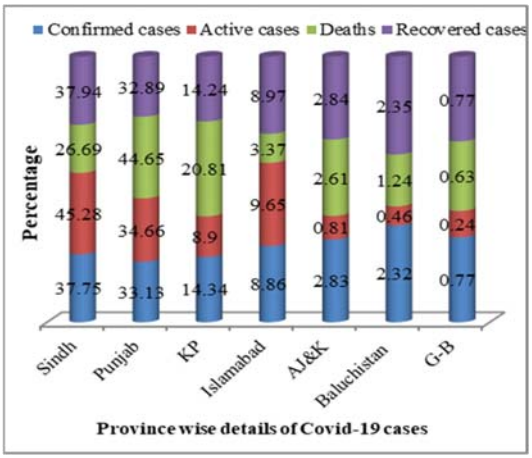


Figure 1: Province wise details of Covid-19 cases (as of June 22, 2022)

District Dir Lower is about 124 Kilometer away from Peshawar, capital city of KP province, Pakistan. Timergara is the Headquarter which is relatively the largest urban center in the district. District Dir Lower is generally consists of rural settings where majority of the people live in mountainous regions and mostly scattered in small villages and settlements. Because of the nature of the population composition and isolated families, it was believed that the people would more likely to be protected from the infection and impact of Covid-19 pandemic. It is because, the population of the district has limited links with the urban centers of the province, and they completely dependent on farming and small scale business for their survival. In spite of all aforementioned factors, district Dir Lower reported the first Covid-19 case when a female returned from Saudi Arab on 15th March, 2020 after performing Umrah. This news shocked the people and a sense of fear and danger was created and spread quickly among the inhabitants. To control the spread of coronavirus, mass mobility and transport was restricted, shops and businesses were closed and income of the people was affected due to reduction in income generating activities. The present study, therefore, tries to investigate the effect of Covid-19 on income of the people in district Dir Lower.

Justification of the study

The effects of the coronavirus are severe and differ from country to country. It has widespread consequences on all aspects of the human life

including economic conditions. Almost all countries of the world are facing shocking consequences of Covid-19 pandemic. Pakistan in particular is facing more challenging situation due to its large population, lack of economic opportunities, poverty, unemployment, illiteracy, poor healthcare and education standards, weak social protection system etc. Until now, the pandemic of Covid-19 had impaired economic well-being of the people in Pakistan including district Dir Lower. At the outset, district Dir Lower was one of the most affected districts in KP. However till date, to the best of our knowledge, no effective study has been conducted and analysed regarding the impact of Covid-19 on income of the people based on quantitative research. Therefore, the present study goes forward and tries to examine quantitatively the effect of Covid-19 on income of the people in district Dir Lower, KP, Pakistan.

Literature Review

Government of Pakistan (2020) reported financial status of the households in Pakistan during Covid-19 pandemic. The study found that about 53% of households have reduced their income level all over the country. The households in KP reported 64% reduction in their income along with 67% reduction in urban areas and 63% in rural areas. The households in Sindh noticed 59% reduction in their income along with 64% in urban area and 53% in rural areas. In Balochistan, the households recorded 51% of decline in their income along with 51% decrease in both urban and rural regions. In Punjab, the households reported 49% fall in their income along with 53% in urban areas and 44% in rural areas.

Kansiime et al., (2021) studied the impact of Covid-19 pandemic on income of the households in Kenya and Uganda. Online questionnaire was used for data collection. The data were collected from 442 sampled respondents in both urban and rural regions. Probit regression model was used to investigate the factors affecting income of the people. The estimated results showed that more than two-third of the respondents had experienced shocks in their income level.

Kumar and Abdin (2021) highlighted the impact of Covid-19 pandemic on income level of the people in India. Mail questionnaire was used and the data were collected from 175 respondents. The study found that 38% of respondents had recorded reduction in their income by more than 40%. Another 14% and 13% noticed reduction in their income from 20-30% and from 30-40% respectively. However, 27% of respondents reported no change in their income during Covid-19 pandemic.

Nilsson (2022) estimated the effect of Covid-19 pandemic on households' income in Sweden. Panel data were collected from Sweden's municipalities. A difference-in difference approach was applied to examine the effect of Covid-19 on income of households and various household size and age groups. In the study, ordinary least square method was used for empirical results. The estimated results found negative and statistically significant relationship of Covid-19 with income of the households. The results found that Covid-19 pandemic has significantly decreased income of the households by almost 58% in age group of 30-49 years. A significant drop of 37% had observed in the income level of households living without children. However, no statistically significant reduction was noticed in the income of women with or without children, and men with or without children.

Pinkovetskaia (2022) studied the effect of Covid-19 pandemic on income level of the household in 43 countries. Methodological approach was used to examine the effect of Covid-19 on income of the household in modern national economies. The estimated results indicated that 53% of households had reported decline in their income, however, the income level of more than 40% of households was not significantly affected, and less than 4% households reported increase in their income during the pandemic of Covid-19.

Concluding remarks and research gap

From above discussion it is concluded that Covid-19 pandemic has affected income of the people worldwide including Pakistan. District Dir Lower has also hit hard by Covid-19

pandemic. Covid-19 is global pandemic which engulfed economic conditions of the entire country and more worst the area where majority of the people are poor and mainly depend on daily wages for their livelihood. Knowing the effect of Covid-19 in such scenario has never been investigated in district Dir Lower and it has been neglected by researchers in the past. The above mentioned studies lack several important economic aspects including income effect of Covid-19. To the best of our knowledge, there exists no empirical study related to examine the effect of Covid-19 on income of the people in district Dir Lower. The present study, therefore, goes forward and tries to fulfill the research gap based on empirical evidence from local population.

Materials and Methods

The present study was conducted in district Dir Lower KP, Pakistan. District Dir Lower is located in the North and Western part of KP province. It shares borders with district Swat on its East, district Bajaur on its West, district Dir Upper on its North and district Malakand on its South. According to Government of Pakistan (2017), district Dir Lower has a total land area of 1583 square kilometer, which is about 1.56% of the total area of KP. It has a total population of about 1.44 million which consists 51% of female and 49% of male, having a population density of 907.19 persons per square kilometer. Agriculture, services, businesses and foreign remittances etc. are the major sources of income of the people in district Dir Lower.

Sampling technique and sample size

Multistage sample technique was applied for sample selection in the research area. In first stage, district Dir Lower was randomly selected from 36 districts in KP. In second stage, four tehsils namely Adenzai, Balambat, Khall and Timergara were randomly selected. In third stage, two Village Councils (VCs) were randomly selected from each selected tehsils. VCs Badwan Bala and Tendodog were selected from tehsil Adenzai, VCs Hajiabad and Odigram were selected from tehsil Balambat, VCs Khall and Toormang were selected from tehsil Khall and from tehsil Timergara, VCs Amlook Dara and Nasafa were selected. Yamane formula and proportional allocation technique were applied to select 378 households from a total of 7112 households. The required sample size was obtained by using Yamane's formula as given in equation 3.1 as under.

$$n = \frac{N}{1 + N(e)^2} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.1$$

Where, n = Total sample size

N = Total population

e = Margin of error (5%)

By substituting the values in equation 3.1, the required sample size has determined as under.

$$n = \frac{7112}{1 + 7112 \times (0.05)^2} = 379$$

To determine sample size for each VC, proportional allocation technique is given as under.

$$ni = \frac{Ni}{N} \times n \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.2$$

Where, n_i = Required sample size in each VC

N_i = Total number of households in each VC

N = Total population (Total households)

n = Total sample size

By putting the values in equation 3.2, the following sample size has determined for each VC.

n_1 = 1372/7112×379 = 73 (VC Badwan Bala)

n_2 = 957/7122×379 = 51 (VC Tendodog)

n_3 = 1034/7122×379 = 55 (VC Hajiabad)

n_4 = 799/7122×379 = 42 (VC Odigram)

n_5 = 806/7122×379 = 43 (VC Khall)

n_6 = 456/7122×379 = 24 (VC Toormang)

n_7 = 751/7122×379 = 40 (VC Amlook Dara)

n_8 = 937/7112×379 = 50 (VC Nasafa)

The detail of sample size for each VC is given in the Table 1 as under.

Table 1: VC wise distribution of sample size in the study area

VC (s)	Total households	Sample size
Badwan Bala	1372	$n_1 = 73$
Tendodog	957	$n_2 = 51$
Hajiabad	1034	$n_3 = 55$
Odigram	799	$n_4 = 42$
Khall	806	$n_5 = 43$
Toormang	456	$n_6 = 24$
Amlook Dara	751	$n_7 = 40$
Nasafa	937	$n_8 = 50$
Total	7112	$n_i = 378$

Sources: Government of Pakistan, 2017 and own calculation

Data source and data collection tool

The present study is based on primary data which were collected from sampled households in the research area. Sampled households are the primary source for data collection. Cross sectional data were collected during Covid-19 from April, 2020 to May, 2021. A pre-tested semi-structured questionnaire and personal interview were used to collect the data from households' heads (respondents).

Data analysis

The collected data from the sampled households were analysed through SPSS. Both descriptive and inferential statistics were applied in the study. In descriptive statistics, simple frequencies and percentages were calculated. In inferential statistics, multiple linear regression model was applied to investigate the effect of Covid-19 on income of the people. The multiple linear regression model is presented as under

$$LogY = \beta_0 + \beta_1 \log X_1 + \beta_2 Log X_2 + \beta_3 \log X_3 + \beta_4 D_1 + \beta_5 D_2 + \beta_6 D_3 + \varepsilon \ldots\ldots\ldots\ldots\ldots (3.3)$$

Where;

Y	=	Annual income of households (PKR).
X_1	=	Age of household head (Years)
X_2	=	Household size (No. of persons)
X_3	=	Land size (Jerib)
D_1	=	Dummy for literacy status (1= literate household head and 0 otherwise)
D_2	=	Dummy for marital status (1= married household head and 0 otherwise)
D_3	=	Dummy for household (1= Covid-19 affected and 0 otherwise)
β_0	=	Intercept of the model
$\beta_{1...}\beta_6$	=	Coefficients of the model
ε	=	error term

Hypotheses

The following hypotheses were formulated to investigate the effect of Covid-19 on income of the people in district Dir Lower.

H_0: The Covid-19 has no significant effect on income of the people in research area.

H_1: The Covid-19 has a significant effect on income of the people in research area.

Results and Discussion

Age of respondents

The results in figure 2 indicate that 58.2% of the respondents were in the age between 41-60 years, followed by 34.9% in age 20-40 years and 6.9% in the age above 60 years. In age group of 41-60 years, Nasafa was the leading VC with 9.8%, followed by Badwan Bala with 9.5%, Tendodog with 9.0%, Hajiabad with 7.9%, Khall with 6.9%, Odigram with 6.1%, Amlook Dara with 5.3% and Toormang with 3.7%. In age between 20-40 years, Badwan Bala was the leading VC with 8.2%, followed by Hajiabad with 5.3%, Khall with 4.5%, Amlook Dara and Tendodog with 4.2% each, Odigram with 3.7%, Nasafa with 2.6% and Toormang with 2.1%. Of age group of 60 and above years, the highest number of respondents was recorded in VC Badwan Bala 1.6%, followed by both Hajiabad and Odigram 1.3% separately, Amlook Dara 1.1%, Nasafa 0.8%, Toormang 0.5% and Tendodog 0.3%.

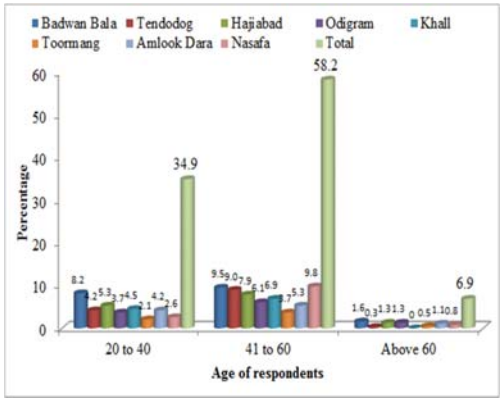


Figure 2: VC wise distribution of respondents by age in the study area

Literacy status of respondents

The results in figure 3 highlight that 86.5% of the respondents were literate while only 13.5% were illiterate. In literate group, 16.7% was the maximum number of respondents in VC Badwan Bala while 6.1% was the minimum share in Toormang. The next major share of respondents was 11.4% in Tendodog, followed by 11.1% in Hajiabad, 10.8% in Nasafa, 10.6% in Odigram, 10.1% in Khall, 9.8% in Amlook Dara and 6.1% in Toormang. In illiterate group, 3.4% was the highest proportion of respondents in VC Hajiabad, followed by 2.6% in Badwan Bala, 2.4% in

Nasafa, 2.1% in Tendodog, 1.3% in Khall, 0.8% in Amlook Dara, 0.5% in Odigram and 0.3% in Toormang.

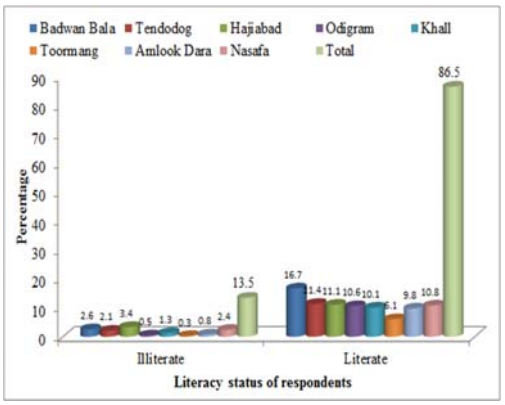


Figure 3: VC wise distribution of respondents by literacy status in the study area

Marital status of respondents

Figure 4 shows that 86% of the respondents were married while only 14% were single. Out of married, the highest number of respondents was 15.6% in VC Badwan Bala, followed by 13.4% in Tendodog, 12.4% in Hajiabad, 10.5% in Nasafa, 10.3% in Odigram, 10.0% in Khall, 8.2% in Amlook Dara and 6.0% in Toormang. Out of single, the largest number of respondents was noticed 3.7% in VC Badwan Bala, followed by 2.6% in Nasafa, 2.4% in Amlook Dara, 2.1% in Hajiabad, 1.3% in Khall, 1.1% in Tendodog, 0.8% in Odigram and 0.3% in Toormang.

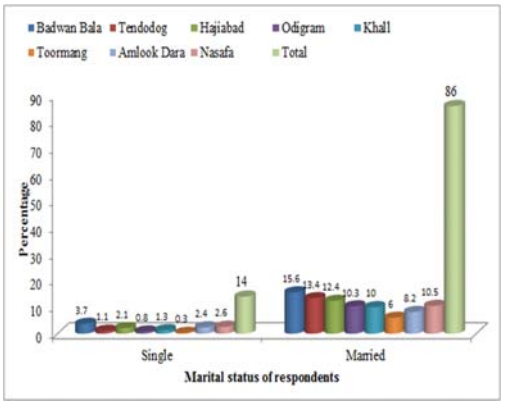


Figure 4: VC wise distribution of respondents by marital status in the study area

Household size of respondents

The results in figure 5 indicate that 43.9% of the respondents had household size ranging from 6-10 persons, 38.4% had household size above 10 persons and 17.7% had household size up to 5 persons. In household size from 5-10 persons, the highest number of respondents was recorded in VC Badwan Bala 9.5%, followed by Amlook Dara 6.6%, Tendodog 6.1%, Khall 5.6%, Nasafa 5.3%, Hajiabad 5.0%, Odigram 3.4% and Toormang 2.4%. In household size above 10 persons, the largest share of respondents was noticed in both VC Hajiabad and Nasafa 6.6% separately, followed by Badwan Bala and Odigram 6.1% each, Tendodog 5.1%, Khall 4.8%, Toormang 1.9% and Amlook Dara 1.3%. In household size up to 5 persons, the highest number of respondents was found in VC Badwan Bala 3.7%, followed by Hajiabad 2.9%, Amlook Dara 2.6%, Tendodog 2.4%, Toormang 2.1%, Odigram 1.6%, Nasafa 1.3% and Khall 1.1%.

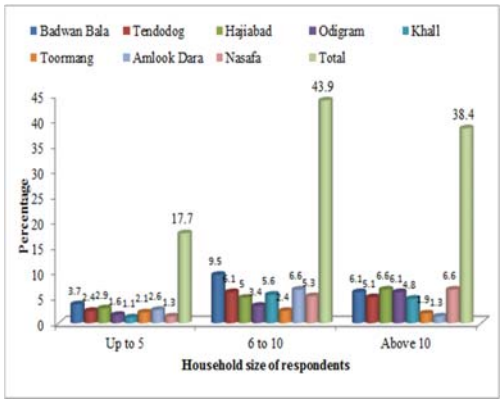


Figure 5: VC wise distribution of respondents by household size in the study area

Land size of respondents

Figure 6 shows that 52.6% of respondents had land size up to 2 jerib, 32.0% from 3-4 jerib and 15.3% more than 4 jerib. Up to 2 jerib land size, the highest number of respondents was 9.3% in VC Badwan Bala while the lowest number was 4.0% in Toormang. The next major share of respondents was 8.2% in Hajiabad, following 7.9% in Odigram, 6.9%

in Tendodog, 6.3% in Khall and 5.0% in Amlook Dara and Nasafa each. In land size from 3-4 jerib, the biggest proportion of respondents was noticed 6.1% in VC Badwan Bala while the smallest portion was 1.9% in Toormang. The next highest proportion of respondents was 5.6% in Nasafa, following 5.0% in Tendodog, 4.2% in Amlook Dara, 4.0% in Hajiabad, 3.2% in Khall and 2.1% in Odigram. In land size above 4 jerib, the maximum portion of respondents was noted in VC Badwan Bala 4.0%, following Nasafa 2.6%, Hajiabad 2.4%, Khall 1.9%, Tendodog 1.6%, Amlook Dara 1.3%, Odigram 1.1% and Toormang 0.5%.

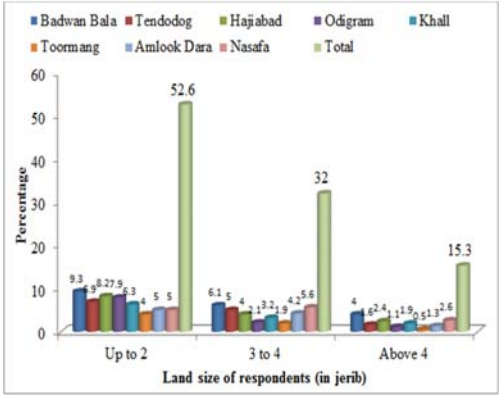


Figure 6: VC wise distribution of households by land size in study area (in Jerib*)

* 1 Jerib = 0.2 Hectare, 1 Hectare = 2.47 Acre, 1 Acre = 8 Kanal, 1 Kanal = 20 Marla (Shaukat, 2012; Jan, 2020).

Effect of Covid-19 on households

A household is said to be affected if its income was affected by Covid-19 pandemic. In this regard, the heads of sampled households were interviewed whether their income had affected by Covid-19 pandemic. The responses of respondents regarding the effect of Covid-19 on income of the households are presented in figure 7. Figure 7 presents that 76.2% of the households were not affected while 23.8% were affected by Covid-19. In affected group, majority of the households were recorded in VC Badwan Bala 14.8%, followed by Hajiabad 13.0%, Nasafa 11.9%, Odigram 10.6%, Khall 8.8%, Tendodog 7.8%, Amlook Dara 5.6% and Toormang 3.7%. Tendodog was the leading VC in not affected households with 5.8%, followed by Amlook Dara with 5.3%, Badwan Bala with 4.5%, Khall with 2.6%, Toormang with 2.1%, Hajiabad with 1.6%, Nasafa with 1.4% and Odigram with 0.5%. The results show that a considerable number of households had affected by Covid-19 pandemic. In case of any future pandemic, paid sick leave should be provided to the employees and job retention schemes should be introduced to preserve employments. The government and private sectors should provide unconditional cash support to the families that are hit hard by Covid-19 pandemic.

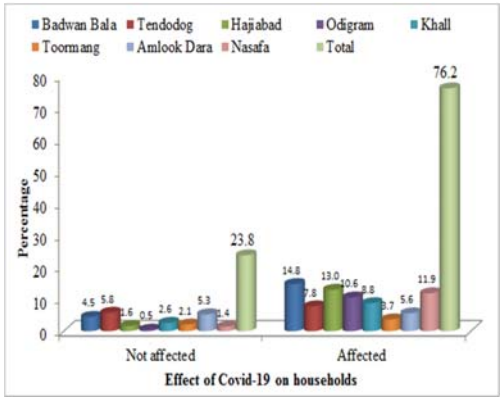


Figure 7: VC wise distribution of households by Covid-19 effect in the study area

Annual income of households

Figure 8 presents VC wise annual income of the sampled households in the study area. The results show that 42.1% of households had an annual income from PKR 0.61-1 million. In this group of income, the maximum number of households was 8.7% in VC Badwan Bala, followed by 6.6% in Hajiabad, 6.3% in Nasafa, 5.3% in Odigram, 4.8% in Tendodog, 4.5% in Amlook Dara, 3.2% in Khall and 2.6% in Toormang. The figure indicates that 37.9% of households had an annual income of PKR above 1 million. In this category, the largest proportion of households was 6.6% in VC Tendodog, followed by 6.4% in Badwan

Bala, 5.3% in Hajiabad and Nasafa each, 4.5% in Khall, 4.2% in Amlook Dara, 3.4% in Odigram and 2.1% in Toormang. According to the figure, 20.1% of households had an annual income up to PKR 0.60 million. In this group, the biggest share of households was 4.2% in VC Badwan Bala, followed by 3.7% in Khall, 2.6% in Hajiabad, 2.4% in Odigram, 2.1% in Tendodog, 1.9% in Amlook Dara, 1.6% in both Toormang and Nasafa separately.

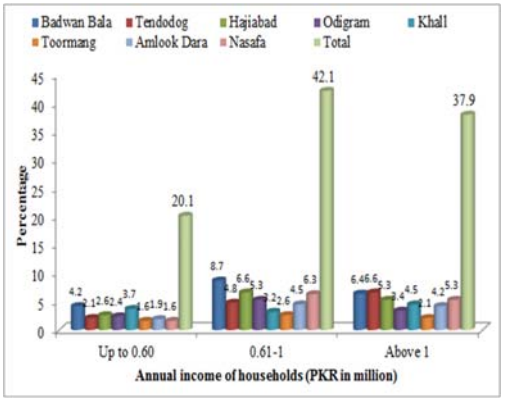


Figure 8: VC wise distribution of households by annual income in the study area (PKR in million)

Measuring effect of Covid-19 on income of households

In this section, multiple linear regression model was used to investigate the effect of Covid-19 on income of the people. In the proposed model, income of households is dependent while age, household size, land size, literacy status, marital status and Covid-19 are independent variables. Before estimation of the model, data were checked for normality. Also hetroskedasticity and multicollinearity were checked in the model.

Normality, Heteroskedasticity and Multicollinearity

Table 2 present the results of Shapiro-Wilk, Breusch-Pagan and Tolerance and VIF tests. The results in Table 2 indicate that p-value of Shapiro-Wilk was greater than alpha value of 0.05. In this scenario we do not reject the null hypothesis and accept that the data were normally distributed. According to table 2, the p-value for Chi-square test was more than the alpha value of 0.05. This means that there was no issue of hetroscedasticity in the error terms of the regression model. Table 2 indicates that the Tolerance values of all independent variables were not less than 0.10 and VIF values of all independent variables were not greater than 5. This implies that there was no issue of multicollinearity between independent variables in the model.

Table 2: Tests for normality, heteroskedasticity and multicollinearity

Dependent variable	**Shapiro-Wilk for normality**	
	Statistic	p-value
Log income	.993	.101
	Breusch-Pagan test for heteroskedasticity	
	Chi-square (1)	p-value
Log income	0.49	0.484
Independent variables	**Tolerance and VIF tests of multicollinearity**	
	Tolerance	VIF
Log age	.929	1.076
Log household size	.793	1.260
Log land size	.772	1.295

Literacy status	.954	1.048
Marital status	.911	1.098
Covid-19	.945	1.059

Effect of Covid-19 on income of households

The estimated results in Table 3 show that all variables were statistically significant except age. The coefficient of household size was 0.247 and indicated positive and statistically significant association with households' income at 0.01% significance level. This shows that 1% increase in household size would lead to increase income by 24.7%, holding all other variables constants. This outcome is similar with Ghafoor et al., (2015) findings who found that 1% increase in household size in turn increases income level of the farmers by 26.7%. Land size had statistically significant ($p<0.01$) relationship with income of households with a positive value of 0.411. This shows that 1% increase in land size in turn increases income by 41.1%, keeping all other variables constant. This outcome supports the results of Baidoo et al., (2016) who investigated that 1 unit increase in farm size in turn increases income of the household by almost 39%. The result is also similar with the findings of Ghafoor et al., (2015). They found that 1% increase in land for cultivation in turn increases income of the farmer by 31.2%. Literacy status had statistically significant ($p<0.05$) relationship with income of households with a positive value of 0.436. This implies that the income of literate-headed households increases by 43.6% than the illiterate-headed households, keeping all other variables constant. This result is similar with Van Vu (2020) study who investigated that education of household head has positive and significant effect on income level. The findings in the study indicated that household with educated heads is related with higher income level. Marital status had statistically significant ($p<0.05$) association with income of households with a positive value of 0.392. This indicates that the income of married-headed households increases by 39.2% compared to single-headed households, holding all other variables constant. The present result supports the findings of Dunga (2017) who found that married households' heads have higher income than that of unmarried, divorce and widowed. Covid-19 had negative but statistically significant ($p<0.01$) effect on income of households with a value of -0.571. This implies that in comparison with not affected households, the income of Covid-19 affected households decreases by 57.1%, holding all other variables constant. This result supports the finding of Nilsson (2022) who estimated that the income of the people having age from 30-49 has significantly declined by 58%. Also the income has significantly reduced by 37% for households living with children in Sweden. Similarly, Government of Pakistan (2020) reported 53% reduction in income of the households because of Covid-19 in Pakistan along with the highest decline in KP 64%, followed by Sindh 59% and so on.

The estimated results show that coefficient of determination (R2) was 0.543 for income of households. This implies that 54.3% of the total variation in households' income was explained by independent variables included in the model. F-statistic had value of 73.50 which was statistically significant at 0.01% of significance level. This means that the overall model is significant and fits the data better than the model with no independent variables.

Table 3: Estimated results of multiple regression model used for measuring effect of Covid-19 on income of households

Variables	Coefficient	Std. Error	t-value	p-value
Constant	1.110	.363	3.057	.002
Log age	-.007	.005	-1.581	.115
Log household size	.247	.029	8.605	.000
Log land size	.411	.037	11.237	.000
Literacy status	.436	.213	2.045	.042
Marital status	.392	.196	1.999	.046
Covid-19	-.571	.130	-4.401	.000
R-squared = 0.543 F-statistic = 73.50 p-value = 0.000				

Conclusions

The study concludes that Covid-19 pandemic affected human beings globally. Its effects were devastating on economic life of the people. Like other countries, the pandemic of Covid-19 affected the population of Pakistan. Its impact was equally felt in district Dir Lower. The current study has presented a case study regarding the effect of Covid-19 on income of the people in district Dir Lower. The results of the study found negative and statistically significant relationship of Covid-19 with income of the people. This implies that Covid-19 had significantly affected income of the people in district Dir Lower.

Based on the findings, some of the recommendations are presented as under.

In case of any future pandemic, paid sick leave should be provided and job retention schemes should be introduced to preserve employees. The government and private sectors should provide unconditional cash support to families that are hit hard by Covid-19 pandemic.

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