THE SOCIO-ECONOMIC IMPACT OF COVID-19 ON HOUSEHOLDS IN PUNJAB, PAKISTAN

Saadia Narjis [*]**, Muhammad Rizwan Yaseen, Sofia Anwar, Muhammad Sohail Amjad Makhdoom**

Department of Economics, Government College University, Faisalabad-38000, Pakistan

ABSTRACT

The COVID-19 pandemic affected the everyday life of human beings. This study investigates the impact of COVID-19 on six socio-economic dimensions (i.e., food availability, food quality, education, finance, non-payment of utility bills, and sale of assets/goods) in Punjab, Pakistan. Three districts were selected from Punjab province based on two criteria such as (a) geographical variability and (b) intensity of COVID-19. Thus, a total of 1200 respondents were interviewed via convenience sampling from selected Punjab districts (i.e., Faisalabad, Muzaffargarh, and Chakwal). Descriptive statistics showed that most respondents face the adverse socio-economic effects of COVID-19. However, the percentage of strongly agree/ agree was comparatively more for low-educated respondents, while it was comparatively less for high-educated respondents. The percentage of strongly agree/agree comparatively more for low-income respondents, while it was comparatively less for high-income respondents. The percentage of strongly agree/agree comparatively more for private job holders while it was comparatively less for public job holders. The percentage of strongly agree/agree comparatively more for urban households, while it was comparatively less for rural households. The percentage of strongly agree/agree comparatively more in Chakwal while it was comparatively less in Faisalabad. The chi-square (χ^2) independence test showed a significant role of education, family income, job type, and area of residence on the socio-economic impacts of COVID-19. Therefore, it is recommended to increase educational opportunities and educational standards. Developing a Learning Management System is also suggested to continue education in emergencies. It is recommended to increase the family income through an increase in investment and employment opportunities. The protection of private-sector employees is necessary during the pandemic situation. The government should provide interest-free loans to businesses during an emergency. The government should ensure the vaccination of citizens to control the spread and intensity of the disease. Training of doctors and paramedical staff is necessary to perform duties during the pandemic.

INTRODUCTION

The Coronavirus (COVID-19) is a contagious disease that occurred due to a novel Coronavirus (COVID-19) at the end of 2019 in Wuhan city, China. It showed rapid spread (Mishra et al., 2020) and affected about 237 countries or territories (WHO, 2022a). The world acknowledged that COVID-19 is responsible for serious challenges and affects the everyday life of humans (Mishra et al., 2020). It threatens the global economy and public health (Raza et al., 2021a). National economies experienced contraction due to business closures, particularly in developing countries (Martin et al., 2020). The world faced poverty, economic crisis, health problems, hunger, unemployment, conflicts, violation of human rights, injustice, authoritarianism, violence, and social unrest. Thus, it acted as a barrier to attaining all 17 SDGs (i.e., the 2030 agenda for global sustainability). The impact of COVID-19 on SDGs can be expressed (Khan et al., 2022) as: COVID-19 → public health threat → policy intervention (lockdown) → economic

disruption → limited financing → stoppage of sustainable development projects.

According to the International Monetary Fund (IMF), the economic loss due to COVID-19 will be $12.5 trillion by 2024 (Reuters, 2022). On December 16, 2022, confirmed cases of COVID-19 were 647,972,911 in the world. The total numbers of deaths were 6,642,832 due to COVID-19 in the world, showing a mortality rate of 1.03% (WHO, 2022b). Fig. 1 shows the trend of COVID-19 across different geographical regions. The world tried to stop virus transmission via several measures (i.e., lockdowns, social distancing, closure of educational institutions, transportation restrictions, ban on public events, and closure of non-essential business) (Ali et al., 2021). It leads to several socio-economic issues, including a reduction in employment, loss of formal education, decrease in social interaction, reduction in entertainment, and loss of support and freedom (Das et al., 2022).
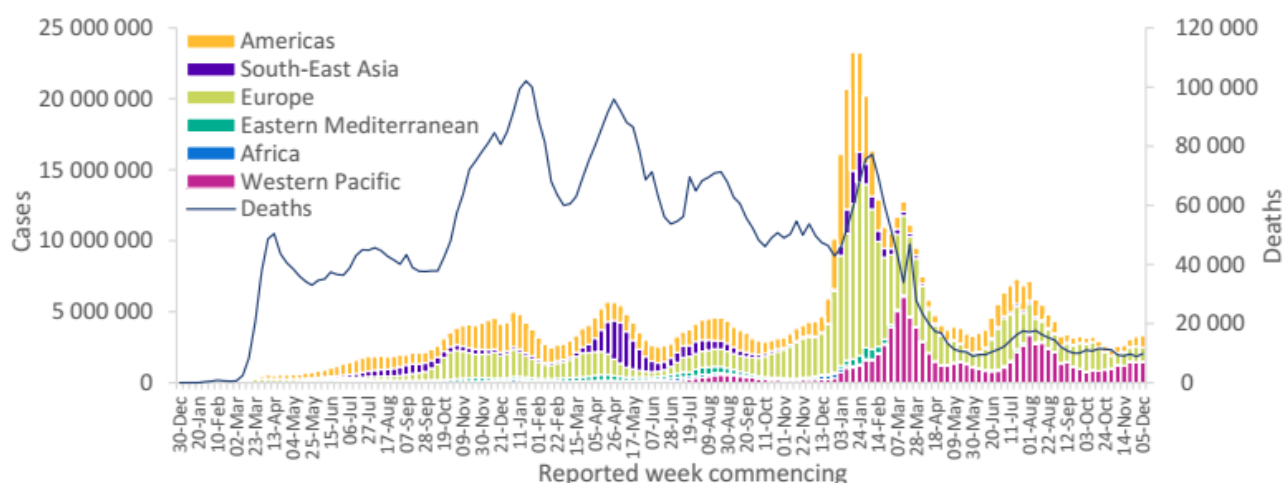
Figure 1. Trend of COVID-19 in the world as of December 17, 2022 (WHO, 2022c).

It adversely affected the business and trade sectors (Mishra et al., 2020). It also showed a destructive effect on agriculture and the food system (i.e., production, marketing, transportation, distribution, and consumption) (Rasul et al., 2021). It significantly impacted global food security, as social distancing and lockdowns disrupted the food supply, especially in vulnerable economies. However, developed economies have sufficient resources to counter food insecurity during a pandemic (Marti and Puertas, 2022).

During the pandemic, it was difficult to forecast the duration of the pandemic and the impact of the economic crisis on households due to uncertainty about "stay-at-home" instructions (Martin et al., 2020). The economic consequences of COVID-19 are evident across the world, but, South Asian economies face greater difficulties due to a weak health sector, large population, low socio-economic profile, poverty, limited access to sanitation and clean water, poor social protection, inadequate living space (Rasul et al., 2021).

In Pakistan, the first COVID-19 case was reported on February 26, 2020 (Raza et al., 2021b). So, the government imposed strict lockdowns in some parts of the country (i.e., Sindh province) to restrict mass moments. However, the government of Pakistan considered the return of out-of-city employed people to their hometowns before the lockdown (Das et al., 2022). It is a fact that "the stronger the lockdown, the greater the economic impact" (Rasul et al., 2021; Bundervoet et al., 2022). The government faced economic problems during COVID-19 and forecasted that a strict lockdown might lead to the job loss of 18.5 million people. Therefore, the Government of Pakistan thought against complete lockdown due to the socioeconomic profile of the country (Das et al., 2022). Moreover, Pakistan's healthcare system is fragile, as one hospital bed is available for about 1,680 people. Initially, testing was very low. However, it was increased due to an increase in infection rate (GOP, 2020a).

Due to COVID-19, economic growth contracted to (-) 0.47% in Pakistan in 2019-20, while it was 1.9% in 2018-19 (GOP, 2020a). The imposition of nationwide lockdown has stopped most nonagricultural economic activities, potentially adversely affecting food supply chains. Therefore, different community sectors faced food shortages at home and a reduced supply of food items in the markets (Yamano et al., 2020). Thus, COVID-19 showed significant negative impacts on the food system in Pakistan (Shahzad et al., 2021). Approximately 10% of households reported severe food insecurity during COVID-19, while it was 3% in 2018-19. Similarly, 30% of households reported moderate food insecurity during COVID-19, while 13% in 2018-19. The government of Pakistan reported that 20.63 million (i.e., 37% of the working population) lost their jobs due to the lockdown. Approximately 6.7 million population (i.e., 12% of the working population) faced a drop in income (GOP, 2020b). Some badly affected segments of society were daily wagers (like construction workers), casual workers, and people involved in non-agricultural activities (like street vendors, shopkeepers, and taxi drivers) (GOP, 2020b). Overall, it compounded long-run challenges, particularly in the services and industrial sectors. To facilitate the poor, the government initiated the "Ehsaas Emergency Cash Programme' and distributed Rs. 179.3 billion has been disbursed to 14.8 million families approximately. Thus, the World Bank ranked this initiative among the top 4 social protection schemes across the globe. The government of Punjab started the Sehat Insaf Card Programme to give health insurance to 30 million families by December 2021 (GOP, 2020a). The economy recovered from the pandemic by showing a 5.97 percent real GDP growth rate in the fiscal year 2022. However, it is unsustainable and has resulted in macroeconomic imbalances (GOP, 2022a).

The education sector was closed during the pandemic to control the spread of the virus via physical and social distancing. It directly affected 42 million students from pre-primary to degree levels. Further, it becomes difficult for low-income private schools to pay salaries to the teachers. All these circumstances exacerbate risks to the education system, particularly in urban slums and rural areas (GOP, 2020a). On December 17, 2022 (Fig. 2), the confirmed cases of COVID-19 were 1,575,486, with 1,544,190 recovered patients and 30,635 deaths, showing a mortality rate of 1.95% (GOP, 2022b).

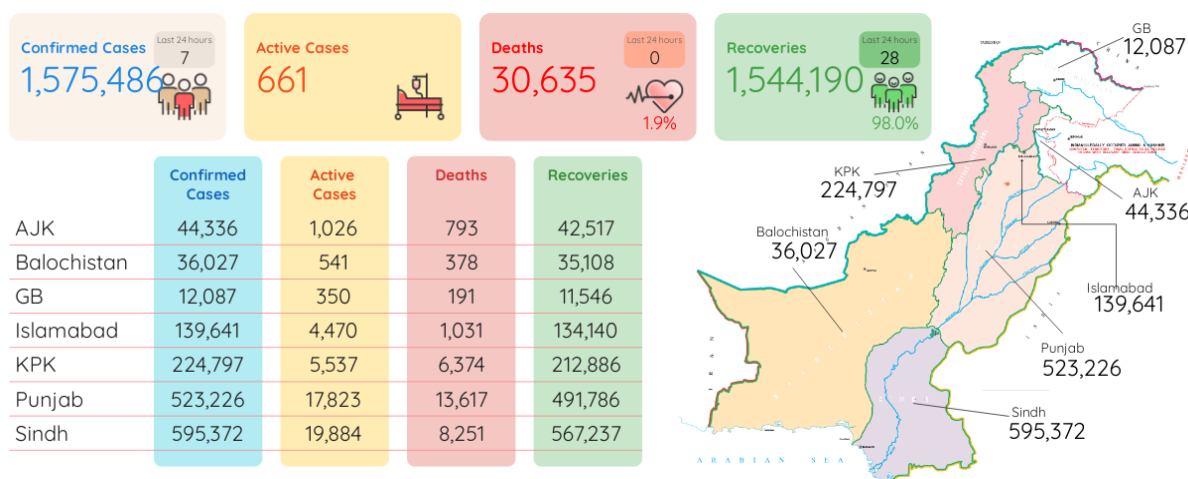|	Confirmed Cases	Active Cases	Deaths	Recoveries
AJK	44,336	1,026	793	42,517
Balochistan	36,027	541	378	35,108
GB	12,087	350	191	11,546
Islamabad	139,641	4,470	1,031	134,140
KPK	224,797	5,537	6,374	212,886
Punjab	523,226	17,823	13,617	491,786
Sindh	595,372	19,884	8,251	567,237

Figure 2. Statistics of COVID-19 in Pakistan, on December 17, 2022 (GOP, 2022b).

Many studies reported the socio-economic consequences of COVID-19 across the globe. Haleem et al. (2020) reported the adverse effect of COVID-19 on daily routines and the global economy due to a drop in manufacturing activities, deterioration of supply chains, closure of domestic and global businesses, drop in cash flow, and reduction in revenue. Additionally, it leads to social consequences like an increase in stress; social distancing with family and friends; cancellation of sports and entertainment events; reduction in the celebration of religious, cultural, and festive events; closure of restaurants, hotels, swimming pools, entertainment places, gymnasiums, and sports clubs. Martin et al. (2020) used a microeconomic model to evaluate the socioeconomic effect of COVID-19 on individuals. They estimated the effect of distancing on income, consumption, savings, and poverty in San Francisco Bay, United States. Results showed a temporary rise in the poverty rate from 17.1% to 25.9% without social protection, and low-income people would face more problems. The intensity of the economic effects is heterogeneous spatially. Mishra et al. (2020) confirmed a significant drop in income, an increase in unemployment, and distractions in the amenities, transportation, and industry due to COVID-19. Therefore, preventive measures are essential to control infection spread, which would save human lives and tackle the economic crisis. Using literature, they studied the science correspondence, social setting, public interests, stress, initiative, and coping in pre-and post-COVID-19 settings.

Ozili et al. (2020) revealed the socio-economic consequences of COVID-19 in Africa. Results confirmed that the effects of the pandemic were severe in African regions. Social distancing is responsible for reducing economic activities and the contraction of social interactions. Results showed a significant effect on the economic and social well-being of people. It also leads to social anxiety among households in the region. Ozili and Arun (2020) also reported economic problems due to monetary policy measures, lockdown days, and global travel restrictions. Janssens et al. (2021) examined the effect of COVID-19 on poor households in Kenya. Results showed a reduction in income from work (one-third) and a reduction in income from remittances and gifts (i.e., more than one-third). Low-income households gave out fewer remittances and gifts, postponed loan repayments, and lent less money. A drop in

educational and transportation expenditures was reported by low-income households due to the closure of educational institutes and travel restrictions. However, households managed the food budget at par, but at the expense of a drop in social support and informal risk-sharing between households. Rasul et al. (2021) described that COVID-19 leads to compromised economic growth, monetary burden, fiscal deficit, macroeconomic instability, remittance loss, drop in tourism-related income, and dwindling industries and businesses. All these socio-economic consequences lead to poverty, unemployment, food insecurity, and hunger. It disturbs social harmony, turbulence, and tension without appropriate mitigation measures and reinforces inequalities. Therefore, it is forecasted that the socioeconomic costs of COVID-19 will be significant and long-lasting in the South Asian region.

Shahzad et al. (2021) reported a significant increase in food insecurity due to the pandemic in Punjab, Pakistan. Food insecurity was more for households with large family sizes, while food insecurity decreased due to the provision of financial assistance. Recently, Bundervoet et al. (2022) revealed the short-term consequences of the pandemic on households in 31 developing economies, which have a 1.4 billion total population. Results showed a drop in income (65% households), stop working (36% households), and discontinuation of children's school learning (30% households). Thus, adverse economic impacts lead to food insecurity at the household level, particularly in the vulnerable population. Warraich (2022) described the socio-economic issues of COVID-19 in Pakistan. The fear among individuals had increased due to job loss, financial uncertainty, and scarcity of vaccines. Results showed that COVID-19 disturbed every dimension of human life.

Although several studies reported the socioeconomic impacts of COVID-19 across the world, most evidence comes from developed countries. Therefore, the literature is limited on the effects of COVID-19 at the household level in low-income countries (Janssens et al., 2021). Due to limited studies on the impact of COVID-19 on households, this study extended the literature by (a) investigating the impact of COVID-19 on food availability, food quality, education, finance, utility bills, and assets, and (b) examining the impact of education, job type,

family income, urban/rural area, and district of residence on the behavior of households. In light of the above discussion, it has been concluded that COVID-19 seriously impacts households in developing countries like Pakistan. However, the Government of Pakistan (GOP, 2020a) reported that survey data is limited to validate the adverse effects of COVID-19 on households. Similarly, Janssens et al. (2021) reported that few studies examined the effects of COVID-19 at the household level in low-income countries.

Therefore, this study makes a significant contribution to the literature. First, this study reveals the impact of COVID-19 on six socio-economic dimensions (i.e., food availability, food quality, education, finance, utility bills, and assets/goods). Second, this study examines the influence of five demographic indicators (i.e., education, job type, family income, urban/rural area, and district of residence) on socio-economic behavior during the pandemic. All these dimensions are relevant to policymakers aiming to maintain a balance between the socioeconomic well-being of households and controlling the spread of COVID-19. Third, this study used a large sample, comprising 1200 respondents from the Punjab province, to make reliable inferences.

METHODOLOGY
Theoretical Framework

The pandemic is an aggregate shock to the economy, which in turn significantly affects individuals' and households' welfare via multiple channels (Figure 3). First, labor income is likely to be reduced due to potential supply shocks, a decrease in aggregate demand, and an increase in unemployment. These impacts are greater on those people who are engaged in vulnerable sectors (i.e., tourism and services). Income-reduction impact is evident in society due to the direct health impact on individuals. Second, an adverse impact is likely to be reported on non-labor income due to a reduction in domestic private transfers and remittances. However, it may increase due to government assistance and public transfers. Third, market disruptions could lead to inflation and/or rationing of the utilization of necessary goods. Fourth, service delivery sectors (i.e., education and health) experienced disruptions, which are likely to create serious long-term impacts on the future well-being of households. Fifth, the income losses can rapidly be transferred to the loss of productive assets, which will be difficult to rebuild (Bundervoet et al., 2022). Sixth, disruption of the food supply chain is likely to restrict population access to nutritious and sufficient food, particularly in virus-affected areas (GOP, 2020a).

Study Area and Sampling Procedure

This research is performed in Punjab, the most populated province of Pakistan (Fig. 4). Punjab is situated at $30^000'$ N and $70^000'$ E in a semiarid region and low land zone (Abbas et al., 2022), has a 110 million population in 2017. It is the second largest province, having a 205,345 square kilometer area, after Baluchistan province (Hussain et al., 2021). This province significantly contributes to the economy and agriculture–– about 54% of the country's GDP and 62% of national agriculture (Abbas et al., 2022). It is located at the center of the country, having seven main airports and most economic

activities (Saeed et al., 2021). In Pakistan (Fig. 1), Sindh province has the highest number of COVID-19 cases (~37.79%), followed by Punjab province (~33.21%). However, Punjab province has the highest number of COVID-19 deaths (~44.45%), followed by Sindh province (~26.93%). Thus, it was more vulnerable to COVID-19 (Shahzad et al., 2021). The greater human loss in Punjab province implies that Punjab province is likely to experience greater socio-economic loss.
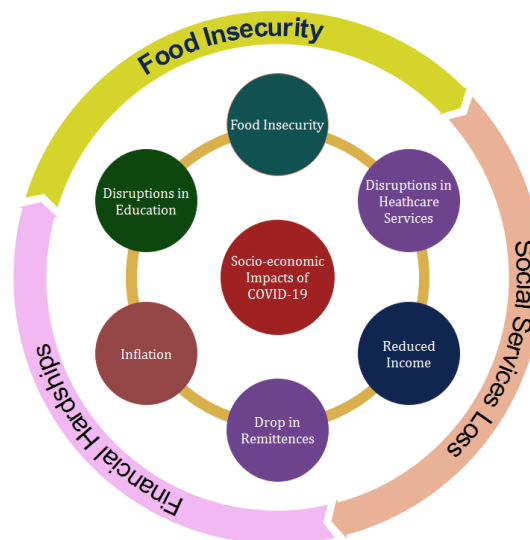

Figure 3. Socio-economic impacts of COVID-19 (author's work).

This province has 36 districts (Fig. 4), with a total area of 205,345 km2 (Irfan et al., 2022). It is difficult to collect primary data from all districts of Punjab due to time and financial constraints. Therefore, three districts were selected from Punjab province based on two criteria such as (a) geographical variability and (b) intensity of COVID-19.

Criteria 1: All 36 districts of Punjab were divided into three categories based on geographical variability. Thus, three main regions of Punjab province are (a) Northern Punjab––situated at 350 to 900 meters above sea level, (b) Central Punjab–– mostly plains situated at less than 350 meters above sea level and (c) South Punjab––Thal desert and mixed typologies of both plains and Thal (Bashir et al., 2012; Yousaf et al., 2018).

Criteria 2: All 36 districts of Punjab were divided into three categories based on the total confirmed cases of COVID-19. Table 1 shows three categories of districts in Punjab such as (a) Districts with High Risk (i.e., more than 5000 cases), (b) Districts with Medium Risk (i.e., more than 3000 and less than 5000 cases), and (c) Districts with Low Risk (i.e., less than 3000 cases). The Government of Punjab (2022) also categorized districts in terms of vulnerability against floods, such as districts with high risk, districts with medium risk, and districts with low risk.

Therefore, three districts were selected from each category. Faisalabad district, situated in Central Punjab, was selected from high-risk districts (28208 confirmed cases). Muzaffargarh district, situated in South Punjab, was selected from medium-risk districts (3145 confirmed cases). Chakwal district, situated in North Punjab, was selected from low-risk districts (1992 confirmed cases) (PDMA, 2022).

Figure 4. Districts of Punjab province.

Table 1. District-wise COVID-19 confirmed cases (as on February 14, 2022).

Districts with High Risk*	Districts with Medium Risk**	Districts with Low Risk***
Lahore	Sahiwal	Bhakkar
Rawalpindi	T.T.Singh	Chiniot
Faisalabad	Okara	Khushab
Multan	Jhang	Pakpattan
Sargodha	Vehari	Hafizabad
Gujranwala	Kasur	Mandi Bahuddin
Bahawalpur	Jehlum	Bahawalnagar
Sialkot	Muzaffargarh	Layyah
Rahimyar Khan	Mianwali	Chakwal
Gujrat	Nankana Sahib	Lodhran
D.G.khan	Khanewal	Attock
Sheikhupura	-	Rajanpur
-	-	Narowal

Note: *COVID-19 cases>5000; **3000<COVID-19 cases<5000; ***COVID-19 cases<3000.

Sampling Technique and Data Collection

This study used primary data collected through a convenience sampling technique. It is a non-probability sampling technique and involves respondents who are "convenient" to the researcher (Galloway, 2005). It is a commonly used method due to several advantages such as (a) it is a money and time-saving procedure as compared to random sampling (Speak et al., 2018), (b) it is not required to list all the population elements (Acharya et al., 2013). So, this study used convenience sampling to explore the socio-economic impact of COVID-19 on households in Punjab province, Pakistan. A household normally consists of persons who share a housing unit or part of a housing unit and share food and other essentials for a living (Willekens, 2010). Each household is asked about the socio-economic impacts of COVID-19, considering several dimensions. The data were collected from March 1, 2022, to June 30, 2022, using a well-structured questionnaire, which was pre-tested to ensure relevant information. There were different challenges in collecting data, such as traveling, language barriers, and the reluctant behavior of respondents.

Sample Size

The people of three selected districts of Punjab were the target population. Census 2017 reported that the total population was 7882444 (Faisalabad district), 4328549 (Muzaffargarh district), and 1495463 (Chakwal district) (GOP, 2022c). It is not possible to collect primary data from the entire population. Therefore, the sample size was calculated using Cochran's (Cochran, 1977) formula, which is suitable for a large population (Shahzad et al., 2021):

$$N = \frac{Z^2 pq}{e^2} \tag{1}$$

Where N is the required sample size; Z is the abscissa of the normal curve that cuts off an area α at the tail; e is the desired precision level; p is the estimated proportion of an attribute, and q = 1−p by assuming p=0.5 (maximum variability) as the desired confidence interval. By assuming precision level (i.e., 5%), and Z value (i.e., 1.96), the formula becomes (Shahzad et al., 2021):

$$N = \frac{(1.96)^2(0.5)(0.5)}{(0.05)^2} \tag{2}$$

$$N = \frac{0.9604}{0.0025} = 384.16 \tag{3}$$

The estimated sample size was 384 for this study, which was increased to 400 from each district for better results. Respondents were also briefed that these data were collected only for academic purposes and that their data would be kept safe and secure. Respondents were asked about their demographic indicators (i.e., age, education, district, residential area, job type, and family income). Shahzad et al. (2021) reported that socioeconomic factors and demographic characteristics of households could influence food insecurity. The rating system of the Likert scale (Likert, 1932; Louviere et al., 1999) was applied to structure answers in an ordered scale (Campisi et al., 2020). Thus, respondents were asked to respond to pandemic-related questions on a five-point Likert scale, indicating 5 for strongly agree, 4 for agree, 3 for uncertain, 2 for disagree, and 1 for strongly disagree. Likert scales are beneficial in social science research and are reliable instruments to measure self-efficacy (Croasmun and Ostrom, 2011). Likert-scale questionnaires have several advantages, such as (a) rapid data collection from a large number of respondents, (b) provision of reliable person ability estimates, (c) valid interpretations of data through multiple ways, and (d) enabling a researcher to handle (contrast, compare, combine) data with qualitative data techniques (Nemoto and Beglar, 2014).

Assessment of Socio-Economic Impacts on Households
This study showed the socio-economic impact of COVID-19 using six indicators: (a) Food loss, whether the household faced a reduction in food intake quantity during the COVID-19?; (b) Low-quality food, whether the household switched to cheaper/lower quality food during the COVID-19?; (c) Loans, whether the household received loans from informal or formal sources due to financial hardships during the COVID-19?; (d) Education, whether the household faced a discontinuation of children education due to non-payment of monthly fee during the COVID-19?; (e) Utility bills, whether the household faced non-payment of utility bills during the COVID-19?; and (f) whether the household sold assets/goods during the COVID-19?

Food
Initially, COVID-19 was observed during the planting and harvesting season. It disturbed agricultural sub-sectors (i.e., vegetables, fruits, dairy, and poultry) (Rasul et al., 2021). Lockdowns and border closures adversely impacted the agriculture value chain (GOP, 2020a). All these jointly lead to a drop in farm produce and farm products (GOP, 2020a). The adverse impacts of COVID-19 (i.e., job loss and income reduction) lead to food insecurity at the household level (Bundervoet et al., 2022). Thus, the community faced food shortages at home and a reduced supply of food items in the markets (Yamano et al., 2020).

Education
This pandemic is responsible for the closure of educational institutes, thus, significantly affecting the educational sector. Teachers and students lose their formal education and are switched to an online teaching system, which is difficult to adopt, especially in developing economies. Additionally, access to internet services is not available to all teachers, students, and their families, which creates difficulty in continuing educational activities. It further leads to educational inequality because those who are not equipped with technology cannot continue their education (Das et al., 2022). Students faced the burden of educational loans, poor connectivity, electricity, and technological issues (Lahiri and Sinha, 2021).

Financial Hardships
Households may face financial hardships during COVID-19, especially in developing countries. Due to these circumstances, households may experience several challenges, such as:
Loans: Poor households living at subsistence levels experienced financial problems because they were not able to sustain their livelihood without any informal or formal savings during the lockdown. Daily wage earners (i.e., those engaged in construction, agriculture, and casual labor) lost their income and are not able to adopt 'work from home' (Gupta et al., 2020). Zhang et al. (2020) reported the adverse effect of COVID-19 on financial markets across the globe, which created an unprecedented risk in the financial sector. Non-Payment of Utility Bills: According to the World Bank, about 11 million people could move below the poverty line in Asian countries. It has been reported that 49 million people will move into extreme poverty (i.e., less than $1.90/day) in 2020 (Buheji et al., 2020; Martin et al., 2020). Karpman et al. (2020) reported that about 31% of individuals claimed their families could not pay utility bills and rent during COVID-19 in the United States. Gonzalez et al. (2020) mentioned that 19.7% of households did not pay electricity, oil, and gas bills.
Assets/Goods Sold: Due to COVID-19, households experience income or job loss, which was responsible for the reduction in savings and assets. Households met their expenditures by drawing their saving, selling assets, and taking loans (Agarwal, 2021). Investors feel panic during COVID-19, and they unwisely sell their financial assets (Ghorbel and Jeribi, 2021). Several studies (Rosenzweig and Wolpin, 1993; Nguyen et al., 2019) reported that households sold their productive assets to maintain consumption during shocks.

Econometric Technique
A Chi-square (χ^2) test checks the significant difference between expected and observed frequencies. It uses qualitative data (Lewis and Burke, 1949; McHugh, 2013; Ugurlu et al., 2020). Literature showed three types of χ^2 tests such as (a) good fit test, (b) homogeneity test, and (c) independence test. However, selecting a suitable test depends on the requirements and data characteristics. For this study, χ^2 The independence test is suitable because it explores the statistically significant association between two variables (Sirkin, 2006; Ugurlu et al., 2020). It is a nonparametric test that explores the association between two events (Williamson et al., 2022). A major advantage of this test is that it can be applied to numerical and nominal data (Burns and Dobson, 1981; Sirkin, 2006; Ugurlu et al., 2020). For two variables, χ2 assesses the deviation between observed and expected count, expressed as (Williamson et al., 2022):

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i} \qquad (4)$$

Where c shows the degree of freedom, E is the expected value, and O is the observed value. The χ^2 independence test used the following general hypotheses (Burns and Dobson, 1981; McHugh, 2013; Ugurlu et al., 2020):

H_0: There is no significant association between the two variables (or two variables are independent of each other).

H_1: There is a significant association between the two variables (or two variables are dependent on each other).

Thus, we applied χ2 test of independence to examine the difference between expected and observed frequencies for the socioeconomic and demographic attributes.

RESULTS AND DISCUSSION

Table 2 shows several demographic indicators of respondents in the Punjab province of Pakistan. A total of 1200 respondents were physically interviewed from three selected districts of Punjab. Therefore, 400 respondents (33.3%) were taken from each selected district. Respondents were categorized into 5 age groups, which shows that 42.1% of respondents (maximum) had less than 30 years of age. So, the maximum number of respondents were youth in the study area. However, a minimum (2.6%) of respondents had more than 60 years of age. Respondents were interviewed about their education, which indicates that 32.1% of respondents had a master's or above education level, followed by graduation (19.8%), matriculation (18.1%), intermediate (17.1%), and middle (7.6%). It implies that a significant proportion of respondents had higher qualifications, while only 5.3% of respondents had primary or below education. Most of the interviewed respondents were male (85.5%), while only 14.5% of respondents were female. Female respondents were fewer because they were reluctant to be interviewed due to several social issues. Generally, family earnings are the responsibility of males in Pakistan. Thus, male respondents were higher in this study. Results also show that most of the respondents were engaged in a private job/business (63.8%), while only 36.3% of respondents had a public-sector job. Respondents were asked about their residential area, revealing that 56.3% of respondents belonged to rural areas while 43.7% were living in urban areas. Family income is an important indicator that shows the financial status of households. A satisfactory level of family income is essential to increase resilience against adverse shocks. Therefore, respondents were categorized into six income groups with respect to their monthly family income such as group-1 (less than Rs. 25000), group-2 (Rs. 25000-50000), group-3 (Rs. 50001-75000), group-4 (Rs. 75001-100000), group-5 (Rs. 100001-150000), and group-6 (more than Rs. 150001). Table 2 shows that 34.8% of respondents belonged to group 2, followed by 21.5% (group 3) and 18.6% (group 4). It shows that the maximum number of respondents belonged to the middle-class income group.

Table 2. Demographic indicators of participants (N=1200).

Characteristics	N	%	Characteristics	N	%
Age (years)			*Gender*		
30 or less	505	42.1	Male	1026	85.5
31-40	284	23.7	Female	174	14.5
41-50	237	19.8	*Education Level*		
51-60	143	11.9	Primary or below	64	5.3
Above 60	31	2.6	Middle	91	7.6
Family Income (Rs.)			Matriculation	217	18.1
Less than 25000	118	9.8	Intermediate	205	17.1
25001-50000	417	34.8	Graduation	238	19.8
50001-75000	258	21.5	Master or Above	385	32.1
75001-100000	223	18.6	*Job Type*		
100001-150000	97	8.1	Public	435	36.3
More than 150000	87	7.3	Private	765	63.8
District			*Residential Area*		
Faisalabad	400	33.3	Urban	524	43.7
Muzaffargarh	400	33.3	Rural	676	56.3
Chakwal	400	33.3	--		

Table 3. Question-wise response (percentage) (N=1200).

Questions	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
Q1: The quantity of food intake is reduced during the pandemic.	9.6	14.3	7.4	16.2	52.5
Q2: The households switched to lower quality or cheaper food during the pandemic.	6.9	13.4	7.3	15.6	56.8
Q3: There is an increase in loans from formal or informal sources during the pandemic.	9.5	14.4	13.8	16.4	45.8
Q4: There is a discontinuation of children's education due to financial problems.	8.2	11.3	11.3	18.2	51.1
Q5: There is non-payment of utility bills due to financial problems.	8.4	12.8	10.8	19.0	49.0
Q6: The households sold assets/goods during the pandemic.	10.5	12.0	10.6	18.3	48.6

Table 3 shows the question-wise response of respondents (in percentage) in the study area. Answers were recorded on a five-point Likert scale. The majority of respondents strongly agree/agree that COVID-19 is responsible for reducing the quantity of food (Q1) and using low-quality food (Q2). The majority of respondents strongly agree/agree that COVID-19 is responsible for the financial hardships due to an increase in loans (Q3), discontinuation of children's education (Q4), non-payment of utility bills (Q5), and sale of assets/goods (Q6).

Table 4 shows the response to six questions regarding the effect of COVID-19 on food, education, finance, utility bills, and assets/goods. The responses were reported in terms of the education of respondents. Respondents were categorized as primary or below (64), middle (91), matriculation (217), intermediate (205), graduation (238), and master or above (385). The impact of COVID-19 on food, education, financial status, utility bills, and assets/goods was reported by all educational groups. However, the percentage of strongly agree/agree was comparatively more for low-educated respondents, while it was comparatively less for high-educated respondents. About 78.13% of primary or below respondents, 79.12% of middle respondents, and 62.34% of master or above respondents strongly agree/agree that COVID-19 is responsible for reducing food intake (Q1). For Q1, the p-value is less than 1%, which implies that the null hypothesis has been rejected. Thus, there is enough evidence to report an association between educational level and food quantity. About 76.56% of primary or below respondents, 83.52% of middle respondents, and 62.08% of master or above respondents strongly agree/agree that COVID-19 switched them to use lower quality or cheaper food (Q2). For Q2, the p-value is less than 1%, which implies that there is enough evidence to report an association between educational level and food quality. Results are in line with Inegbedion (2020), who stated that the pandemic had adverse impacts on farm labor, security, and transportation, leading to food insecurity. In Iran, Fami et al. (2021) found a positive correlation between education and food availability at the household level, thus, claiming that education is a predictor of food security in urban areas.

Table 4. Distribution of response (by education level).

Questions	Response	Primary or Below	Middle	Matriculation	Intermediate	Graduation	Master or Above	P-value
1	Strongly agree	37	59	106	119	127	182	
	Agree	13	13	36	36	38	58	
	Uncertain	4	5	24	18	18	20	0.001***
	Disagree	7	7	33	23	36	66	
	Strongly Disagree	3	7	18	9	19	59	
2	Strongly agree	39	61	125	125	146	186	
	Agree	10	15	35	38	36	53	
	Uncertain	9	5	19	16	15	23	0.001***
	Disagree	3	8	24	20	31	75	
	Strongly Disagree	3	2	14	6	10	48	
3	Strongly agree	35	48	111	102	118	136	
	Agree	13	17	31	40	30	66	
	Uncertain	8	11	30	29	36	52	0.001***
	Disagree	7	10	33	26	32	65	
	Strongly Disagree	1	5	12	8	22	66	
4	Strongly agree	41	53	121	108	126	164	
	Agree	11	16	36	38	44	73	
	Uncertain	6	12	24	22	33	38	0.001***
	Disagree	3	9	22	20	23	59	
	Strongly Disagree	3	1	14	17	12	51	
5	Strongly agree	30	51	122	103	116	166	
	Agree	18	22	36	48	41	63	
	Uncertain	4	11	23	23	32	37	0.000**
	Disagree	10	5	24	17	34	63	
	Strongly Disagree	2	2	12	14	15	56	
6	Strongly agree	30	45	111	92	122	183	
	Agree	14	28	34	45	38	61	
	Uncertain	8	4	35	25	18	37	0.002***
	Disagree	7	8	17	27	37	48	
	Strongly Disagree	5	6	20	16	23	56	

Note: ***significance at 1%, **significance at 5%, *significance at 10%.

About 75% of primary or below respondents, 71.43% of middle respondents, and 52.47% of master or above respondents strongly agree/agree that they get a loan from formal or informal sources due to COVID-19 (Q3). For Q3, the p-value is less than 1%, which implies that there is enough evidence to report an association between educational level and financial vulnerability. About 81.25% of primary or below respondents, 75.82% of middle respondents, and 61.56% of master or above respondents strongly agree/agree that the non-availability of monthly fees forced them to discontinue the education of children (Q4). For Q4, the p-value is less than 1%, which implies that there is enough evidence to report an association between educational level and the continuation of children's education. Bundervoet et al. (2022) also reported that interruptions in education were most salient for children from lower-income households with lower-educated parents and in rural areas. About 75% of primary or below respondents, 80.22% of middle respondents, and 59.18% of master or above respondents strongly agree/agree that they experienced non-payment of utility bills due to financial hardships during COVID (Q5). For Q5, the p-value is less than 1%, which implies that there is enough evidence to report an association between educational level and non-payment of utility bills. About 68.75% of primary or below respondents, 80.22% of middle respondents, and 63.38% of master or above respondents strongly agree/agree that they sold their assets/goods during COVID (Q6). For Q6, the p-value is less than 1%, which implies that there is enough evidence to report an association between education and the sale of assets/goods. Anderloni et al. (2012) found that a higher educational level can help to minimize financial fragility. Bundervoet et al. (2022) reported that youth, women, and workers without higher education faced income loss and were more likely to lose their jobs. In general, low-income respondents were casual workers and self-employed, thus, faced financial hardships during the pandemic. Arndt et al. (2020) reported that households where families possess a lower education and depend on labor income were more likely to face food shortages. So, the educational status of the household head showed a significant impact on food security, as betterment in education positively affects the ability to earn income and access to food (Mallick and Rafi, 2010; Ngema et al., 2018; Ibukun and Adebayo, 2021). In a study, Muttarak and Pothisiri (2013) stated that education positively impacts disaster preparedness because educated people have more economic resources to adopt preparedness. Education can improve an individual's cognitive skills, enabling them to assess and minimize the consequences (Menard et al., 2011). In a study, Levy et al. (2017) found that education is a preventative tool against Ebola.

Table 5 shows the response to six questions regarding the impact of COVID-19 on food, education, finance, utility bills, and assets/goods. The responses were reported in terms of monthly family income. Total respondents were categorized as group 1 (Rs. 25000 or less per month), group 2 (Rs. 25001 to Rs. 50000 per month), group 3 (Rs. 50001 to Rs. 75000 per month), group 4 (Rs. 75001 to Rs. 100000 per month), group 5 (Rs. 100001 to Rs. 150000 per month), and group 6 (Rs. 150000 or above per month). Results indicate that the impact of COVID-19 on food, education, loan-taking, utility bills, and assets/goods was reported by all income groups. However, the percentage of strongly agree/agree is comparatively more for low-income respondents and comparatively less for high-income respondents. About 69.49% of group-1 respondents, 70.50% of group-2 respondents, and 44.83% of group-6 respondents strongly agree/agree that COVID-19 is responsible for a reduction in the quantity of food intake (Q1). For Q1, the p-value is less than 1%, which shows that there is enough evidence to report an association between monthly family income and food quantity. About 76.27% of group-1 respondents, 78.42% of group-2 respondents, and 40.23% of group-6 respondents strongly agree/agree that COVID-19 switched them to use lower quality or cheaper food (Q2). For Q2, the p-value is less than 1%, which implies that there is enough evidence to report an association between monthly family income and food quality. An adverse household income impact increases food insecurity (Arndt et al., 2020). The majority of food-insecure households had low-income levels (Nord and Brent, 2002). Furness et al. (2004) reported that food insecurity is a major public health issue in low-income households in the United States. Further, an increase in household income is associated with a reduction in food insecurity, which is in line with the present study. Olielo (2013) found that low-income households could not purchase the recommended quantity of food, thus, concluded that an increase in income promotes the utilization of diverse foods. According to Carroll et al. (2020), high-income households had lower food security concerns during COVID-19. Hamadani et al. (2020) reported a 51.7% rise in the number of households that faced any kind of food insecurity during COVID-19 in Bangladesh. About 12.7% of households face food insecurity in Canada, which is associated with lower-income households (Deaton and Deaton, 2020). About 69.49% of group-1 respondents, 64.75% of group-2 respondents, and 37.93% of group-6 respondents strongly agree/agree that they get a loan from formal or informal sources due to COVID-19 (Q3). For Q3, a significant p-value implies that there is enough evidence to report an association between monthly family income and financial vulnerability. About 67.80% of group-1 respondents, 73.86% of group-2 respondents, and 42.53% of group-6 respondents strongly agree/agree that the non-availability of monthly fees forced them to discontinue children's education (Q4). For Q4, a significant p-value implies that there is enough evidence to report an association between monthly family income and discontinuation of children's education. About 64.41% of group-1 respondents, 71.94% of group-2 respondents, and 40.23% of group-6 respondents strongly agree/agree that they experienced non-payment of utility bills due to financial hardships during COVID (Q5). For Q5, the p-value is less than 1%, which implies that there is enough evidence to report an association between monthly family income and non-payment of utility bills. About 66.10% of group-1 respondents, 69.78% of group-2 respondents, and 39.08% of group-6 respondents strongly agree/agree that they sold their assets/goods during COVID (Q6). For Q6, a significant p-value implies that there is enough evidence to report an association between monthly family income and the sale of assets/goods.

Table 5. Distribution of response (by family income).

Questions	Response	25000 or less	25001-50000	50001-75000	75001-100000	100001-150000	Above 150000	P-value
1	Strongly agree	57	218	144	128	51	32	0.000***
	Agree	25	76	34	34	18	7	
	Uncertain	11	33	24	14	5	2	
	Disagree	16	55	31	24	13	33	
	Strongly Disagree	9	35	25	23	10	13	
2	Strongly agree	70	263	140	124	57	28	0.000***
	Agree	20	64	50	35	11	7	
	Uncertain	10	29	23	15	1	9	
	Disagree	13	38	30	37	13	30	
	Strongly Disagree	5	23	15	12	15	13	
3	Strongly agree	61	202	116	99	48	24	0.017**
	Agree	21	68	49	38	12	9	
	Uncertain	15	54	33	35	11	18	
	Disagree	16	55	36	33	15	18	
	Strongly Disagree	5	38	24	18	11	18	
4	Strongly agree	58	239	137	99	51	29	0.000***
	Agree	22	69	40	59	20	8	
	Uncertain	15	38	36	22	6	18	
	Disagree	11	42	27	30	9	17	
	Strongly Disagree	12	29	18	13	11	15	
5	Strongly agree	56	215	134	114	47	22	0.003**
	Agree	20	85	50	40	20	13	
	Uncertain	16	42	23	26	8	15	
	Disagree	14	48	29	27	12	23	
	Strongly Disagree	12	27	22	16	10	14	
6	Strongly agree	58	211	132	105	51	26	0.001***
	Agree	20	80	49	43	20	8	
	Uncertain	13	49	21	26	4	14	
	Disagree	15	45	32	25	9	18	
	Strongly Disagree	12	32	24	24	13	21	

Note: ***significance at 1%, **significance at 5%, *significance at 10%.

Several studies also report the association between income level and financial hardships. In a study, Carroll et al. (2020) found that COVID-19 led to financial hardships due to the closure of businesses and job loss. Adegboye et al. (2021) reported financial stress during COVID-19, particularly in low-income households. Chen et al. (2022) found that lower-middle and low-income households experienced more financial hardships during COVID-19.

Table 6 shows the response to six questions regarding the impact of COVID-19 on food, education, finance, utility bills, and assets/goods. The total respondents were 1200, whose Likert Scale responses were reported in terms of their job type, residential area, and district. Results indicate that the impact of COVID-19 on food, education, financial status, utility bills, and assets/goods were reported by the majority of respondents either (a) doing a public job or private job, (b) either living in an urban or rural area, and (c) either belongs to Faisalabad, Muzaffargarh, or Chakwal. However, the percentage of strongly agree/agree was comparatively more for private job holders while it was comparatively less for public job holders. For Q1, the p-value is less than 5%, which

implies that the null hypothesis has been rejected. Thus, there is enough evidence to report an association between job type and food quantity. For Q2, the p-value is less than 1%, which implies that there is enough evidence to report an association between job type and food quality. COVID-19 showed serious consequences on every household's food security and nutritional needs. However, marginalized and middle-income group faces serious challenges in fulfilling their food intake. The purchasing power of households decreased due to higher food prices, as the food supply chain was distorted during the lockdown (Mandal et al., 2021). For Q3, the p-value is less than 10%, which implies that there is enough evidence to report an association between job type and financial vulnerability. For Q4, the p-value is less than 1%, which implies that there is enough evidence to report an association between job type and the continuation of children's education. For Q5, the p-value is less than 5%, which implies that there is enough evidence to report an association between job type and payment of utility bills. For Q6, the p-value is less than 5%, which implies that there is enough evidence to report an association between job type and the sale of assets/goods.

Results were in line with the literature, as Djoumessi (2021) found that the socio-economic impact of COVID-19 was more on workers in private firms as compared to workers in public firms. According to Mandal et al. (2021), the majority of respondents were private-sector workers in Bangladesh. Due to the industrial shutdown, many private workers (i.e., urban day laborers and garment workers) lost their job. Thus, about 50 million people engaged in the informal job sector experienced serious consequences of COVID-19. Bilal et al. (2020) reported that the private sector experienced a large recession during the pandemic; therefore, people became jobless and moved into poverty. Nhamo et al. (2020) mentioned that about eight million private sector workers faced job loss due to the closure of restaurants and related businesses.

Similarly, the percentage of strongly agree/agree was comparatively more for urban households while it was comparatively less for rural households. For Q1, the p-value is less than 10%, which implies that the null hypothesis has been rejected. Thus, there is enough evidence to report an association between the residential area and food quantity. For Q2-Q5, the

p-value is more than 10%, which implies that there is not enough evidence to report an association between (a) residential area and food quality, (b) residential area and financial vulnerability, (c) residential area and continuation of children education, and (d) residential area and payment of utility bills. For Q6, the p-value is less than 10%, which implies that there is enough evidence to report an association between the residential area and the sale of assets/goods. The short-run distributional effects of COVID-19 are unclear ex-ante in developing economies. Most of the poor live in rural areas in developing economies, which are mainly involved in own-account agriculture. Thus, it reduces their probability of being infected due to low population density in rural areas. Further, income-reduction impacts are less because farmers are unlikely to stop working subject to a complete lockdown. Contrary to this, urban service workers have been more affected during the pandemic, thus, showing an income-reduction impact on urban service workers. However, the continuity of the pandemic may reduce farm incomes due to a decrease in urban demand, resulting from the closure of hospitality services in urban areas and a reduction in purchasing power (Bundervoet et al., 2022).

Table 6. Distribution of response (by residential area and district).

Q	Response	Job Type			Residential area			District			
		Public	Private	P-value	Rural	Urban	P-value	Faisalabad	Muzaffargarh	Chakwal	P-value
1	Strongly agree	213	417	0.034**	334	296	0.063*	202	199	229	0.032**
	Agree	64	130		117	77		60	71	63	
	Uncertain	36	53		53	36		26	39	24	
	Disagree	67	105		96	76		75	49	48	
	Strongly Disagree	55	60		76	39		37	42	36	
2	Strongly agree	241	441	0.002***	370	312	0.122	222	204	256	0.000***
	Agree	51	136		117	70		44	83	60	
	Uncertain	33	54		49	38		20	48	19	
	Disagree	68	93		86	75		76	42	43	
	Strongly Disagree	42	41		54	29		38	23	22	
3	Strongly agree	193	357	0.094*	308	242	0.894	159	191	200	0.007***
	Agree	59	138		112	85		56	76	65	
	Uncertain	64	102		91	75		71	50	45	
	Disagree	69	104		103	70		71	50	52	
	Strongly Disagree	50	64		62	52		43	33	38	
4	Strongly agree	213	400	0.001***	344	269	0.141	195	183	235	0.000***
	Agree	68	150		132	86		60	88	70	
	Uncertain	42	93		67	68		48	60	27	
	Disagree	64	72		71	65		61	33	42	
	Strongly Disagree	48	50		62	36		36	36	26	
5	Strongly agree	201	387	0.028**	319	269	0.512	184	177	227	0.000***
	Agree	82	146		139	89		53	101	74	
	Uncertain	41	89		72	58		41	57	32	
	Disagree	61	92		89	64		75	39	39	
	Strongly Disagree	50	51		57	44		47	26	48	
6	Strongly agree	201	382	0.018**	317	266	0.060*	175	204	204	0.000***
	Agree	66	154		135	85		65	78	77	
	Uncertain	51	76		61	66		46	51	30	
	Disagree	59	85		84	60		51	39	54	
	Strongly Disagree	58	68		79	47		63	28	35	

Note: ***significance at 1%, **significance at 5%, *significance at 10%.

Mandal et al. (2021) reported that many low-income households moved to rural areas from urban areas during COVID-19. In Pakistan, Azam et al. (2020) mentioned that the poor in urban areas had more probability of being infected due to poor quality services. Contrary to this, the poor in rural areas had less probability of being infected due to living in open spaces. However, they had less access to health services. Rural people received fewer remittances from urban migrants due to the lockdown in cities. Therefore, COVID-19 disturbed the socio-economic life of rural as well as urban households.

In the same way, the percentage of strongly agree/agree comparatively more in Chakwal while it was comparatively less in Faisalabad. A significant proportion of sample respondents from Faisalabad (60%), Muzaffargarh (70.5%), and Chakwal (70.25%) strongly agree/agree that COVID-19 is responsible for the reduction in the quantity of food intake (Q1). For Q1, the p-value is less than 5%, which implies that there is enough evidence to report an association between the district and food quantity. For Q2, the p-value is less than 1%, which implies that there is enough evidence to report an association between the district and food quality. Bashir et al. (2012) found that 31% of the selected households were food insecure in Central Punjab, while 15% and 13.5% were food insecure in North and South Punjab, respectively. For Q3, the p-value is less than 1%, which implies that there is enough evidence to report an association between the district and financial vulnerability. For Q4, the p-value is less than 1%, which implies that there is enough evidence to report an association between the district and the continuation of children's education. For Q5, the p-value is less than 5%, which implies that there is enough evidence to report an association between the district and the payment of utility bills. For Q6, the p-value is less than 5%, which implies that there is enough evidence to report an association between the district and the sale of assets/goods. In a recent study, Sajjad et al. (2022) confirmed region-wise heterogeneity across the Punjab province of Pakistan, thus, reporting that district-wise vulnerability was different during COVID-19. They found that developed districts (i.e., Faisalabad and Lahore) had comparatively least vulnerability scores or high response readiness towards COVID-19. Contrary to this, the impact of the pandemic was serious in southern districts of Punjab. The central and northern districts were better prepared to tackle pandemics and bio-hazards, while the situation differed in the southern region (Sajjad et al., 2022).

CONCLUSIONS AND RECOMMENDATIONS

COVID-19 affected the everyday life of human beings. People become unemployed, leading to poverty, food insecurity, and financial hardships. Thus, this study investigated the impact of COVID-19 on six socio-economic dimensions (i.e., food availability, food quality, education, finance, utility bills, and assets) in Punjab, Pakistan. It further examined the influence of five demographic indicators (i.e., education, job type, family income, urban/rural area, and district of residence) on the socio-economic behavior of households. A total of 1200 respondents were interviewed via the convenience sampling technique from selected districts of Punjab (i.e., Faisalabad, Muzaffargarh, and Chakwal). Descriptive statistics confirmed that the majority of respondents confirmed the adverse socio-economic effects of COVID-19. Results showed that adverse impacts of COVID-19 on food, education, financial status, utility bills, and assets/goods were reported by all educational categories. However, the percentage of strongly agree/agree was comparatively more for low-educated respondents, while it was comparatively less for high-educated respondents. The chi-square (χ^2) independence test showed a significant role of education on the socio-economic impacts of COVID-19. Similarly, the adverse impacts of COVID-19 on food, education, financial status, utility bills, and assets/goods were reported by all income groups. However, the percentage of strongly agree/agree is comparatively more for low-income respondents and comparatively less for high-income respondents. The χ^2 independence test showed a significant role of family income on the socio-economic impacts of COVID-19. The percentage of strongly agree/agree comparatively more for private job holders while it was comparatively less for public job holders. The χ^2 independence test showed a significant role of job type on the socio-economic impacts of COVID-19. The percentage of strongly agree/agree comparatively more for urban households, while it was comparatively less for rural households. The χ^2 independence test showed a significant role of the residential area on food quantity and sale of assets/goods. The percentage of strongly agree/agree comparatively more in Chakwal while it was comparatively less in Faisalabad. The χ^2 independence test showed a significant role of the district of residence on the socio-economic impacts of COVID-19.

Therefore, it is recommended to increase the educational opportunities in the province. It is also required to develop Learning Management System to continue education under emergencies. It is required to increase the educational standard across the country. It is recommended to increase the family income through an increase in investment and employment opportunities. The protection of private-sector employees is necessary during the pandemic situation. The government should provide financial assistance during hardship days. The government should provide interest-free loans to businesses during an emergency. It is suggested to give subsidies or delay in the payment of utility bills, particularly for the poor segment of society. The government should ensure the vaccination of citizens to control the spread and intensity of the disease. Training doctors and paramedical staff is necessary to perform duties during the pandemic.

This study has some limitations due to time and financial constraints. First, it did not explore the socio-economic impact of COVID-19 on other provinces of Pakistan. Second, it did not explain the role of gender, family size, vaccination, family type, and social capital on the socioeconomic consequences of COVID-19. Future studies could assess the impact of COVID-19 on other provinces of Pakistan. Future studies could assess the impact of COVID-19 on other dimensions of human life.

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