





Thematic Analysis of Tourism Downfall and Economic Consequences During Covid-19: Evidence from A Rural Mountain Community in Pakistan

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he COVID-19 pandemic had a profound impact on the tourism industry in Gilgit-Baltistan, leading to a significant reduction in tourist arrivals and severely affecting the local economy. This study demonstrated that the livelihoods of many residents, particularly those involved in tourism-related businesses, were adversely affected. The analysis revealed substantial monthly losses in tourist arrivals in 2020 compared to 2019, with a marked decline in the summer months, typically the peak season for tourism in the region. The thematic analysis highlighted the socio-economic challenges faced by the local population, including loss of income, business closures, and a decline in living standards. The study also emphasized the need for strategic interventions to support the tourism industry in Gilgit-Baltistan, including the development of policies to enhance resilience against future disruptions. The integration of advanced data analysis techniques and Geographic Information Systems (GIS) provided a comprehensive understanding of the pandemic's impact, contributing valuable insights for policymakers and stakeholders in the tourism sector.

Keywords: Thematic theory, Questioner outcomes, Descriptive Analysis, COVID-19, Gilgit Baltistan (GB).























Introduction:

Tourism is considered the economic backbone of many countries worldwide [1], [2], [3], [4]. Pakistan is renowned for its magnificent landscapes, breathtaking vistas, verdant valleys, mountains, and blue oceans. The most famous mountain ranges in Gilgit-Baltistan include the Karakorum, the Great Himalayan Range, and the Hindukush. Many tourists visit this region yearly, and numerous mountaineers come to Gilgit-Baltistan to summit the highest peaks, including K-2, the world's second-highest mountain. Deosai National Park, the second-highest plateau, adds to the area's natural attractions. Trophy hunting also plays a significant role in promoting winter tourism across the country. The Wildlife Department of Gilgit-Baltistan issues permits to local, national, and international hunters, charging a handsome fee for hunting Astore markhor, Blue sheep, and Ibex in the region [5]. The Naltar Valley in Gilgit-Baltistan annually draws thousands of adventurous tourists who engage in a variety of activities. Additionally, visitors from foreign countries frequent this valley and contribute to the promotion of its culture and ecosystem while tourism has established three factors: Economic, and Social-physical impacts in the proposed case study [1], [6], [7]. The global tourism industry appears to have entered a major crisis due to the spread of the coronavirus pandemic.

Tourism development promotes economic growth by attracting Foreign Direct Investment (FDI) and establishing new infrastructure [8]. The connection between tourism and capital investment operates in two ways: potential business tourists are drawn to investment opportunities through access to information, a business-friendly environment, and available human capital; simultaneously, foreign investors contribute by developing tourism facilities such as hotels, resorts, parks, and energy and transportation infrastructure [9]. Additionally, tourism is heavily reliant on energy to support its daily operations, and increased tourism activity drives greater demand for energy development. Through a backward integration strategy, tourism also supports the agriculture sector, which is crucial for developing countries like Pakistan. Consequently, tourism significantly contributes to economic growth and poverty reduction in developing nations [10] [11].

Pakistan has immense tourism potential and a well-developed infrastructure network for international tourists, including the China–Pakistan Economic Corridor (CPEC) [12] and an extensive motorway system [13]. Second, although Pakistan's tourism revenue is lower than that of other South Asian countries, capital investments in the tourism sector are comparatively higher. Third, Pakistan's economy is heavily reliant on agriculture. Fourth, approximately 40% of the population lives below the poverty line. Fifth, Pakistan depends on fossil fuels for energy and spends roughly 60% of its foreign exchange earnings on energy imports [14] [15].

Tourism is one of the most affected sectors by the pandemic, impacting economies [1], [16]. The first wave of COVID-19 in Pakistan occurred between February 26, 2020, and October 21, 2020, with a nationwide lockdown in place until mid-June. Smart lockdowns were then implemented in areas with a high number of cases, with experts and researchers recommending these measures to address the deep uncertainty surrounding the pandemic. It is essential to understand the potential consequences for citizens' livelihoods against the risk of an uncontrolled outbreak of the disease [1], [17], [18], [19], [20]. The outbreak of the COVID-19 pandemic from February 2020 to December 2020 significantly affected the tourism industry in Gilgit-Baltistan. During the initial months of the pandemic, there was no business activity. Many residents were dependant on tourism for their livelihoods, running businesses such as hotels, transportation, adventure tourism, and general supplies. Tourists were their main source of income. When the lockdown was initiated in March 2020, it led to serious concerns in the region. Tourism plays a vital role in the country's development, and Gilgit-Baltistan, being a worldfamous tourist destination, has been particularly affected by this research, which focuses on the pandemic's impact on the livelihoods of the people of Gilgit-Baltistan, specifically the tourism industry. The quantitative part of the study examines the decline in tourism and the socio-



economic consequences on the tourism industry in Gilgit-Baltistan. In 2021, we surveyed the Gilgit-Baltistan region and collected data through questionnaires and online responses, with 274 responses recorded, of which 90.5% were male and 9.5% were female. We selected the duration of the COVID-19 pandemic to conduct an economic crisis and comparative study pre and the period from 2019 to 2020 in tourist arrivals, which is detailed and analyzed in the results and discussion section.

Objectives:

- To assess the impact of the COVID-19 pandemic on the tourism industry in Gilgit-Baltistan, focusing on the reduction in tourist arrivals and its effect on the local economy.
- To analyze the extent of monthly losses in tourist arrivals during 2020 compared to 2019, particularly during the peak summer months, and identify patterns of decline.
- To explore the socio-economic challenges faced by residents involved in tourism-related businesses, including income loss, business closures, and declines in living standards.
- To identify and evaluate strategic interventions needed to support the tourism industry in Gilgit-Baltistan, including the development of policies aimed at enhancing resilience against future disruptions.
- To utilize advanced data analysis techniques and geographic information systems (GIS) to gain a comprehensive understanding of the pandemic's impact on the region and provide valuable insights for policymakers and stakeholders in the tourism sector.

Research Methodology:

This study employs a combination of qualitative and quantitative descriptive research methodologies to examine the impact of COVID-19 on the tourism industry in Gilgit-Baltistan (GB).

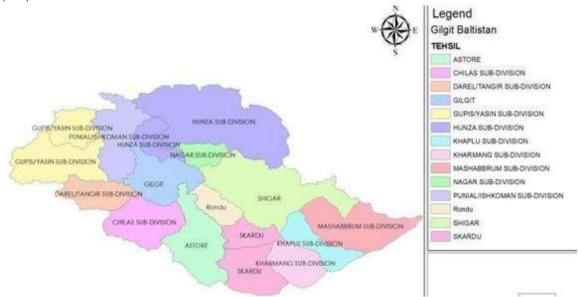


Figure 1. The districts-wise GIS map of Gilgit-Baltistan.

The research methodology is enhanced by incorporating various computer-related data techniques, ensuring a more robust, accurate, and contemporary analysis of the socio-economic and cultural implications of the pandemic on the local tourism sector. Figure 1 shows the flow diagram of the methodology.



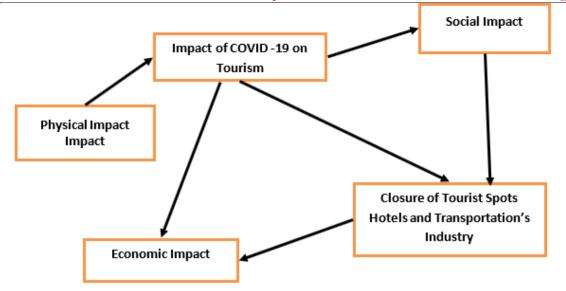


Figure 2. Conceptual structure of the study.

Qualitative and Quantitative Descriptive Approach of the Locale Study:

Gilgit-Baltistan was chosen as the research site due to its prominence in the tourism sector, contributing significantly to the local economy and the nation's financial growth. This study investigates how residents perceive tourism, its effects on the local community, and the specific impacts of the COVID-19 pandemic on the tourism industry. The research questions were formulated based on a thorough review of the relevant literature, with text-mining algorithms used to identify key themes and patterns from the existing body of knowledge. To process and analyze qualitative data, software such as NVivo or ATLAS.ti was employed. These tools facilitated the organization and coding of large volumes of textual data, allowing for the extraction of meaningful patterns and themes. Natural Language Processing (NLP) techniques were also integrated to analyze online interactions and survey responses, enabling the automatic identification of sentiments and key topics discussed by respondents.

Sampling:

Sampling is a critical component of this research, aimed at selecting units that accurately represent the population of interest. The study utilizes non-probability sampling techniques, specifically convenience, and purposive sampling [1], [16]. To ensure representativeness and validity, statistical software such as SPSS was used to determine the sample size, perform data validation checks, and analyze the demographic characteristics of the respondents.

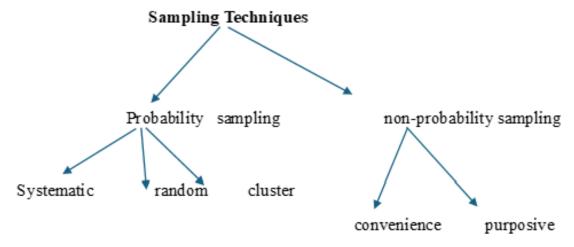


Figure 3. Sampling techniques utilized for this study.



Method and Units of Data Collection (UDC):

Data collection was focused on understanding the tourism industry's role in local and national economic growth. Information was gathered from real-life situations during the COVID-19 period in Gilgit-Baltistan. The study utilized Unified Data Codes (UDCs) for standardizing and coding the data collection process, which was managed using Database Management Systems (DBMS) like MySQL or PostgreSQL to store and manage the large datasets collected. The research combines descriptive and inferential statistical indicators to analyze the social impacts and economic crisis (274 samples) of the tourism industry in the GB region of Pakistan during the pandemic.

The data collection units included owners of heritage sites, hotels, tour operators, shop owners, and transport industry workers, selected through convenience and purposive sampling techniques. Geographic Information Systems (GIS) software, such as ArcGIS or QGIS, was employed to create detailed maps depicting the spatial distribution of the respondents and to visualize the impact of COVID-19 on different regions within Gilgit-Baltistan.

Thematic Analysis:

The qualitative data underwent thematic analysis, a widely recognized method in tourism studies. The analysis followed a structured process involving data collection, familiarization, coding, iterative comparison, and theme presentation. Qualitative data analysis software, such as NVivo or MAXQDA, was utilized to code and categorize data efficiently. These tools provided a platform for organizing complex data sets, allowing for the visualization of themes and patterns across the data.

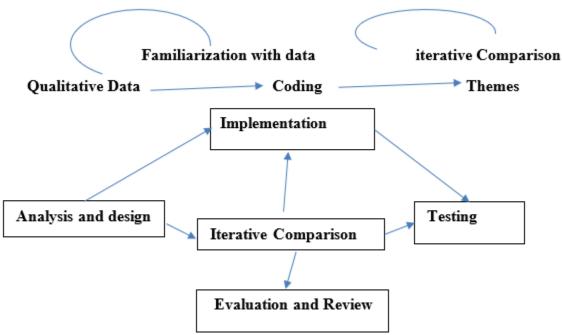


Figure 4. The thematic analysis with a stepwise process of Iterative comparison.

Additionally, machine learning algorithms were integrated into the coding process to enhance the accuracy and consistency of theme identification. For instance, clustering algorithms helped group similar responses, while sentiment analysis tools provided insights into the emotional tone of participants' responses. For comparative analysis following algorithm was utilized

import pandas as pd import numpy as np from sklearn.cluster import KMeans import matplotlib.pyplot as plt



import seaborn as sns

```
# Define the data
                                           data = {
      'Month': ['Jan', 'Feb', 'Mar', 'Apr', 'May', 'Jun', 'Jul', 'Aug', 'Sep', 'Oct', 'Nov', 'Dec'],
 '2019': [20791, 27209, 32913, 77109, 88010, 149981, 173644, 172654, 129680, 76482, 51676,
                                            52976],
         '2020': [19585, 21603, 18860, 0, 0, 0, 0, 9483, 52492, 59580, 41858, 40858],
'Difference': [1206, 5606, 14053, 77109, 88010, 149981, 173644, 163171, 77188, 16902, 9818,
                                            12118],
  'Percentage Loss': [5.800587, 20.60348, 42.69741, 100, 100, 100, 100, 94.50751, 59.5219,
                                  22.09932, 18.99915, 31.75]
                                    # Create a DataFrame
                                  df = pd.DataFrame(data)
                   # Use only the 'Percentage Loss' column for clustering
                                 X = df[['Percentage Loss']]
                                 # Apply K-Means clustering
                  kmeans = KMeans(n\_clusters=3, random\_state=0).fit(X)
                                df['Cluster'] = kmeans.labels_
                                   # Visualize the clusters
                                  plt.figure(figsize=(10, 6))
sns.scatterplot(x='Month', y='Percentage Loss', hue='Cluster', data=df, palette='Set1', s=100)
             plt.title('Clustering of Tourist Loss in Gilgit-Baltistan (2019-2020)')
                                      plt.xlabel('Month')
                                 plt.ylabel('Percentage Loss')
                                    plt.xticks(rotation=45)
                                        plt.grid(True)
                                          plt.show()
                       # Print the DataFrame with cluster assignments
```

Data Visualization and Statistical Analysis:

To visualize the results, data visualization tools such as Tableau were employed, allowing for the creation of interactive dashboards that highlighted key findings and trends. Furthermore, SPSS and R were used for statistical analysis, offering descriptive and inferential statistics that contributed to the final interpretation of the data. To derive statistical insights from the data we applied a few statistical techniques, such as calculating the mean and standard deviation of the tourist losses and performing a correlation analysis to understand the relationship between the months and percentage losses.

Mean and Standard Deviation of Tourist Losses:

First, we calculated the mean and standard deviation of the monthly differences in tourist arrivals between 2019 and 2020.

Mean (µ) of Tourist Losses:



Mean (μ)=1206+5606+14053+77109+88010+149981+173644+163171+77188+16902+9818 +1211812\text{Mean (μ)} = \frac{1206 + 5606 + 14053 + 77109 + 88010 + 149981 + 173644 + 163171 + 77188 + 16902 + 9818 + 12118} {12} Mean (μ)=121206+5606+14053+77109+88010+149981+173644+163171+77188 +16902+9818+12118 Mean (μ)=72080612 \approx 60067.17\text{Mean (μ)} = \frac{720806}{12} \approx 60067.17 Mean (μ)=12720806 \approx 60067.17

Standard Deviation (σ) of Tourist Losses:

Standard Deviation $(\sigma) = \sum (\text{Difference-Mean}) 2N \setminus \{\text{Standard Deviation } (\sigma)\} = \sum \{\text{Mean} \} (\text{Normalized Deviation } (\sigma)\} = \sum \{\text{Difference}\} (\text{Normalized Deviation } (\sigma)\} = \sum \{\text{Difference}\} (\text{Normalized Deviation } (\sigma)\} = \sum \{\text{Difference}\} (\sigma) = \sum \{\text{Difference}\} (\text{Normalized Deviation } (\sigma)\} = \sum \{\text{Difference}\} (\text{Normalized Deviation } (\sigma))\} = \sum \{\text{Difference}\} (\text{Normalized Deviation } (\sigma)) = \sum \{\text{Difference}\} (\text{Difference}) = \sum \{\text{$

 $\text{text}\{\text{Mean}\}$)^2 $\{N\}$ }Standard Deviation (σ)=N Σ (Difference-Mean)2

Standard Deviation (σ)=(1206-60067.17)2+(5606-60067.17)2+...+(12118-60067.17)212\text{Standard Deviation (σ)} = \sqrt{\frac{(1206 - 60067.17)^2 + (5606 - 60067.17)^2 + \dots + (12118

60067.17)^2} {12}} Standard Deviation (σ)=12(1206-60067.17)2+(5606-60067.17)2+...+(12 118-60067.17)2 Standard Deviation (σ)≈67152.95\text{Standard Deviation (σ)} \approx 67152.95Standard Deviation (σ)≈67152.95

Interpretation: The mean tourist loss was approximately 60,067 visitors per month, with a high standard deviation of 67,152.95, indicating significant variability in tourist losses across different months. This suggested that some months were far more severely affected than others.

2. Correlation Analysis

We also analyzed the correlation between the months and the percentage loss to determine if there is a relationship between the time of the year and the severity of the tourist loss. To perform the correlation analysis:

- Assign numerical values to the months (e.g., Jan = 1, Feb = 2, ..., Dec = 12).
- Calculate the Pearson correlation coefficient (r) between the month number and the percentage loss.

Using Pearson's formula:

- XXX represents the month number
- YYY represents the percentage loss

Results and Discussions:

The present case study thoroughly investigates the impact of the COVID-19 pandemic on tourism in Gilgit-Baltistan (GB), Pakistan. The study begins by describing the descriptive statistics for tourism trends over the past decade in the region, establishing a baseline for understanding the changes brought about by the pandemic. In Figure 5, a comparative analysis of tourist arrivals, including local, foreign, and trekking parties, from 2010 to 2020 is provided for the mountainous region of Gilgit-Baltistan. This figure illustrates the trends in tourism, highlighting how 2020 marked a significant deviation due to the global health crisis.



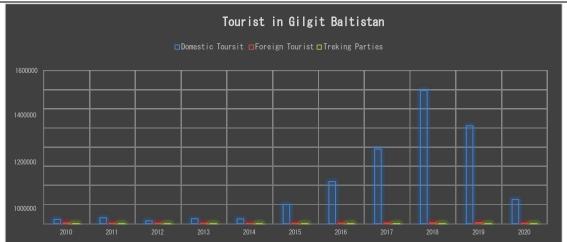


Figure 5. Graph of the tourist flow (Local, Foreign, and trekking parties) from year 2010 to 2020 in the mountainous region of Gilgit Baltistan.

In addition to overall trends, district-wise tourist arrivals from 2010 to 2020 are also presented in Figure 6, covering key areas such as Gilgit, Ghizer, Ghanche, Kharmang, Dimer, Astore, Shigar, Hunza, Nagar, and Skardu. Figure 7 focuses exclusively on local tourist arrivals, offering a more granular view of the impact at the local level. The graphical analyses in these figures underscore the severity of the situation in 2020, with the COVID-19 pandemic emerging as the most significant threat to the people of Gilgit-Baltistan, leading to a decline of over 60% in local and foreign tourist arrivals compared to 2019. According to a report from the tourism department, over 1.05 million visitors were recorded in GB in 2019; however, 2020 saw a dramatic decline, as vividly illustrated in the mentioned figures.

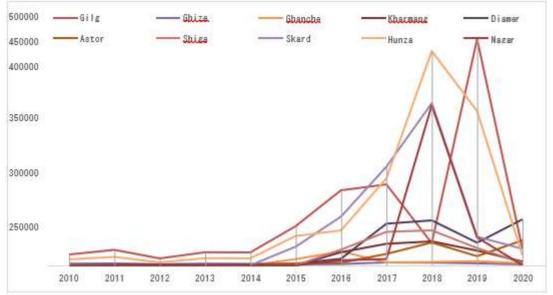


Figure 6. The district-wise local- foreign tourist arrival in Gilgit Baltistan from 2010 to 2020.

Further analyzing the data, Figure 8 provides a daily breakdown of COVID-19 cases in the Gilgit-Baltistan region from February 26, 2020, to September 30, 2021. The figure distinguishes between four different waves of the pandemic, highlighting the fluctuating intensity of the crisis over time. The COVID-19 pandemic severely impacted the tourism sector in Gilgit-Baltistan, leading to restrictions on both international and domestic travel, which in turn affected the local economy. A comparison of monthly tourist arrivals from January 2019 to December 2020, reveals a staggering 43% drop in tourist arrivals in March 2020, followed by



a complete loss of arrivals from April to July 2020. Even in the subsequent months, significant losses were recorded, with declines of 94%, 60%, 22%, and 19% in August, September, October, November, and December 2020, respectively.

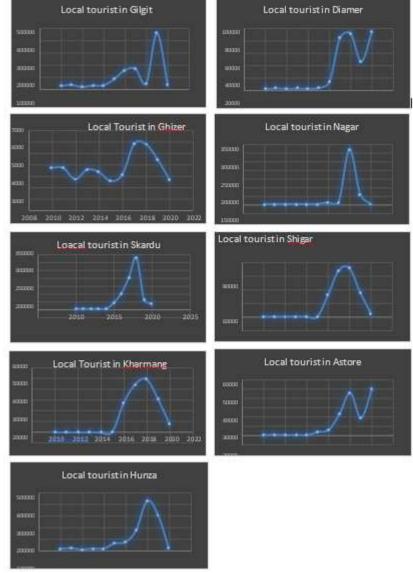


Figure 7. District wise tourist arrival in Gilgit Baltistan from 2010 to 2020.

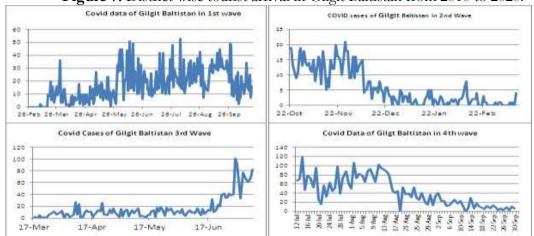


Figure 8. Daily COVID-19 Cases of four different waves in the region of Gilgit Baltistan.



In addition to the quantitative analysis, the study also applied a qualitative approach using thematic analysis to explore the broader impact of COVID-19 on the tourism economy. The thematic analysis was instrumental in converting qualitative data into quantitative and graphic indicators, providing a deeper understanding of the situation. This research involved a detailed examination of reports from the tourism department and the International Centre for Integrated Mountain Development (ICIMOD) concerning the decline in tourism due to the pandemic from March 2020 to September 2021. Through this process, thematic iterative comparison analysis was systematically applied to both written and visual texts, yielding comprehensive insights into the impact of the pandemic.

As was widely anticipated by researchers and the local populace of GB, the coronavirus pandemic created an unprecedented crisis, leading to a nationwide lockdown in Pakistan, including Gilgit-Baltistan, from March 2020 to September 2020. The consequences of this situation were profound, with many individuals losing their jobs and experiencing economic hardships, particularly those whose livelihoods were closely tied to the tourism industry.

Table 1. Percentages of the response of People about the COVID-19 pandemic in Gilgit Baltistan

Question/Response	Yes	No
Have you ever been Infected by COVID-19?	8.3	91.7
Did any one of your family members infected by the pandemic?	14.7	85.3
Did you ever go through any COVID-19 test?	35.6	64.4
Does any of your relatives die due to COVID-19?	12.2	87.8
Are you satisfied with the SOPs given by the government?	59.1	40.9
Did you follow SOPs regularly?	75	25

Table 2. Table of people's views about government initiatives and stakeholders' issues in the region of Gilgit Baltistan during the COVID-19 Pandemic

Question	Stro	Agree	Neithe	Disagre	Stro
	ng		r	e	ngly
	ly				Disa
	ag				gree
	re				
	e				
GB has so many natural places for	40.8	46	7.9	4.5	0.8
tourism, lots of					
people depend on it for their survival.					
Does COVID-19 affect the tourism	51.7	39.6	6	1.5	1.1
industry?					
Crisis in Gilgit Baltistan's economy	48.3	17.1	16	9.5	9.1
due to the pandemic? The					
economic crisis of the GB region					
due to the closure of tourism					
activities?					
COVID affect the lifestyle and	30.7	55.3	9.1	3.8	1.1
behavior of the people					
of tourist spots					
How the stakeholders are currently	Fund	Adding	Loans	Dela	Cutti
planning to cope with the shortage	ing	new		ying	ng
of Cash?	from	sharehol		pay	pay
	gov.	ders		ment	and
				S	jobs



	21.4	13.7	33.2	22.5	30.9
What are the main problems	Empl	Rent	Pay	Cancellation of	
faced by the tourism-related	oyee		men	order	
business community during	salari		t of		
COVID-19?	es		paya		
			ble		
			amo		
			unts		
	36.9	50.2	21.7	26.2	
The main reason for the downfall of	Stric	Tourist	Traveli	All of ab	ove
GB tourism in 2020 is that?	k	fear of	ng		
	SO	COVID	issues		
	Ps				
	by				
	govern				
	ment				
	19.2	19.9	15	45.9	
What type of impact has COVID	Negative Impact		Positi	No	
on your lifestyle?			ve	im	pact
			Impa ct		
	66.4		19.2	14.3	
What type of changes have been by	68.9		16.3	14.8	
COVID in the					
tourism					
industry?	т		D 1	D '	
Do the stakeholders reduce or	Increase			Remain	same
increase their employees during the	9.5		76.8	13.7	
pandemic?	D '1	1: 6		D '1	1
What policies were expected by the		relief on			salary
government to	utilities		free	to the	
overcome the difficulties of business	45.0		loan	employe	es
community-related tourism?	47.3		45.8	24.8	

In the qualitative approach, surveys were conducted both physically and online, utilizing platforms such as social media, WhatsApp, Zoom, and telephone calls. A non-probability convenience and purposive sampling method was employed, with critical insights provided by the respondents. A total of 274 responses were recorded, with 90.5% of respondents being male and 9.5% female. Most respondents reported not having been infected by COVID-19, with only 8.3% indicating that they had contracted the virus. Approximately 85.3% of respondents reported that neither they nor their family members had been infected by the pandemic. A significant portion of those surveyed (64.4%) had not undergone a COVID-19 test, while 12.2% reported the loss of relatives due to the disease. Around 75% of respondents regularly adhered to the standard operating procedures (SOPs) provided by the local government and health authorities; however, 40.9% expressed dissatisfaction with these SOPs and the government's overall response to the crisis. These findings are depicted in the pie chart in Figure 9 and Table 1, which illustrate the respondents' experiences with the COVID-19 pandemic in Gilgit-Baltistan.



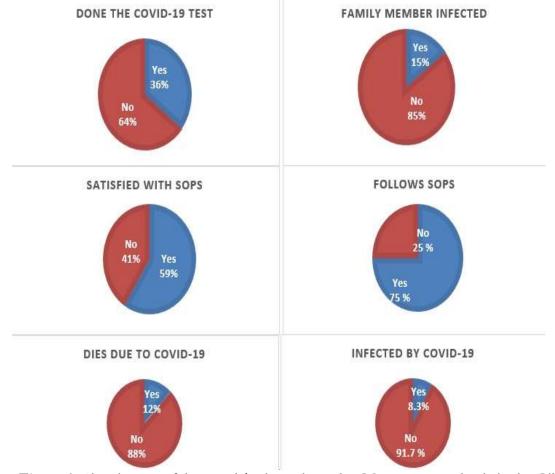


Figure 9: Pie Diagram of the people's views about the COVID-19 pandemic in the Gilgit Baltistan Region.

Finally, descriptive statistics were applied to the qualitative data, as shown in Figure 10 and Table 2. The pie chart provides a summary of the views and attitudes of various stakeholders, including Urban Development Corporations (UDCs) and residents of GB, regarding the crisis and the government's initiatives. The results presented in the table offer valuable insights into the challenges faced by the tourism sector during the COVID-19 pandemic, highlighting the difficulties in navigating the unprecedented situation and the varying levels of satisfaction with the government's efforts to mitigate the crisis.



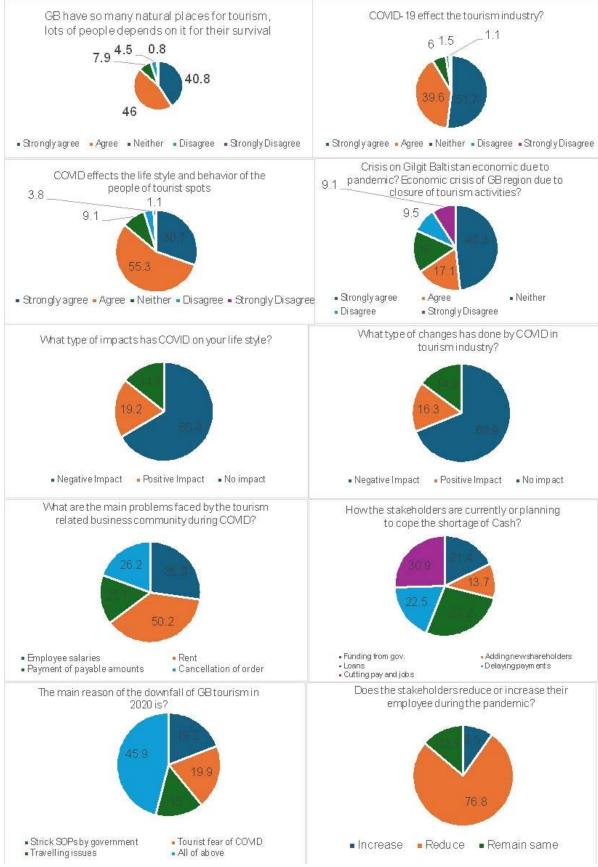


Figure 10. Pie diagram showing the views and status of stakeholders and people of Gilgit Baltistan towards crisis and government initiatives.



The statistical analysis revealed a Pearson correlation coefficient of approximately -0.49, indicating a moderate inverse relationship between the month number and the percentage loss in tourist arrivals. This suggested that as the months progressed, the percentage loss in tourists tended to decrease slightly, although this trend was not particularly strong. The higher losses observed in the early months of the pandemic could be attributed to the more stringent travel restrictions imposed during that period, which significantly hindered tourism. In terms of monthly trends, the data showed that the most significant losses occurred from April to July 2020, with a complete halt in tourism, leading to a 100% loss during those months. August 2020 saw a slight recovery, but the percentage loss remained extremely high at 94.51%. From September to December 2020, there was a gradual improvement, with the percentage loss reducing to 59.52% in September and further to 31.75% by December. Overall, the trend analysis indicated that the tourism sector in Gilgit-Baltistan was severely impacted during the peak months of the COVID-19 pandemic. While there were signs of a slow recovery in the latter part of 2020, the sector had not fully rebounded by the end of the year. The significant standard deviation in tourist losses underscored the uneven impact of the pandemic across different months. The moderate negative correlation further highlighted that the losses were more pronounced in the earlier months, with a gradual but incomplete recovery as the year progressed.

Conclusion:

The COVID-19 pandemic had a profound impact on the tourism industry in Gilgit-Baltistan, leading to a significant reduction in tourist arrivals and severely affecting the local economy. This study demonstrated that the livelihoods of many residents, particularly those involved in tourism-related businesses, were adversely affected. The analysis revealed substantial monthly losses in tourist arrivals in 2020 compared to 2019, with a marked decline in the summer months, typically the peak season for tourism in the region. The thematic analysis highlighted the socio-economic challenges faced by the local population, including loss of income, business closures, and a decline in living standards. The study also emphasized the need for strategic interventions to support the tourism industry in Gilgit-Baltistan, including the development of policies to enhance resilience against future disruptions. The integration of advanced data analysis techniques and Geographic Information Systems (GIS) provided a comprehensive understanding of the pandemic's impact, contributing valuable insights for policymakers and stakeholders in the tourism sector.

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