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Impact of COVID-19 on Public Transport Ridership in Srinagar City

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ABSTRACT- This paper briefly summarizes the evaluation of the effects brought on by the devastating COVID-19 pandemic on public transport ridership. The transportation industry has been significantly impacted by COVID-19, thus this study identifies, analyses, and offers some useful improvement approaches to prevent the challenges that are currently occurring and being confronted, notably by stakeholders and the public. A questionnaire form was created, and with the aid of web based survey, a sample size of 180 survey forms was completed while taking into account D Morgan's Table. Data and replies were gathered using the main data source. This is the initial study on the effects of COVID-19 on transportation in Srinagar (Jammu and Kashmir, India), and it is anticipated that it will be crucial in reducing the adverse effects of a pandemic on Srinagar's transportation industry. In addition, the study emphasizes a number of significant elements that are very likely to affect travelers' choices in the post-pandemic period. Factors such as respondents' regular modes of transportation during the pre-COVID-19 period, their frequency of public transportation use in that time period, their anticipated change in trip frequency and virtual activities during the "new normal" situation, their perception of risk, and their confidence in preventive measures all had an impact on the anticipated change in frequency of travel by public transportation during that time period.

KEYWORDS- COVID-19, Public, Transportation, Srinagar, India.

I. INTRODUCTION

The 2019–2020 atypical corona-virus pandemic has significantly altered practically everyone's daily lives worldwide, especially in regard to mobility. Because it is no longer feasible or inexpensive for people to avoid being infected by these diseases, the repercussions may be observed in many places, including in governments who have had to adjust their urban environments. Previous studies have revealed that, particularly during pandemics, human movement and interaction patterns actively transfer infectious diseases [1, 2, 3, 4, and 5]. Due to the virus' enormous threat, unanticipated dread, and unforeseen pace of transmission, the World Health Organization declared the COVID-19 outbreak a pandemic on March 11, 2020 [6]. A series of cases from Wuhan in late December 2019 resulted in the classification of the outbreak as COVID-19, and the first outbreak was exclusively present in China [7]. Corona-viruses are a family of viruses that primarily cause symptoms of respiratory infections in both people and animals. It's crucial to keep aware about these things as they can spread quickly through the air or by eating tainted food [7]. The newly discovered corona-virus, also known as SARS-COV-2 and COVID-19, has proliferated throughout China and into many other countries [8]. Around 32.7 million COVID-19 reported cases and 91,000 deaths have been recorded thus far, and from 21 September to 27 September 2020, an additional 2 million infections are expected to be reported each [7]. The very first COVID-19 case outside of China was reported on January 13, 2020, and by the end of that month, there were 7087 verified cases globally. We must exercise caution because this illness has claimed more than 100 lives in just the past week, according to a WHO trip to China that was reported on January 22, 2020 [7]. With around 118 thousand cases in 114 countries, the COVID-19 corona-virus has reached pandemic levels, shocking the entire world. COVID-19 corona-virus has reached pandemic levels, shocking the entire world. Estimated 4000 deaths have occurred as a result, making it one of the deadliest diseases we have seen thus far in addition to this worrying increase in many countries throughout the world [7]. As of May 31, 2020, there were 6.164 million cases worldwide and 370,000 fatalities as a result of COVID-19 infections. These figures are increasing at an alarming rate (Johns Hopkins University, 2020).

A. Pandemic (COVID-19) and Public Transport

The COVID-19 pandemic has the potential to spread quickly throughout the nation via public transportation. There are two types of transportation: private and public. The distinction between mode of transport and type of transport must be made quickly. The most pertinent means of transportation will normally operate under transportation objects like the road network, airlines, railroads, etc. in an urban setting.

Public transportation is unsafe and harmful for people while the pandemic is going on since it played a significant role in the transmission of the Covid-19 sickness. The Covid-19

pandemic has severely curtailed and impacted public transportation; bus services have almost completely ceased and have decreased by 98–99%. The pandemic has had a significant impact on both employees' and passengers' mobility. Based on the severity of the infectious illness outbreak that started on January 23, 2020, in China, travel restrictions are put in place at the local, state, national, or international level. People are advised to avoid using public transit and shared mobility. During this pandemic, public transportation raises the danger of acute respiratory infections and presents difficulties with social isolation, which has a significant negative influence on regional and national economies. Up to now, social segregation and different forms of control, such as closing schools, restricting big gatherings, avoiding public spaces, avoiding transit and travel restrictions, etc., have been used. These control measures have an immediate influence on travel patterns, causing many people to postpone or cancel their non-essential travels and forcing the majority of people to work from home or be temporarily unemployed. After the lockdown period ends, it is anticipated that individuals will begin their required travel, but the fear of the corona-virus will alter people's daily travel frequency and travel psychology in terms of mode of transportation. The way individuals live and interact with the system has changed as a result of psychological effects on people. People's lifestyles have changed as a result of the impact on them, thus it will be impossible to ignore this issue in the future and required adjustments must be made with this in mind. The pandemic has had a big influence on the transportation industry, notably conveyance. Due to heightened perceived hazards, people may strive to avoid using public and shared transportation services, which may increase use of private transportation. While Indian cities are working to lessen their reliance on private motor vehicles, this situation could worsen due to negative effects brought on by high motorization rates. People's beliefs and behaviours have changed significantly as a result of the epidemic, and this will probably have an impact on demand for urban freight transport as well. Many people's life have been placed on hold by the COVID-19 outbreak, which has caused individuals to reconsider their decisions and actions.

II. LITERATURE REVIEW

To stop and limit the spread of the virus during pandemics, several countries have put restrictions in place to differing degrees. Such limitations may have an impact on people's life, social relationships, and financial conditions. Travel by people and outdoor activities in particular could be significantly affected [6, 9]. According to several studies, passengers who were older (18-35 years old) than those who were younger tended to delay their travel during the H1N1 pandemic [10, 11]. As a result of COVID-19, people will travel less and favor active modes or their own vehicles over public transit. As a result, traffic will be reduced, and people's health will be affected [12]. The government's directives to stop the spread of COVID-19 have significantly reduced movement worldwide [13]. In the worst-affected cities, mobility was reduced by up to 90% [14]. In the United States, official orders to stay at home decreased population mobility by 7.87 percent.

SARS and H1N1 illness outbreaks from the past did not cause the same kind of widespread public health and safety issue as COVID-19. The new coronavirus illness outbreak has resulted in a considerable change in how and why individuals travel about, which has an impact on transportation networks. A significant portion of populations are being asked, or demanded, to stay home and limit non-essential movement as much as possible, whether through emergency legislation and voluntary work-from-home policies from the private workforce. As a result, systems worldwide are experiencing a massive decline in transportation demand. The enormous scope of the epidemic also had an impact on the market for oil and other fossil fuels, which has a direct bearing on the economics of transportation systems. Moving forward to discuss how this outbreak has influenced a growing need for personal space among passengers on vehicles and what impact this has had on the environment. The transportation infrastructure and capacity of almost all cities are frequently planned for a morning and afternoon peak travel culture [15]. Regular travelers are given the option to work from home, thereby reducing the need for transportation. Major corporations throughout the world, including Apple, Google, Amazon, and many others, have requested and enacted work-from-home rules to limit the spread of the virus. The public transportation market in Asia did not experience as large of a decline, with Google data suggesting a 45% drop in ridership in Hong Kong and just a 15–16% drop in Taipei's metro system during February and March [16].

In a pandemic, a transport system's characteristics and the number of passengers may have an impact on how quickly the illness spreads [17, 18]. In contrast, the pandemic itself has an impact on the transportation infrastructure and the passengers, which could significantly alter their behaviour. There was a substantial variation in the primary traveller's trip purpose, method of transportation, distance travelled, and frequency during the pandemic in different nations [19]. They noticed a shift away from public transportation and toward private modes in particular. The correlations between the intention to utilize public transportation and underlying characteristics, such as a favorable link with disease awareness were established [20]. An analysis using demographic information was done at the zonal level and individual smart card holders' inclination to quit using public transportation during COVID-19 in Stockholm, Sweden, The findings indicate that workplace type, age, income, and level of education are all significant determinants [21]. Data from traffic counters, public transportation GPS and ticket sales data, and pedestrian movements from traffic cameras was collected in order to provide an overall evaluation for Santander, Spain. They found that the quarantine had caused a 93% decrease in public transportation users in Santander (Spain), and they hypothesised that overcrowded public transportation systems would make people feel uncomfortable and cause them to switch to private modes [22].

III. METHODOLOGY

A. Study Area

At an average altitude of 1500 m above sea level, Srinagar district, the summer capital of Jammu & Kashmir Union Territory lies between 34 ° 0 'N to 34 °15' N latitude and 74 ° 45 'E to 75 °0' E longitude. The town of Srinagar is almost centrally located in the Kashmir region. The city is located on both the sides of the Jhelum River, which is called *Vyath* in Kashmir. The river enters the city and crosses the valley, going onward and deepening in the Wular Lake. The city is well known for its nine ancient bridges, linking the two parts of the city. There entire city has numerous lakes and swamps. These incorporate the Dal, the Nigeen, the Anchar, Khushal Sar, Gil Sar and Brari Nambal.

B. Data Collection

Primary data are quite useful for this study. Primary data were acquired by questionnaires, group discussions, observation or experimentation, and surveys. Since in-person/face-to-face surveys would have gone against the pandemic-related physical distancing rules, a web-based survey was carried out from July to August 2021. The study was open to anyone who was interested. Once the questionnaire was created it was distributed in the form of survey through a variety of electronic channels, including the internet, social media, and emails. Additionally, a significant social media effort (such as a Facebook and Instagram advertisement) was launched to reach a wider audience in Srinagar. Through the use of personal and professional networks, as well as by personally contacting the administrators of social media groups, the survey was pushed on numerous social media sites and groups. The study gathered data on the socio-demographic characteristics of respondents, including age, gender, income, and living circumstances. The questionnaire asked a variety of questions about travel behaviour, such as the preferred mode of transportation, how frequently they used public transportation, and whether they owned any vehicles (such as a car, motorcycle, or bicycle). To further understand how the respondents thought about the hazards of COVID-19 transmission when utilising public transportation, a series of perception-based questions were put to them. Respondents were asked to share how frequently they used public transportation before to COVID-19 as well as their predictions on how that frequency would alter under a hypothetical "new normal" scenario. A fictitious scenario was presented in the questionnaire to the respondents in order to describe the "new normal" situation. In this fictitious scenario, people would need to modify their lifestyles in order to fully begin their activities by adopting preventive measures to protect both themselves and others from COVID-19 infection. This new hypothetical circumstance was regarded as the "new normal" situation in this study relative to the pre-COVID-19 situation. All of the responses were validated and confirmed to be complete after data screening.

C. Sample Size

The sample size based on population was determined using the D Morgan table (Table 1). When choosing respondents for the questionnaire survey, several parts of the city of Srinagar were looked at. Using Morgan's (1970) sampling method, the sample size was calculated, and 180 participants were obtained.

Table 1: D Morgan's table

N	S	N	S
10	10	220	140
15	14	230	144
20	19	240	148
25	24	250	152
30	28	260	155
35	32	270	159
40	36	280	162
45	40	290	165
50	44	300	169
55	48	320	175
60	52	340	181
65	56	360	186
70	59	380	191
75	63	400	196
80	66	420	201
85	70	440	205
90	73	460	210
95	76	480	214
100	80	500	217
110	86	550	226
120	92	600	232
130	97	650	242
140	103	700	248
150	108	750	254
160	113	800	260
170	118	850	265
180	123	900	269
190	127	950	274
200	132	1000	278
210	136	1100	285

N: Population; S: Sample

D. Snowball Sampling

Chain-referral sampling, commonly referred to as snowball sampling, is a non-probability sampling technique where the samples include hard-to-find properties. The reason this method is known as "Snowball" is because the sample group expands like a snowball in motion (Figure 1). Non-probability sampling is when the sample is chosen by the researchers or other participants rather than randomly, therefore not every person of the population has an equal chance of being chosen for the study. For the purposes of a research study, existing people are referred to as recruiting samples. Using this sampling approach, a primary data source suggests other potential data sources that might participate in the study projects. The only on referrals-based snowball sampling strategy allows a researcher to generate a sample. Thus, it is sometimes referred to as the chain-referral sampling method.

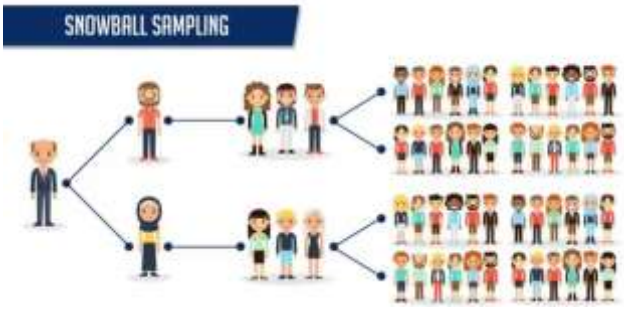

Figure 1: Snow ball Sampling[23]

IV. DATA ANALYSIS

Both descriptive analysis and statistical modeling approaches were applied to analyze the data.

A. Descriptive Statistical Analysis

The properties of a data set are organized and summarized using descriptive statistics. A data set is a compilation of observations or responses from a sample of a population or the complete population. The initial stage in statistical analysis in quantitative research is to define the features of the replies, such as the average of one variable (for example, age) or the relationship between two variables (e.g., age and creativity). Inferential statistics are the next step, which aid in determining whether your data supports or contradicts your hypothesis and whether it can be extrapolated to a broader population. Before the COVID-19 pandemic and during the "new normal" condition, descriptive analysis (mean and standard deviation) was carried out to examine the anticipated fluctuation in the usage of public transportation.

B. Arithmetic Mean

The measure of central value for a distribution is the arithmetic mean or average, which is frequently referred to as just the mean. The answer is obtained by dividing the total number of observations by their sum. A little bar is frequently placed across the variable's symbol, such as x, to indicate the mean. The arithmetic mean, also known as the arithmetic average or simply the mean or average, is the sum of a set of numbers divided by the total number of numbers in the set. The collection frequently consists of a series of findings from a survey, experiment, or observational study.

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} a_i$$

Where,
$\bar{x}$: Arithmetic mean
n: No. of values
a_i: Data set values

C. Standard Deviation

The standard deviation is a statistic that expresses how much variance or dispersion there is in a group of numbers. While a high standard deviation suggests that the values are dispersed throughout a wider range, a low standard deviation suggests that the values tend to be close to the established mean.

$$\sigma = \sqrt{\frac{\sum(x_i - \mu)^2}{N}}$$

Where,
σ : Population standard deviation
N: Size of population
x_i: Each value from population
μ: Population mean

V. RESULTS AND DISCUSSION

A. Socio-Economic Variables

Table 2 compares the socio-economic characteristics of the sample and the general population. According to the sample's characteristics, 72% of the respondents were men. The majority of responders were also youthful (under 30) and middle-aged (between 30 and 60) individuals. In a way, it aided our causes because we had hoped to concentrate on these demographics as we believed they made up the majority of Srinagar's public transportation users. Due to the low service quality and unfriendly design of Srinagar's public transportation system, relatively few women and a small proportion of seniors (60 years and over) use it. Additionally, older people are exceedingly difficult to include in an online poll because they are not tech proficient, especially in developing nations. As a result, the elderly demographic was underrepresented in our poll. Additionally, survey participation was not possible for those without internet connection. The low-income category (monthly income less than 30000 INR) and those who lived outside the divisional districts as a result showed lower participation rates. Therefore, this study may have certain limitations linked to sample features, just like many other studies carried out through the online platform during this epidemic. Despite these drawbacks, sample characteristics show that respondents came from a variety of socio-economic and geographic backgrounds, which may be sufficient to generate accurate results when applied to Srinagar.

Table 2: Socio-economic variables of the sample respondents

Variables	Sample (180 respondents)
Gender	
Male	72%
Female	28%
Age	
< 30 years	79.23%
30-60 years	19.67%
> 60 years	1.1%
Monthly Household Income	
< 30000 INR	14.73%
> 30000 INR	85.27%
Living Location Type	
Main city	75.34%
City outskirts	24.66%

B. Impact of Covid-19 on Public Transport Usage

The outcome illustrates the facts on the use of public transportation before and after the 2020 pandemic. Distribution of the respondents were accomplished

according to mode of transportation, type of transportation, type of traveler, major impact of COVID-19 on transportation, impact of COVID-19 on social activities, economic activities, factors influencing public transport mode choice during COVID-19, effect on the distance travelled, cost of transportation post pandemic, following SOP during travel and perceived risk of infection during travel.

C. Usual mode of transportation before COVID-19

Table 3 shows percentage and frequency of respondents depending upon the mode of transportation used by them before COVID-19 pandemic. It exhibits the passengers who travelled by using public mode were 43% and 15.3% were those who used private mode and 41.7% have used both public and private mode (Figure 2).

Table 3: Usual mode of transportation before COVID-19

Mode of Transportation	Frequency	Percentage
Public	77	43
Private	28	15.3
Both	75	41.7
Total	**180**	**100**
Mean ($\bar{x}$)	**60**	
S.D. (σ)	**27.7**	

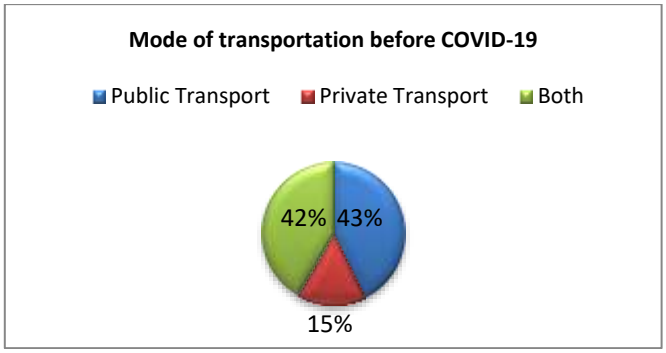

Figure 2: Usual mode of transportation before COVID-19

D. Type of transportation before COVID-19

Table 4 shows percentage and frequency of respondents depending upon the type of transportation used by them before COVID-19 pandemic. It exhibits the passengers who travelled by bus were 62% and 15% were those who used auto rickshaw and 22% have used sumo service 1% used other type of transportation (Figure 3).

Table 4: Usual type of transportation before COVID-19

Type of Transportation	Frequency	Percentage
Bus	100	62
Auto Rickshaw	25	15
Sumo	35	22
Other	20	1
Total	**180**	**100**
Mean ($\bar{x}$)	**45**	
S.D. (σ)	**37.1**	

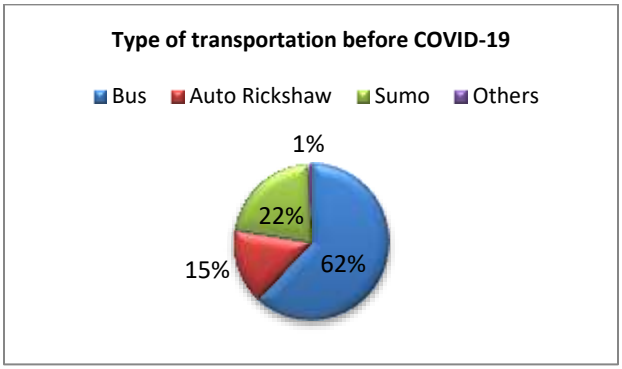

Figure 3: Type of transportation before COVID-19

E. Type of traveler before COVID-19

Table 5 shows percentage and frequency of respondents depending upon the type of traveler they were. It exhibits the passengers who travelled frequently were 61% and 28% were those who traveled randomly as and when needed and 11% traveled during leisure times (Figure 4).

Table 5: Type of traveler before COVID-19

Type of Traveler	Frequency	Percentage
Frequent	110	61
Random	50	28
Leisure	20	11
Total	**180**	**100**
Mean ($\bar{x}$)	**60**	
S.D. (σ)	**45.8**	

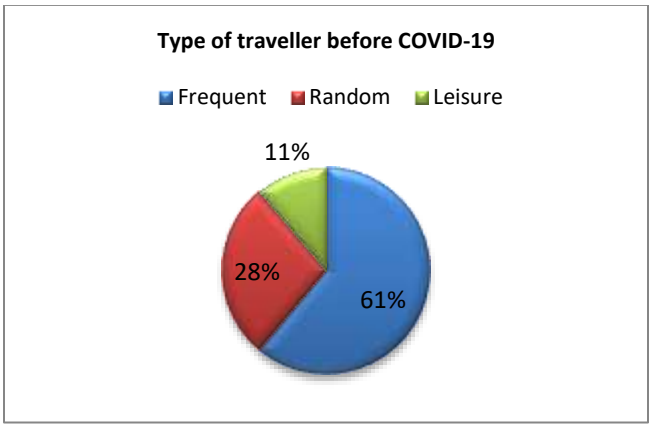

Figure 4: Type of traveller before COVID-19

F. Major impact of COVID-19 on transportation

Table 6 shows percentage and frequency of major impacts of COVID-19 on transportation. It exhibits the major impacts of COVID-19 in Srinagar are 52.7% cost increment, 11.1% lack in transportation, 5.5% was traffic congestion and 30.5% was social distancing (Figure 5).

Table 6: Major impact of COVID-19 on transportation

Impact on transportation	Frequency	Percentage
Cost of transportation	95	52.7
Shortage/Lack of transportation	20	11.1
Traffic Congestion	10	5.5
Social distancing	55	30.5
Total	**180**	**100**
Mean ($\bar{x}$)	**45**	
S.D. (σ)	**38.5**	

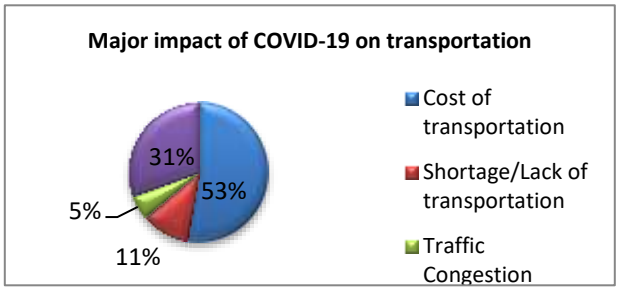

Figure 5: Major impact of COVID-19 on transportation

G. Major impact of COVID-19 on economic activities

Table 7 shows percentage and frequency of major impacts of COVID-19 on economic activities of respondents. According to the respondents, COVID-19 has impacted economic activities of 72.2% respondents while 27.8% remain unaffected (Figure 6).

Table 7: Major impact of COVID-19 on economic activities

Impact on economic activities	Frequency	Percentage
Yes	130	72.2
No	50	27.8
Total	**180**	**100**
Mean ($\bar{x}$)	**90**	
S.D. (σ)	**56.5**	

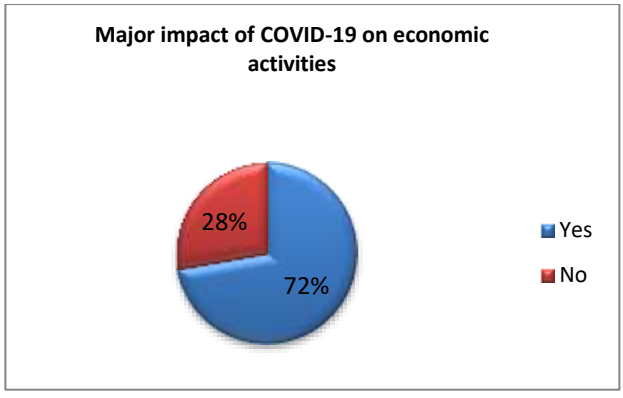

Figure 6: Major impact of COVID-19 on economic activities

H. Factors influencing public transport mode choice in COVID-19

Table 8 shows percentage and frequency of factors influencing public transport mode choice in COVID-19. According to the respondents, 11.1% believe that time and availability of vehicles influence public transport mode while 16.6% believe social distancing influences public transport mode and 61.1% believe all these factors influence public transport mode (Figure 7).

Table 8: Factors influencing public transport mode choice in COVID-19

Factors influencing public transport mode choice	Frequency	Percentage
Time	20	11.1
Availability of vehicle	20	11.1
Social distancing	30	16.6
All	110	61.1
Total	**180**	**100**
Mean ($\bar{x}$)	**45**	
S.D. (σ)	**43.5**	

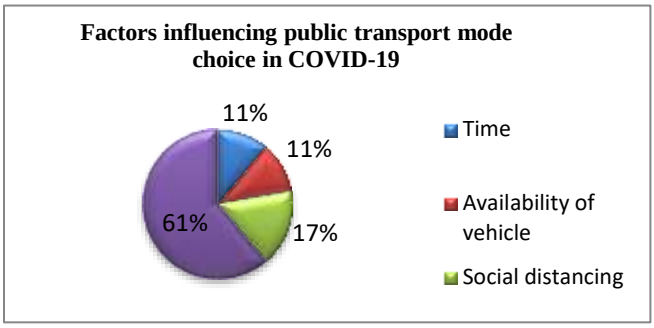

Figure 7: Factors influencing public transport mode choice in COVID-19

I. Effects on distance travelled during COVID-19

Table 9 shows percentage and frequency of effects on distance travelled during COVID-19. According to the respondents, 83.8% believe that COVID-19 affected the distance travelled by respondents while 16.7% believed otherwise (Figure 8)

Table 9: Effects on distance travelled during COVID-19

Effects on distance travelled during COVID-19	Frequency	Percentage
Yes	150	83.8
No	30	16.7
Total	**180**	**100**
Mean ($\bar{x}$)	**90**	
S.D. (σ)	**84.8**	

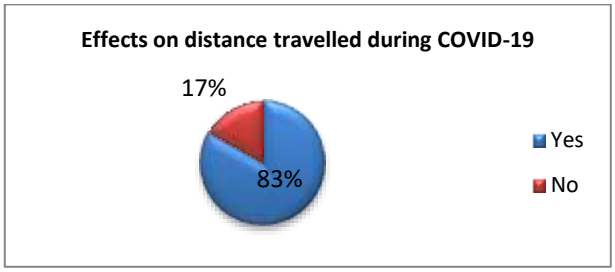

Figure 8: Effects on distance travelled during COVID-19

J. Effects on cost of transportation post COVID-19

Table 10 shows percentage and frequency of effects on cost of transportation post COVID-19. According to the respondents, 80.5% believe that transportation cost increased post COVID-19 while 8.3% believed that the transportation cost decreased and 11.1% believed that the cost remain unaffected (Figure 9).

Table 10: Effects on cost of transportation post COVID-19

Effects on cost of transportation post COVID-19	Frequency	Percentage
Increase	145	80.5
Decrease	15	8.3
Constant	20	11.1
Total	**180**	**100**
Mean ($\bar{x}$)	**60**	
S.D. (σ)	**73.6**	

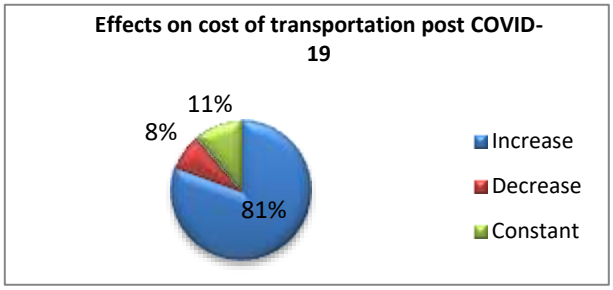

Figure 9: Effects on cost of transportation post COVID-19

K. Follow of SOP during travel in COVID-19

Table 11 shows percentage and frequency of following SOP during travel in COVID-19. According to the respondents, 85% followed SOP during travel in COVID-19 while 15% didn't follow the SOP during travel (Figure 10).

Table 11: Follow of SOP during travel in COVID-19

Follow of SOP during travel in COVID-19	Frequency	Percentage
Yes	153	85
No	27	15
Total	**180**	**100**
Mean ($\bar{x}$)	**90**	
S.D. (σ)	**89.09**	

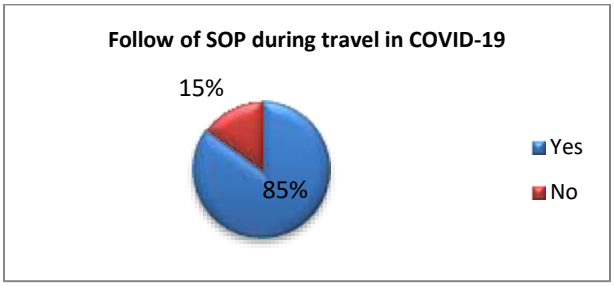

Figure 10: Follow of SOP during travel in COVID-19

L. Perceived risk of infection during travel in COVID-19

Table 12 shows percentage and frequency of following SOP during travel in COVID-19. According to the respondents, 78% believed that there was a perceived risk of infection during travel in COVID-19 while 22% didn't believe that there was a perceived risk of infection (Figure 11).

Table 12: Perceived risk of infection during travel in COVID-19

Perceived risk of infection during travel in COVID-19	Frequency	Percentage
Yes	140	78
No	40	22
Total	**180**	**100**
Mean ($\bar{x}$)	**90**	
S.D. (σ)	**70.7**	

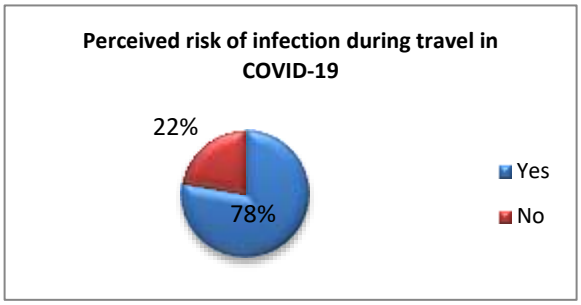

Figure 11: Perceived risk of infection during travel in COVID-19

M. Expected change in the frequency of travel by public transport post COVID-19

Table 13 shows percentage and frequency of expected change in frequency of travel by public transport post COVID-19. According to the respondents, 78% believed that there was a perceived risk of infection during travel in COVID-19 while 22% didn't believe that there was a perceived risk of infection (Figure 12).

Table 13: Expected change in the frequency of travel by public transport post COVID-19

Expected change in the frequency of travel by public transport post COVID-19	Frequency	Percentage
Less often than before	110	61
Same as before	60	33
More than before	10	6
Total	**180**	**100**
Mean ($\bar{x}$)	**60**	
S.D. (σ)	**50**	

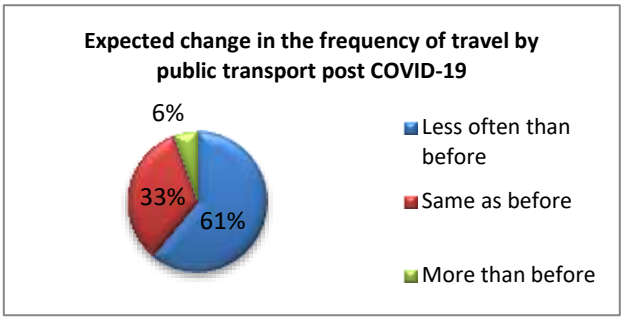

Figure 12: Expected change in the frequency of travel by public transport post COVID-19

It is likely that a significant section of the population will limit their use of public transit. By bringing a non-infected passenger up close to an infected passenger, public transportation can be labelled as a virus transmission site. Extreme crowding, paying fares in cash, interacting with other passengers, operating vehicles that are poorly designed (e.g., having a single door, having a small space between two rows of seats), not knowing about and being unwilling to routinely disinfect vehicles are some of the main factors that increase the risk of the passengers getting sick even after using proper personal hygiene precautions. Similar to how they felt about it before COVID-19, respondents to this study predicted to go less by public transportation. Numerous studies indicate a decrease in the frequency of travel by public transport mode, despite the fact that there is a paucity of study on the projected change in public transport use during the "new normal" condition globally. Surprisingly, a sizable portion of respondents still anticipated an increase in public transportation use. Their declining economic situation as a result of the epidemic may be the underlying cause.

VI. CONCLUSION

This study briefly summarizes the evaluation of the effects brought on by the devastating COVID-19 epidemic. The research was conducted with the aim of reaching a few predetermined goals and objectives. The transportation industry has been significantly impacted by COVID-19; as a result, this research identifies, analyses, and recommends some practical improvement approaches to prevent the challenges that are currently occurring and being confronted, notably by stakeholders and the public.

The investigation was conducted using a thorough methodology while keeping a close eye on how developed nations are handling the issue globally. After reviewing case studies from many nations, it was determined that Snowball sampling is the most effective method for doing this research. With the aid of a web-based survey, a sample size of 180 survey forms was filled out using a created questionnaire form and D Morgan's Table. Data and replies were gathered using the main data source. This research has been simplified and made understandable by the use of many charts and maps. This is the first study on COVID-19's effects on Srinagar's transportation system, and it is anticipated that it will be crucial in reducing the pandemic's detrimental effects on Srinagar's transportation system. Factors such as respondents' regular modes of transportation during the pre-COVID-19 period, their frequency of public transportation use in that time period, their anticipated change in trip frequency and virtual activities during the "new normal" situation, their perception of risk, and their confidence in preventive measures all had an impact on the anticipated change in frequency of travel by public transportation during that time period. According to the results' effect sizes, the most important elements influencing public transportation use in the "new normal" circumstance are the regular mode utilised in the pre-pandemic period and the anticipated change in overall trip frequency by all modes. These findings may be generalised to other emerging nations with comparable socioeconomic, cultural, and geopolitical circumstances, particularly those in South Asia.

The following are suggested for Srinagar and comparable developing cities, primarily its neighbours in South Asia:

- The study finds that if public transportation use is to increase to pre-COVID-19 levels or higher, risk perceptions linked with it must be reduced and trust in preventive measures must be built. The general public should be made aware of any changes to the way public transportation services are run. The amount of time that drivers and other employees of the public transportation system interact with passengers should be kept to a minimum. At the bus stop, temporary kiosks might be erected in areas with room to sell tickets. In an open setting, there are fewer dangers of contamination. Customers might purchase the ticket for the service they choose by joining a line and keeping a safe gap between themselves and those in front of them. It might still be possible to use the increasingly common contactless payment technique. Only those who have booked tickets in advance will be permitted to board.
- A sizable portion of the respondents in our study indicated that they would continue to utilise public transportation under the "new normal" circumstances, maybe as a result of budgetary limitations or a lack of available alternatives. If COVID-19 preventive practices are used inside the public transportation vehicles, these passengers are likely to feel at ease. Maintaining sufficient physical separation between passengers on board is difficult. The operators must be permitted to raise the fee to make up for the

revenue lost if any of the seats are left empty. However, a fare rise is likely to make people even less likely to use public transportation. These precautions have been in place for nearly two months, but neither the operators nor the passengers fully complied. All reported instances of COVID-19 infections in transit vehicles—including the one in Ningbo, China—occurred while passengers weren't donning masks. We firmly believe that requiring passengers to properly wear masks can considerably lower the likelihood of transmission. People's faith will be restored by the strict enforcement of this restriction, especially those who consider the transmission risking public transportation to be a major concern.

- By keeping the windows open to promote natural ventilation and providing hand sanitizers to the passengers, bus operators can adhere to strict hygiene measures inside the bus and further limit the likelihood of viral transmission while enhancing passenger confidence. They would clean and sanitize the bus after each round trip's first leg.
- The onboard environment must be made even safer in order to lower the perceived risk of the passengers. In Srinagar, almost all buses have just one door. Otherwise, entry and egress may have been set up through various doors. The owners should be pushed to expand their fleet of two-door buses as soon as possible.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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