



# Statistical Analysis of Tourism During Covid-19 Pandemic

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## 1. INTRODUCTION :

Tourism, the act and process of spending time away from home in pursuit of recreation, relaxation, and pleasure, while making use of the commercial provision of services. The activities of people travelling to and staying in places outside their usual environment for leisure.

The COVID-19 pandemic has been a health and economic crisis with devastating effects on developing countries, especially those dependent on tourism. As governments have attempted to protect their populations, lockdowns, quarantines, and major restrictions on national and international mobility were implemented. This, coupled with the decision of consumers to limit international travel resulted in a sharp contraction for the tourism sector with severe economic consequences, particularly on countries that rely on the sector. The number of international tourist arrivals declined by 74 per cent in 2020 compared with the previous year (UNWTO Tourism Dashboard). In many developing countries, arrivals were down by 80-90 per cent

Since, out brake of this pandemic, face of tourism is completely changed. Tourism or Tours that were used to before covid-19 pandemic are not same. Tourism continues to be one of the sectors hit hardest by the Covid-19 pandemic. While everyone is getting adapted to live with Covid-19, tourism is also getting back on track by following necessary guidelines issued by the government.

With this pandemic going on since more than a year many of the tourists are getting out for tour with friends, family, relatives and many of them are also bored with work from home, online lectures.

Along with this, Covid-19 vaccination is one of the key factors that can helped to restart tourism, along with other bio security behavior such as hand washing and wearing masks and taking necessary precautions.

## 2. Objectives :

### Through Graphical Representation:-

- i. To study which type of tour tourists prefer
- ii. To study travelling preferences
- iii. To study vaccination status of tourist who went for tour
- iv. To study reason of tour between age groups

### 1) Through Chi-square method:

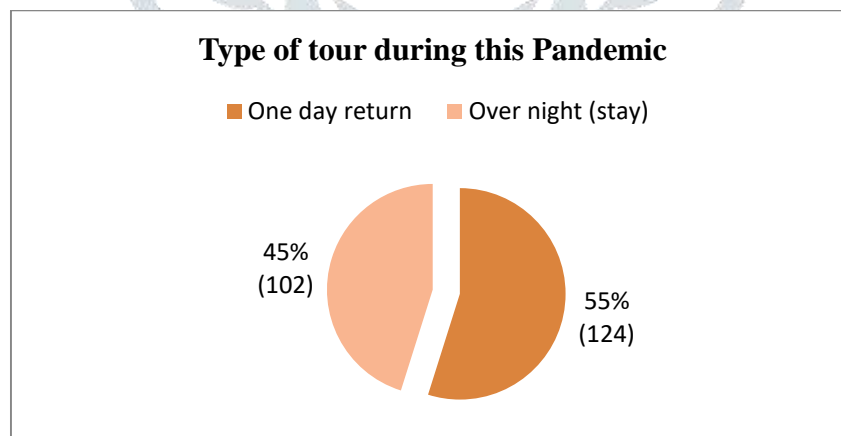
- i. To study whether there is association between Mode of transport and Type of tour
- ii. To study whether there is association between Gender and to prefer travelling during covid-19
- iii. To study whether there association between vaccination of tourist and visiting crowded tourist places
- iv. To study whether there is association between precautions taken by hired accommodation and hike in prices of accommodation
- v. To study whether there is association between type of accommodation and precautions taken by hired accommodation
- vi. To study whether there is association between travelling before Covid-19 and travelling after Covid-19

## 3. graphical representation:

The main purpose of graphical representation is to give some idea about entire data and draw instant conclusion.

### 1. Type of Tour :

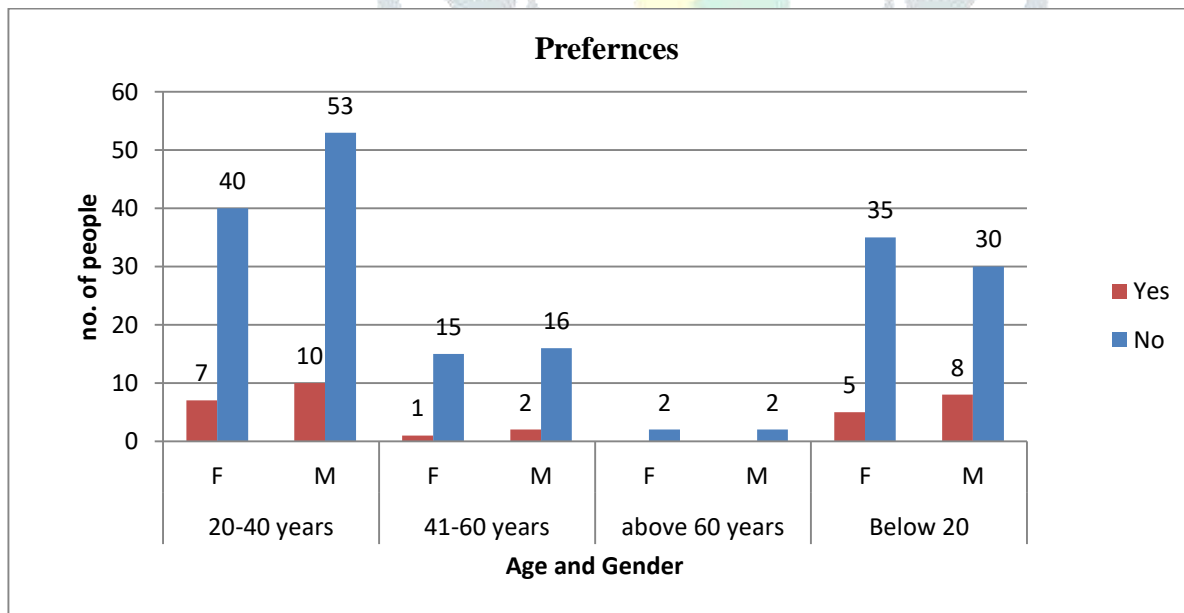
Type of Tour	Count
One day return	124
Overnight (stay)	102
<b>Grand Total</b>	<b>226</b>



It can be seen that 124 (55%) of respondents choose for one day return trip and 102(45%) of respondents choose for overnight (stay) trip.

**Thus more no. people choose for one day return trip during this Covid-19 Pandemic****2. Travelling preferences between age group:**

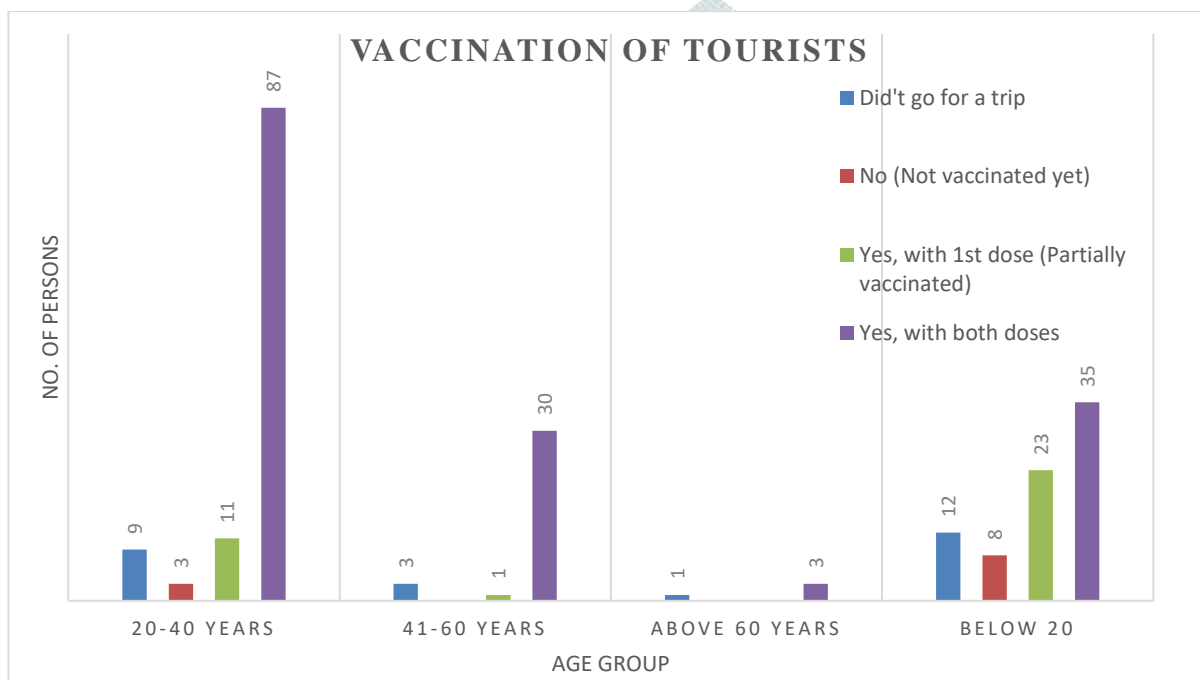
		Prefer Travelling During Covid		
Age	Gender	No	Yes	Grand Total
20-40 years	F	40	7	47
	M	53	10	63
<b>20-40 years Total</b>		<b>93</b>	<b>17</b>	<b>110</b>
41-60 years	F	15	1	16
	M	16	2	18
<b>41-60 years Total</b>		<b>31</b>	<b>3</b>	<b>34</b>
above 60 years	F	2		2
	M	2		2
<b>above 60 years Total</b>		<b>4</b>		<b>4</b>
Below 20	F	35	5	40
	M	30	8	38
<b>Below 20 Total</b>		<b>65</b>	<b>13</b>	<b>78</b>
<b>Grand Total</b>		<b>193</b>	<b>33</b>	<b>226</b>



It can be seen that more number of respondents prefer not to travel during this Covid-19 pandemic. While all the respondents of above 60 years of age group prefer not to travel. Preference to travel is high between age group 20-40 years as compared to other age groups.

**3. Vaccination status of tourists:**

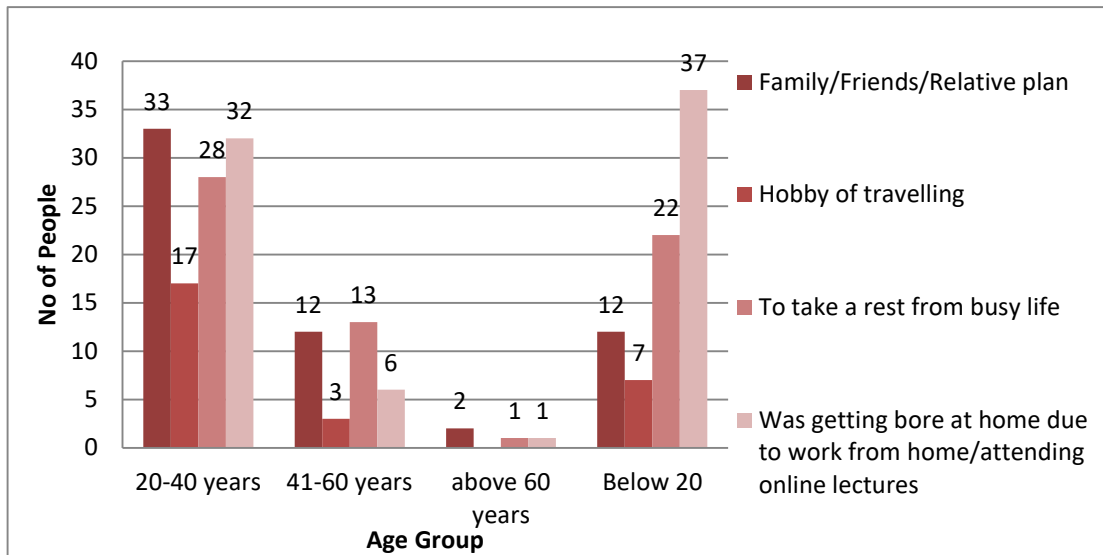
AGE GROUPS	Didn't go for a trip	Not vaccinated	Partially vaccinated (1st dose)	Fully vaccinated	Grand Total
20-40 years	9	3	11	87	110
41-60 years	3		1	30	34
above 60 years	1			3	4
Below 20	12	8	23	35	78
<b>Grand Total</b>	<b>25</b>	<b>11</b>	<b>35</b>	<b>155</b>	<b>226</b>



It can be seen that 155 tourists out of 226 were vaccinated when they went for the tour. 11 tourists were not vaccinated while 35 tourists were vaccinated with 1<sup>st</sup> dose. We can say that most of the tourists were vaccinated when they went for the tour.

**4. Reason of tour:**

Age	Family/ Friends/ Relative Plan	Hobby of travelling	To take a rest from busy life	Was getting bore at home due to work from home/attending online lectures	Grand Total
20-40 years	33	17	28	32	110
41-60 years	12	3	13	6	34
above 60 years	2		1	1	4
Below 20	12	7	22	37	78
<b>Grand Total</b>	<b>59</b>	<b>27</b>	<b>64</b>	<b>76</b>	<b>226</b>



It can be seen that most respondents in age group below 20 prefer to travel as they are bore at home due to work from home/attending online lectures. Most respondents in age group 20-40 yrs and above 60 yrs go for tour as it was family/friends/relatives plan. Maximum respondents in age group 41-60 yrs go for tour as to take a rest from busy life.

#### 4. CHI-SQUARE TEST:

Chi-square test is used to test the independence (no association) of two attributes. A test of independence assesses whether paired observation on two attributes, expressed in a contingency table, independent of each other. For the test of independence, a chi-square probability of less than or equal to 0.05 is commonly interpreted by applied workers as justification for rejecting the null hypothesis that the row attribute is unrelated (no association).

The  $\chi^2$  test first calculates a  $\chi^2$  statistic using the formula:

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^c \frac{(A_{ij} - E_{ij})^2}{E_{ij}}$$

Where :

$A_{ij}$  = actual frequency in the i-th row, j-th column

$E_{ij}$  = expected frequency in the i-th row, j-th column

r = number of rows

c = number of columns

#### 1. Checking independence of Mode of Transport & Type of tour:

Attribute 1 = Mode of Transport

Attribute 2 = Type of Tour

To test:

Ho: There is no association between Mode of Transport & Type of tour

H1: There is association between Mode of Transport & Type of tour

Observed values	Type of tour		
	One day return	Overnight (stay)	Grand total
Mode of transport			
Private Vehicle	89	69	158
Public transport	35	33	68
<b>Grand total</b>	<b>124</b>	<b>102</b>	<b>226</b>

Expected values	Type of tour		
	One day return	Overnight (stay)	Grand total
Mode of transport			
Private Vehicle	86.69026549	71.30973451	158
Public transport	37.30973451	30.69026549	68
<b>Grand total</b>	<b>124</b>	<b>102</b>	<b>226</b>

p value =0.500833189

Since p-value = 0.500833189 is greater than (0.05) i.e. p-value >=0.05,

Hence we accept Ho. There is no association between of Mode of Transport & Type of tour

## 2. Checking independence between Genders and Preference to travelling during covid-19

Attribute 1 = Gender

Attribute 2 = Preference to travelling during covid-19

To test:

Ho: There is no association between Genders and Preference to travelling during covid-19

H<sub>1</sub>: There is association between Genders and Preference to travelling during covid-19

OBSERVED	PREFER TRAVELLING DURING COVID			
	Maybe	No	Yes	Grand Total
Female	32	60	13	105
Male	36	65	20	121
<b>Grand Total</b>	<b>68</b>	<b>125</b>	<b>33</b>	<b>226</b>

EXPECTED	PREFER TRAVELLING DURING COVID			
	Maybe	No	Yes	Grand Total
Female	31.59292035	58	15	105
Male	58.07522124	67	18	121
<b>Grand Total</b>	<b>68</b>	<b>125</b>	<b>33</b>	<b>226</b>

p value =0.010163418

Since p-value = 0.010163418 <=0.05, Hence we reject Ho.

There is association between Mode of Transport & Type of tour

## 3. Checking independence of vaccination of tourist and preference to visit crowded tourist places

Attribute 1 = Vaccination of Tourists

Attribute 2 = Preference to visit crowded tourist places

To test:



Ho: There is no association between vaccination of tourist and preference to visit crowded tourist places

H1: There is association between vaccination of tourist and preference to visit crowded tourist places

OBSERVED	TO VISIT CROWDED TOURIST PLACES			
	Definitely not	Maybe	Yes of course	Grand Total
VACCINATION				
No (Not vaccinated yet)	5	4	2	11
Yes, with 1st dose (Partially vaccinated)	21	11	3	35
Yes, with both doses	99	49	7	155
<b>Grand Total</b>	<b>125</b>	<b>64</b>	<b>12</b>	<b>201</b>

p value

ESTIMATED	TO VISIT CROWDED TOURIST PLACES			
	Definitely not	Maybe	Yes of course	Grand Total
VACCINATION				
Not vaccinated yet	6.84079602	3.502487562	0.656716418	11
Yes, with 1st dose	21.76616915	11.14427861	2.089552239	35
Yes, with both doses	96.39303483	49.35323383	9.253731343	155
<b>Grand Total</b>	<b>125</b>	<b>64</b>	<b>12</b>	<b>201</b>

=0.359337152

Since p-value  $0.359337152 \geq 0.05$ , Hence we accept Ho.

There is no association between vaccination of tourist and preference to visit crowded tourist places.

#### 4. Checking independence of Precautions by Hired Accommodation & Hike in Price of Accommodation

Attribute 1 = Precautions by Hired Accommodation

Attribute 2 = Hike in Price of Accommodation

To test:

Ho: There is no association between Precautions by Hired Accommodation & Hike in Price of Accommodation

H1: There is association between Precautions by Hired Accommodation & Hike in Price of Accommodation

OBSERVED	Hike in Price of Accommodation		
	No	Yes	Grand Total
Precautions by Hired Accommodation			
Completely dissatisfied	2	12	14
Dissatisfied	5	10	15
Highly satisfied	6	12	18
Satisfied	15	54	69
Satisfied but not completely	20	90	110
<b>Grand Total</b>	<b>48</b>	<b>178</b>	<b>226</b>

ESTIMATED	Hike in Price of Accommodation		
	No	Yes	Grand Total
Precautions by Hired Accommodation			
Completely dissatisfied	2.973451327	11	14
Dissatisfied	3.185840708	12	15
Highly satisfied	3.82300885	14	18
Satisfied	14.65486726	54	69
Satisfied but not completely	23.36283186	87	110
<b>Grand Total</b>	<b>48</b>	<b>178</b>	<b>226</b>

p value = 0.417613257

Since p-value 0.417613257 is greater than (0.05) i.e.  $p\text{-value} > 0.05$ ,

Hence we accept  $H_0$ .

There is no association between Precautions by Hired Accommodation & Hike in Price of Accommodation.

### 5. Checking independence of Type of Accommodation & Hired accommodations taking Precautions:

Attribute 1 = Type of Accommodation

Attribute 2 = Hired accommodations taking Precautions

To test:

$H_0$ : There is no association between Type of Accommodation & Hired accommodations taking Precautions

$H_1$ : There is association between Type of Accommodation & Hired accommodations taking Precautions

OBSERVED	Hired accommodation Taking precautions		
	Type of accommodation	No	Yes
Friends or relatives house	37	37	74
Hired accommodation	45	26	71
No need of accommodation( one day return)	42	39	81
<b>Grand Total</b>	<b>124</b>	<b>102</b>	<b>226</b>

EXPECTED	Hired accommodation Taking precautions		
	Type of accommodation	No	Yes
Friends or relatives house	40.60176991	33	74
Hired accommodation	38.95575221	32	71
No need of accommodation( one day return)	44.44247788	37	81
<b>Grand Total</b>	<b>124</b>	<b>102</b>	<b>226</b>

p value = 0.214033843

Since p-value 0.214033843 is greater than (0.05) i.e.  $p\text{-value} > 0.05$ , Hence we accept  $H_0$ . There is no association between Type of Accommodation & Hired accommodations taking Precautions.

### 6. Checking independence of Travelling before Covid-19 & Travelling after Covid-19

Attribute 1 = Travelling before Covid-19

Attribute 2 = Travelling after Covid-19

To test:

$H_0$ : There is no association between Travelling before Covid-19 & Travelling after Covid-19

$H_1$ : There is association between of Travelling before Covid-19 & Travelling after Covid-19



OBSERVED	Travelling after Covid-19					
	Travelling before Covid-19	After every 15 days	After every 3 months	After every 6 months	After every month	Rather prefer not to travel
After every 15 days	1	1	2	4	10	18
After every 3 months		8	16		21	45
After every 6 months			22		34	56
After every month	1	3	6	6	6	22
once a year		2	13	4	66	85
<b>Grand Total</b>	<b>2</b>	<b>14</b>	<b>59</b>	<b>14</b>	<b>137</b>	<b>226</b>

Estimated	Travelling after covid-19					
	Travelling before Covid-19	After every 15 days	After every 3 months	After every 6 months	After every month	Rather prefer not to travel
After every 15 days	0.159	1.11504	4.69911	1.11504	10.9115044	18
After every 3 months	0.398	2.78761	11.7477	2.78761	27.27876106	45
After every 6 months	0.495	3.46902	14.6194	3.46902	33.94690265	56
After every month	0.194	1.36283	5.74336	1.36283	13.33628319	22
once a year	0.752	5.26548	22.1902	5.26548	51.52654867	85
<b>Grand Total</b>	<b>2</b>	<b>14</b>	<b>59</b>	<b>14</b>	<b>137</b>	<b>226</b>

p value = 0.00000006

Since p-value = 0.00000006  $\leq$  0.05,

Hence we reject  $H_0$ .

There is association between Travelling before Covid-19 & Travelling after Covid-19

## 5. METHODOLOGY:

By keeping the objective and the techniques which will be used in the analysis, questionnaires are designed. Survey was done through online method by using Google forms. Questionnaires are multiple choice question and checkbox questions. Data of 226 respondents was collected from this survey.

### Techniques used:

1. Graphical Representation
2. Chi-Square test

Both the techniques are performed in excel using pivot table.

## 6. CONCLUSION:

The major Purpose of this project was to understand the mentality of people and to study the impact of Covid-19 on the tourism and the tourists.

Our project was a small effort to study the various parameters related to tourism that would give us an understanding of its acceptability, knowledge of the challenges faced by the tourists due to this Covid-19 pandemic. Based on our study we make the following conclusions:

- **Through Graphical Representation we can conclude that:**
  1. More no. of people chooses for one day return trip during this Covid-19 pandemic.
  2. People choose not to go for tour during this Covid-19 Pandemic.
  3. Most of the tourists that went for the tour were vaccinated.
  4. It can be seen that maximum of the people who went for tour as it was family/friends/relatives plan.
  
- **Through Chi-Square Test (Cross Tabulation) we conclude that:**
  1. There was no association between mode of transport & type of tour, vaccination of tourist & preference to visit, Type of accommodation & Hired accommodation taking necessary precautions, Travelling before Covid-19 & travelling during Covid-19.
  2. There is association between mode of transport & type of tour, type of accommodation & hired accommodation taking necessary precautions

## REFERENCES:

Moore, D. S., Notz, W. I, & Flinger, M. A. (2013). *The basic practice of statistics* (6th ed.). New York, NY: W. H. Freeman and Company.

Lancaster, H.O. (1969), *The Chi-squared Distribution*, Wiley

Dasgupta, Sanjoy D. A.; Gupta, Anupam K. (January 2003). "An Elementary Proof of a Theorem of Johnson and Lindenstrauss"(PDF). *Random Structures and Algorithms*. **22**(1): 60–65. doi:10.1002/rsa.10073. Retrieved 2012-05-01.

M.A. Sanders. "Characteristic function of the central chi-square distribution" (PDF). Archived from the original (PDF) on 2011-07-15. Retrieved 2009-03-06.

Chi-squared distribution, from MathWorld, retrieved Feb. 11, 2009