



## Flattening the Covid-19 curve: A myth or reality - A questionnaire based study

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### ABSTRACT

Flattening the curve is a public health strategy to slow down the spread of SARS- COV - 2 viruses during the covid-19 pandemics. The study aims to assess the knowledge and create awareness of flattening the COVID- 19 curves. A survey-based questionnaire was done to create understanding about 'flattening the curve'. A total of 12 questions were collected by google forms app.SPSS statistical analysis was done. The results were obtained, and the data was analysed. The overall awareness of all subgroups was fair in reporting correct answers. People of the 15-25 age groups mostly attended the survey. (50.7%).71% of the respondents were males. In this study, almost 71% of the respondents were aware of the covid-19 curve. Nearly 54% of the respondents believed that community transmission is increasing in their area.71% of the respondents found lockdown can affect India's economic capital.71% believed lockdown implemented in India is effective.55.5% of the respondents thought that India is flattening the curve. Hence, the study concludes that the participants have awareness about the measures taken to flatten the COVID - 19 curves.

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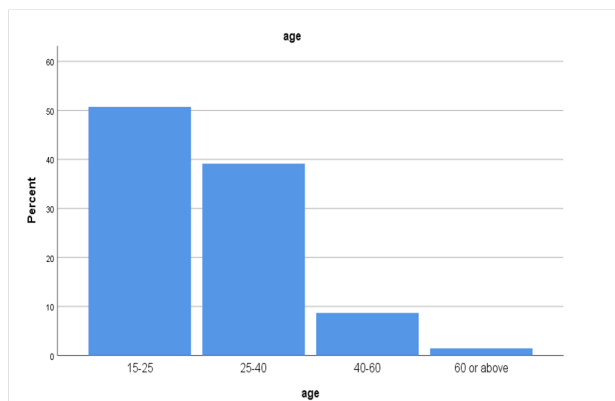
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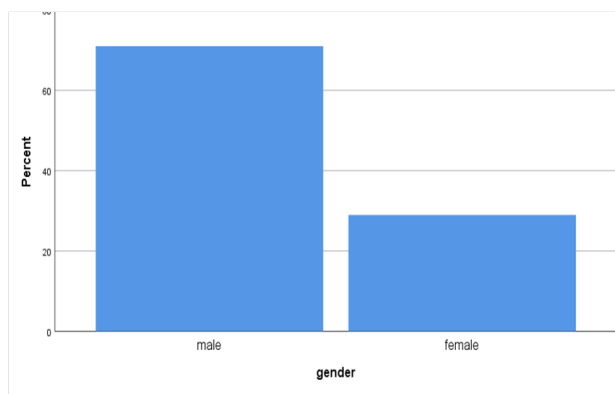
### INTRODUCTION

Flattening the curve is a public health strategy to slow down the spread of SARS- COV - 2 viruses during the covid-19 pandemics. The curve being flattened is the actual and visual representation of

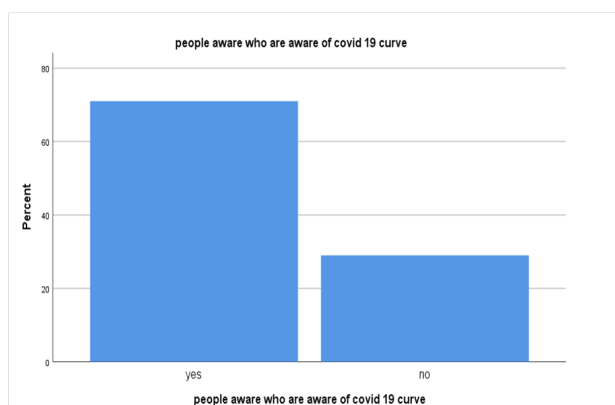
the number of infected people versus those needing health care over time. Flattening the curve slows the spread of an epidemic so that the peak number of people requiring attention at a time is reduced, and health care devices no longer exceed its capacity (Schramm, 2020). Flattening the curve relies on mitigation strategies which include social distancing. A complementary measure is to increase health care capability. Preventing the health care from being crushed requires a society to do things: 'flatten the curve'- that is, slow down the pace of the spread of the infection, so there are not too many cases that need to be hospitalised at one time.- and "increase the line"- that is, increase the hospital capacity to treat big numbers of patients (Tao, 2020). As of April 2020, with the exponential rise in the cases of the covid-19 pandemic, key measures are to increase the numbers of available ICU beds and ventilators that are in the system.



**Figure 1: Bar graph representing age groups of respondents**



**Figure 2: Bar graph representing gender of respondents who attended the survey**

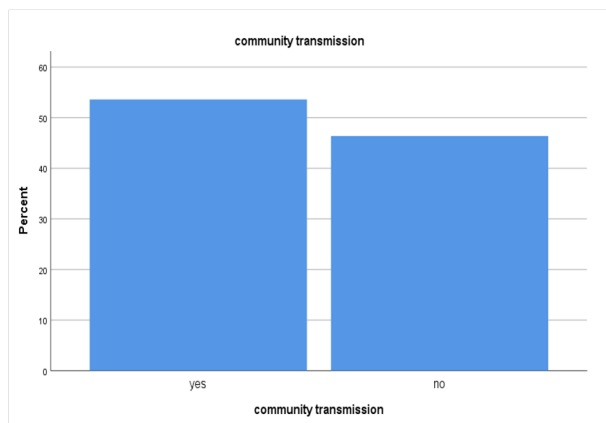


**Figure 3: Bar graph representing the percentage of respondents who are aware of the covid 19 curve**

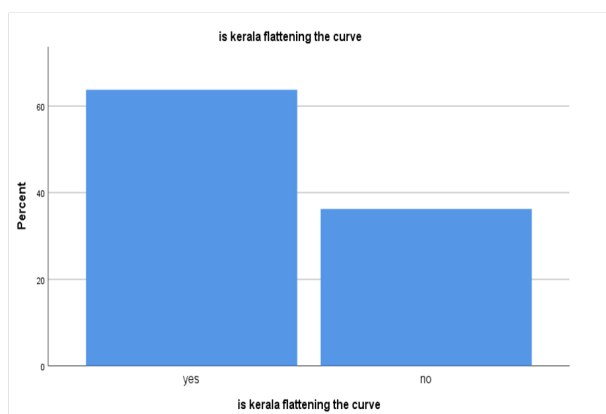
Figure 1, X axis represents age group of participants, Y axis represents the number of responses for various age groups

Figure 2, X axis represents the male or female gender and Y axis represents no. of responses. Males - 71 % Females- 29 %

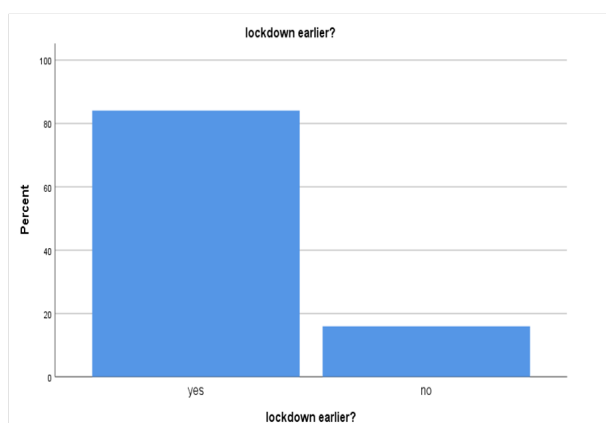
Figure 7, X axis represents whether respondents agree or disagree and Y axis represents number of



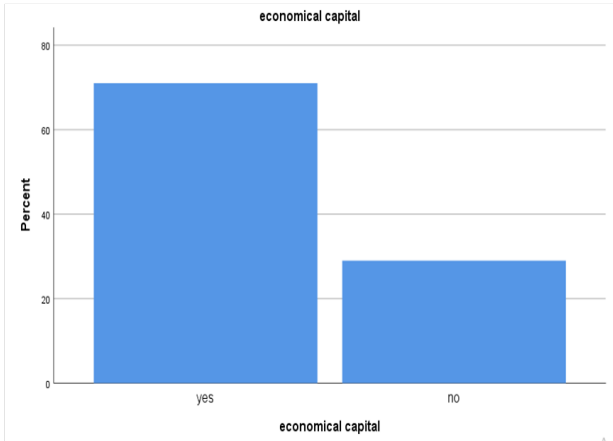
**Figure 4: Bar graph representing percentage of respondents who think community transmission is increasing in their area**



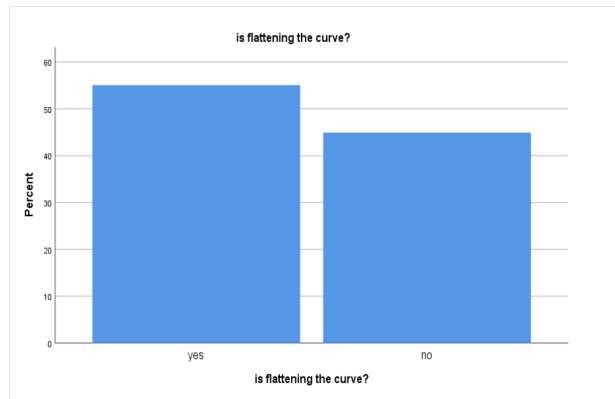
**Figure 5: Bar graph representing percentage of respondents who believe Kerala is the first state in India to 'flatten the curve'**



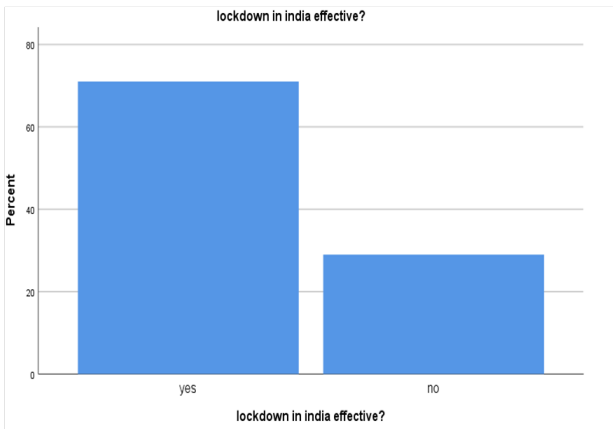
**Figure 6: Bar graph representing percentage of respondents who think it was more effective to start lockdown earlier in India before other countries**



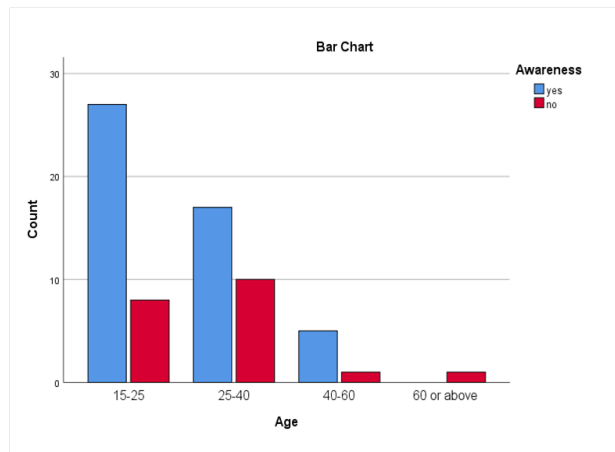
**Figure 7: Percentage of people who think lockdown can affect India's economic capital**



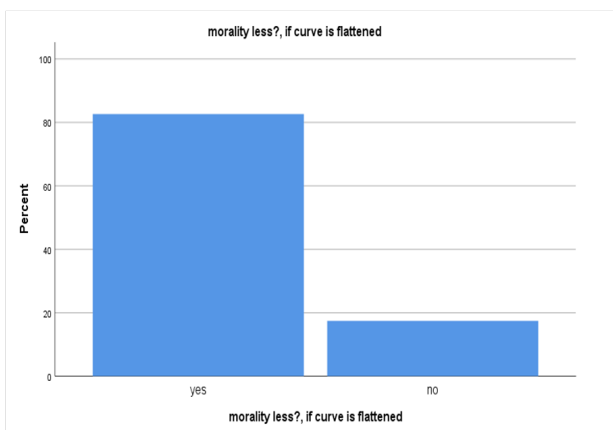
**Figure 10: Bar graph representing percentage of respondents who know 'what is flattening the curve'**



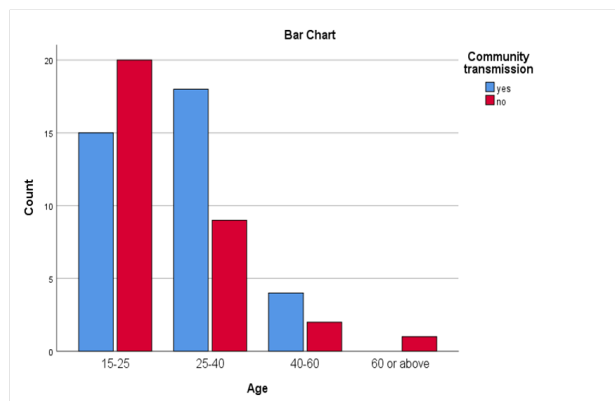
**Figure 8: Bar graph representing percentage of people who believe lockdown implemented in India is effective**



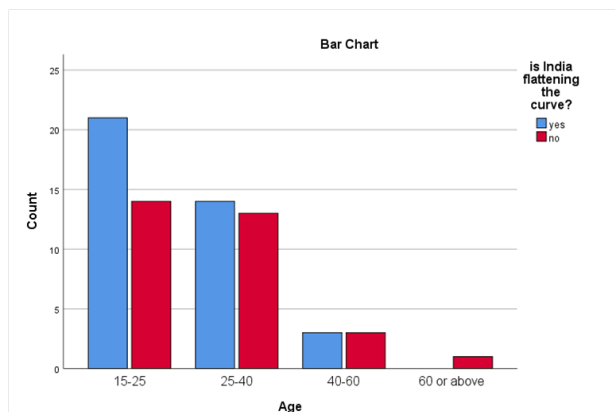
**Figure 11: Association between age and awareness on flattening the covid 19 curve**



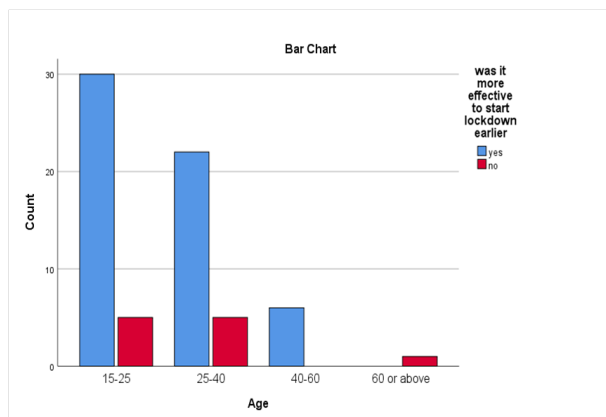
**Figure 9: Bar graph representing percentage of people who think mortality will be less if the curve is flattened**



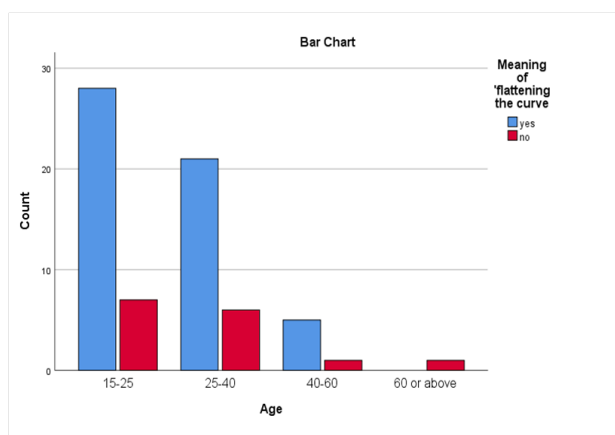
**Figure 12: Association between age and awareness on community transmission**



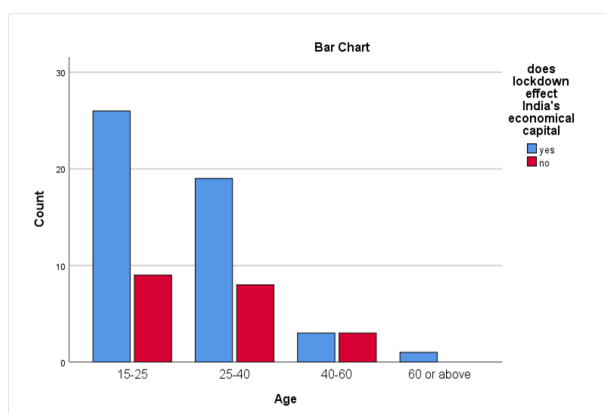
**Figure 13: Association between age and opinion on India flattening the covid 19 curve. p value is 0.62**



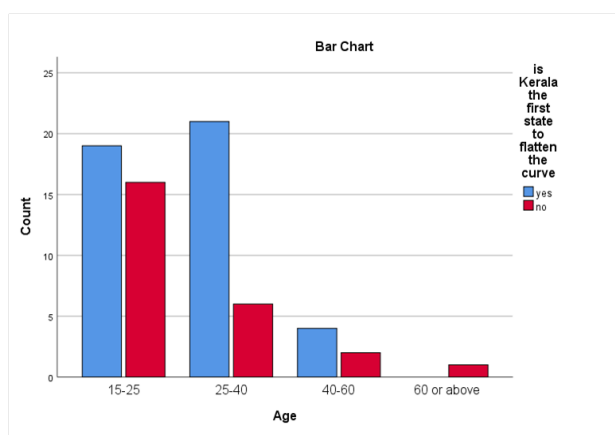
**Figure 16: Association between age and opinion on starting lockdown earlier in India before other countries**



**Figure 14: Association between age and respondents aware of meaning of 'flattening the curve'**



**Figure 17: Association between age and lockdown's effect on India's economic capital**



**Figure 15: Association between age and opinion on Kerala's flattening**

responses. Those who agree -71% those who do not agree - 29%

Figure 8, X axis represents whether the respondents agree or disagree and Y axis represents the no. of responses. Those who agree -71 %, those who disagree -29 %

Figure 11, X axis represents the age and Y axis represents the no. of responses on awareness about flattening the covid 19 curve. Chi square analysis shows p value is 0.223 (p value > 0.05) which is statistically not significant.

Figure 12, X axis represents the age and Y axis represents the knowledge of awareness on flattening the covid 19 curve. Chi square analysis shows p value is 0.169 (p value > 0.05) which is statistically not significant.

Figure 13, X axis represents the age and Y axis represents the awareness on India flattening the curve. Chi square analysis is shows p value is 0.627 (p value > 0.05) which is statistically not significant.

Figure 14, X axis represents the age and Y axis represents the awareness of the meaning of 'flattening the

curve'. Chi square analysis shows p value is 0.289 (p value > 0.05) which is statistically not significant.

Figure 15, X axis represents the age and Y axis represents opinion on Kerala's flattening curve'. Chi square analysis is shows p value is 0.142 (p value > 0.05) which is statistically not significant

Figure 16, X axis represents the age and Y axis represents opinion on starting lock down earlier in India before other countries. Chi square analysis shows p value is 0.85 (p value > 0.05) which is statistically not significant

Figure 17, X axis represents the age and Y axis represents lockdown's effect on India's economic capital. Chi square analysis shows p value is 0.597 (p value > 0.05) which is statistically not significant.

Although COVID-19 has symptoms similar to seasonal influenza, SARS-CoV-2 has much higher transmissibility, the incubation period is different, and the mortality rate is higher. Based on the reproduction number, R0 2.2-2.68 (number of cases directly generated by one case) while in the seasonal influenza virus R0 is 1.3 and 1.5 in H1N1 influenza, SARS had an R0 between 2 and 3 while the MERS R0 is <1. The mortality rate is also much higher (2.3% in COVID-19 vs 0.13% in seasonal influenza and 0.20% in H1N1 influenza) (Novel Coronavirus Pneumonia Emergency Response Epidemiology Team, 2020).

The two important strategies to flatten curve as suggested by (Schramm, 2020) would be to decrease the infectivity parameter or increase the speed of recovery.

The countermeasures to decrease the spread would be the following suggestions put forth by many experts in the field. Decrease the chances of exposure by increasing sanitation measures, such as masks, hand washing, hand sanitising, by reducing the intensity with which people interact, limiting travel, encouraging people to work from home and reduce large gatherings. Also quarantining infected individuals and include self-quarantine might increase the speed of recovery (Schramm, 2020).

Many regulations were brought about by the WHO during the pandemic situation in the previous years, mainly after the 2002-2004 SARS outbreak (Gopalan and Misra, 2020). Governments including the United States and France, before 2009 swine flu pandemic, and during the last decade following the pandemic, bolstered their health care capacities after which the facilities were weakened (Sharfstein, 2018). At the time of the covid-19 pandemic, health care systems in many nations have been function-

ing their maximum capacities. Empathy is important to handle patients with covid-19 (Prasanna and Gheena, 2016). Medical negligence should be avoided as the clinician has to face several legal problems when he shows medical negligence (Uma et al., 2020). Coronavirus gets worse, when it affects old age individuals especially those in nursing homes (Palati et al., 2020).

Coronavirus can effect the same level in both males and females, and there is no difference for different genders even though a slight male predilection has been reported. In a situation like this, when a widespread new pandemic rises and the demand surpasses the ability to control, then the prevailing health facilities cannot adequately cope with the patients, resulting in more deaths than if preparations had been made (Marques, 2020). Our previous research was conducted in many topics like surgical specimen handover (Krishnan et al., 2018), diagnostic studies (Shree et al., 2019) age estimation, identification based on gender (Palati et al., 2019; Abitha and Santhanam, 2019), ethics and scope of dental photography (Hannah et al., 2018), tooth sensitivity among residential university students (Gunasekaran and Abilasha, 2016) and microbial variation in climatic change (Gunasekaran and Abilasha, 2016; Sarbeen and Gheena, 2016) which have shown that it's essential to follow safety precautions and maintain hygiene to overcome various challenges.

## MATERIALS AND METHODS

The present study was carried out among a group of people in the region of Kerala selected by random sampling method. A questionnaire-based observational cross-sectional type of study comprising 100 people was conducted. A self-administered questionnaire was circulated through an online survey and created in google forms. The data was analysed and represented in the pie chart and bar graphs. The data collected in google forms were converted to excel sheet. The data in the excel sheet was transferred to SPSS software. It involves both statistical and percentage analysis, and results were in the form of a bar graph with conclusions. The independent variables used were age, gender, and knowledge, while the dependent variables include awareness and knowledge.

## RESULTS AND DISCUSSION

There are extensive knowledge and awareness on flattening the covid-19 pandemic among the participants. The respondents were of different age groups (Figure 1) shows that 50.7% were from 15-

25 years age group, 39.1% of the respondents were from the 25-40 years age group. 8.7% of the respondents were from 40-60 years of age and different gender (Figure 2). In the present study, the majority of the respondents (71%) are aware of the covid-19 curve. In a similar kind of research by L Thungstrom, the results are supporting the present study (Thunstrom *et al.*, 2020), (Figure 3) shows that X axis represents whether respondents are aware about the covid-19 curve and Y axis represents the number of respondents who said yes or no. Percentage of respondents who are aware - 71 % Percentage of respondents who are not aware - 29 %. In the present study, the majority of the respondents believed that community transmission is increasing in their area (Figure 4) shows that X axis represents whether the respondents feel there is increase in community transmission or not and Y axis represents no. of responses. Respondents who feel there is transmission - 53.6%, Percentage of respondents who feel there is no transmission - 46.4 %. In this study, most of the people thought that India is flattening the curve (55.1%) and they also supported that Kerala is the first state in India to flatten the curve (63.8%) (Figure 5) shows that X axis represents whether the respondents agree or disagree that Kerala is flattening the curve and Y axis represents number of responses. Percentage of respondents who agree - 63.8 % those who do not agree - 36.2 %. When we took the count of people who wanted to start the lockdown earlier in India before other countries, almost 85% of the respondents supported it (Figure 6) shows that X axis represents whether respondents agree that lockdown was earlier in India before other countries or disagree and Y axis represents the number of responses. Those who agree - 84.1 % those who do not agree - 15.9%. When the respondents were asked, if lockdown can affect India's economic capital, the majority of the respondents (71%) believed it affects (Figure 7). In a similar kind of study by S Agarwal, they had the same types of results supporting the present study. In this study, the majority of the people (71%) believe lockdown implemented in India is effective (Figure 8). In a study by P Pulla, the results were contradictory to the present study. It may be because of the geographical area of the respondents who attended the survey (Pulla, 2020). In this study, 82.6% of the respondents believed that the mortality rate would be less if the curve is flattened (Figure 9) shows that X axis represents whether people agree or disagree and Y axis represents the no. of responses. Those who agree that the curve flattening will decrease mortality - 82.6% those who disagree - 17.4%. In another study by

V Rotondi, the results are supporting the present study (Rotondi and Andriano, 2020). In the present study, the majority of the respondents were aware of the meaning of 'flattening the curve' (Figure 10) shows that X axis represents whether the respondents are aware or not aware, Y axis represents the no. of response. Those who are aware - 77.9 %, those who are not aware - 22.1%.

Association between the age and the various parameters in flattening of the covid-19 curve was analysed using chi-square test and mentioned in the graphs (Figures 11, 12, 13, 14, 15, 16 and 17), p-value more than 0.05 was considered to be statistically insignificant.

Numerous research has been done by our team previously, on the determination of physical height using the crown length of deciduous teeth (Harrita and Santhanam, 2019), evidence-based dentistry among dental practitioners (Ahad and Gheena, 2016), molar incisor hypomineralisation (Sukumaran and Padavala, 2018), a study on causes of pigmentation on gingiva (Manohar and Abilasha, 2019) and knowledge and awareness on oral biopsy. (Sheriff and Santhanam, 2018), which are general awareness studies done among dental students. Such studies have to be conducted often to improve the knowledge of individuals about a particular situation or condition.

## CONCLUSIONS

In the present study, most of the respondents are aware of flattening the covid-19 curve. More awareness has to be created to make everyone know the importance of flattening the curve. The limitations in the present study include the number of people involved in the research and limited geographical area. More number of people should be included in the survey, and it should not stick into a particular geographic area or a homogenous community. Otherwise, we cannot generalise the results. Including more participants and comparing with the present study can help in giving precise results in the coming future, thus assisting the government to "flatten the curve."

### Funding Support

None

### Conflict of Interest

None.

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