



Research Article

## Myths regarding COVID-19 among Indian population – An online survey

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### ABSTRACT

**Objectives:** The coronavirus disease (COVID-19) has been recognized as one of the fast spreading infectious outbreaks of the recent times. In such situations, assessing the knowledge concerning the myths of the disease is crucial. Hence, this study employs a rapid online survey methodology to check the prevalence of myths concerning COVID-19 among a convenient sample of Indian population.

**Materials and Methods:** A total of 1016 respondents participated in the study. Demographic details along with the data regarding the myths of COVID-19 were collected and evaluated using 19 questions in a yes/no format. Mean score and overall mean score for the incorrect responses were calculated and compared based on demographic variables using *t*-test for two variables and analysis of variance (ANOVA) for three or more variables.

**Results:** The mean score for myths among the study population was 7.17 + 3.27 that displayed significant difference for educational level with postgraduation degree holders having lower score ( $P = 0.007$ ). Multiple logistic regression analysis indicated younger age group (18–30 years) ( $P = 0.01$ ) and middle age groups (41–60 years) ( $P = 0.04$ ) which were at higher odds of myths related to COVID-19 as compared to older age group (61+ years).

**Conclusion:** On the whole, 44.69% of the population had high levels of myths. Such kind of population should be included as part of the disease surveillance and campaigns by the public health authorities that might facilitate to alleviate the fear and anxiety among the general population.

**Keywords:** COVID-19, Myths, Prevalence, Knowledge, Pandemic, General population

### INTRODUCTION

Coronavirus disease (COVID-19) caused by novel coronavirus has emerged as a global pandemic in the past few months.<sup>[1]</sup> The contagious nature of this virus has led to a public health crisis, with the World Health Organization (WHO) declaring it a Public Health Emergency of International Concern on January 30, 2020.<sup>[2]</sup>

The pandemic hit India in the month of March and since then the Government of India along with health authorities is strategizing countermeasures to contain the disease and to stem the devastating effects. To begin with a nationwide lockdown was enforced from 25 of March to interrupt the chain and “flatten the curve” of COVID-19 infection. Introduction of Aarogya Setu mobile application to educate citizens about novel coronavirus facilitates them in making

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informed decisions amid the crisis.<sup>[3]</sup> Social media campaigns to educate public on physical distancing, hand hygiene, personal protection, etc., are some of the implementation measures undertaken by Government of India.

Facilitating outbreak management of COVID-19 urges a need to understand the public's awareness of COVID-19. Prevention of such outbreaks largely depends on how the population accepts it and behaves that successively is influenced by what individuals apprehend and believe about the disease.<sup>[4]</sup> Since the course of this disease, its outcome, and long term effects are unclear, it has created a state of panic among the general population with social media providing easy access to information concerning this disease.

A particular concern in this regard is the spread of misinformation about COVID-19 among general population which would further add to fear and anxiety. Midst this situation, the World Health Organization (WHO) has addressed the topic, that is, "Myth Busters" on its website to avoid the spread of false information.<sup>[5]</sup>

Hence, understanding general population awareness and myths about COVID-19 may prove important for improving emergency responses, enhancing sentiment awareness and support decision-making.<sup>[6]</sup> It additionally may help the public health authorities in designing effective campaigns.

Since this disease is swiftly spreading across the globe, it calls for a rapid testing methodology to assess the populations knowledge and perception of the infection.<sup>[7]</sup> Thus, this study employs a rapid online survey methodology to assess the prevalence of myth's concerning COVID-19 among a convenient sample of Indian population.

## MATERIALS AND METHODS

Ethical clearance was obtained from the Review Board. This cross-sectional online questionnaire survey utilized a convenient sampling technique.

The sample size was determined based on a pilot survey. A minimum sample of 1003 participants was arrived at based on the pilot survey and calculation using the formula  $n = Z^2pq/d^2$ . Where,  $Z$  = Standard normal variate value ( $Z$ -value) = 2.58 at 99% confidence,  $P$  = Prevalence = 59.47%,  $q = 100 - p$ , (i.e.)  $100 - 59.47$ ,  $d$  = precision = 4%.

The questionnaire gathering demographic data and the myth's relating to COVID-19 was designed using an online survey administration app, Google Forms (Google LLC) for easy access and understanding and circulated through WhatsApp (WhatsApp Inc., USA). Participation was voluntary and informed consent was obtained through the questionnaire. People aged 18 years and above, with smartphone and WhatsApp application, ability to understand

and read English, residing in the State of Telangana, India, were included for the study.

Age, gender, and educational qualifications were the demographic details recorded and the various myths relating to COVID-19 were evaluated using nineteen questions in a yes/no format. The correct response was yes for all the questions except Q2, for which the response was no.

For each incorrect response, a score of 1 was assigned. Mean score for each question and overall mean score for the incorrect responses were calculated to categorize into low and high levels of incorrect knowledge, lower score signifying lesser incorrect knowledge. Data were analyzed using SPSS software. Descriptive statistics in the form of number and percentages were calculated and compared based on demographic variables using  $t$ -test for two variables and analysis of variance (ANOVA) for three or more variables. Comparison of low level and high level of incorrect knowledge was done for demographic variables. Multiple logistic regression analysis of levels of incorrect knowledge with demographic variables was evaluated.  $P \leq 0.05$  was considered statistically significant.

## RESULTS

A total of 1016 respondents participated in the study. Of which 50.10% (509) were female 49.9% (507), male with around 46.26% (470) belonging to the age group of 18–30 years, and the rest belonging to the other age group categories. Majority of the study population were either undergraduates (44.09%) or postgraduates (42.52%).

[Table 1] demonstrates the demographic details of the study population in number and percentage. [Table 2] illustrates the distribution of responses for every question in percentages of correct and incorrect knowledge. It was observed that only Q no. Q3, Q6, Q7, Q10, and Q19 had majority incorrect responses.

**Table 1:** Demographic profile of respondents.

Demographic profile	No. of respondents $n$ (%)
Age groups	
18–30 years	470 (46.26)
31–40 years	210 (20.67)
41–60 years	219 (21.56)
61+ years	117 (11.52)
Gender	
Male	507 (49.9)
Female	509 (50.10)
Education	
High school	136 (13.39)
Undergraduate degree	448 (44.09)
Postgraduate degree	432 (42.52)
Total	1016 (100.00)

**Table 2:** Distribution of responses for questions.

Q. No.	Questions	n (%)	
		Correct	Incorrect
Q1	People who are infected with the common flu are likely to get infected with the COVID-19?	776 (76.38)	240 (23.62)
Q2	Are those with other health problems like diabetes, hypertension more likely to acquire the COVID-19 disease than those without any other health problems?	619 (60.93)	397 (39.07)
Q3	Would it be wise not to eat food from Chinese restaurants for the next few weeks to reduce the risk of getting infected with the COVID-19?	449 (44.19)	567 (55.81)
Q4	Do you think pregnant women can transmit the virus to the baby inside?	712 (70.08)	304 (29.92)
Q5	Do you think the virus be transmitted from mother to child through breastfeeding?	688 (67.72)	328 (32.28)
Q6	Do you think multivitamins and immunoboosters help in protecting an individual from the COVID-19 virus?	246 (24.21)	770 (75.79)
Q7	Eating garlic, turmeric, ginger, or applying oil can help prevent COVID-19 disease?	466(45.87)	550 (54.13)
Q8	Exposing yourself to sun or higher temperatures can prevent the COVID-19 disease?	631 (62.11)	385 (37.89)
Q9	Do you think COVID-19 will go away on its own in warm weather?	807 (79.43)	209 (20.57)
Q10	Cold weather can increase the chance of catching the COVID-19 virus infection easily?	290 (28.54)	726 (71.46)
Q11	Do you think taking a hot bath prevents the new COVID-19 disease?	698 (68.70)	318 (31.30)
Q12	Do you think the COVID-19 virus can be transmitted through mosquito bites and pests	972 (95.67)	44 (4.33)
Q13	Do you think spraying alcohol or chlorine all over the body can prevent or kill the COVID-19 virus?	715 (70.37)	301 (29.63)
Q14	Do you think hand dryers are effective in killing the COVID-19 virus?	822 (80.91)	194 (19.09)
Q15	Ultraviolet disinfection lamps can kill the COVID-19 virus?	661 (65.06)	355(34.94)
Q16	Are antibiotics and antiviral effective against the COVID-19 virus?	770 (75.79)	246 (24.21)
Q17	Once infected with the COVID-19 virus there are chances that you are susceptible to lung infections throughout your life?	807(79.43)	209(20.57)
Q18	Being able to hold your breath for 10 s or more without coughing or feeling discomfort mean you are free from the COVID-19 disease or any other lung disease.	592 (58.27)	424 (41.73)
Q19	Do you think washing your vegetables and groceries with disinfectants would prevent the COVID-19 disease.	295 (29.04)	721 (70.96)

\*Except for Q2 for all other questions the correct response is yes. For Q2, correct response is no

Comparison of incorrect responses (myths) based on demographic variables is shown in [Table 3]. Age group has shown significant difference with most of the questions except Q6, Q12, and Q17, wherein no particular age group showed significant incorrect responses to all the questions. Overall, gender had a significant influence on the responses to question numbers (Q1, Q2, Q3, Q7, Q11, and Q14) with females accounting more incorrect responses to Q1 ( $P = 0.05$ ) and Q3 ( $P = 0.04$ ), while male population had significantly more myths for Q2, Q7, Q11, and Q14. On the other hand, educational status played a significant role for majority of the questions (Q2, Q3, Q5, Q10, Q13, Q14–16, and Q 18–19).

The mean score for myths for the entire study population was  $7.17 \pm 3.27$ , which was significant for educational level with postgraduation degree holders having lower score ( $P = 0.007$ ). *Post hoc* analysis reveals significance between high school and postgraduate educational level ( $P = 0.01$ ) [Table 4].

On the whole, 55.31% of the surveyed population had low levels of myths that were significant in comparison to number of people who had high levels of incorrect knowledge ( $P = 0.0001$ ). On the basis of level of incorrect knowledge,

none of the demographic variables revealed a significant difference [Table 5].

Multiple logistic regression analysis indicated that respondents with high school level of education had 1.56 higher odds of incorrect knowledge as compared to those with postgraduate degree. Younger age group (18–30 years) ( $P = 0.01$ ) and middle age groups (41–60 years) ( $P = 0.04$ ) were at higher odds of myths related to COVID-19 as compared to older age group (61+ years) [Table 6].

## DISCUSSION

Preventive measures are the sole existing strategy to limit the spread of COVID-19 infection as there are no substantiated treatment protocols and vaccine till date.<sup>[8]</sup>

It has been established that assessing knowledge and awareness related to the varying preventive measures or myths among general population would be critical in reducing the transmission of infection which has been studied and reported within the literature.<sup>[9–11]</sup> Obtaining appropriate information at the right time about the perception of public may be the key to successful management through these perplexing times.

**Table 3:** Comparison of incorrect responses (myths) based on demographic variables.

Q. No.	Age groups in years				p	Gender			Educational level			
	18-30	31-40	41-60	61+		Male	Female	P-value	High school	Undergraduate degree	Postgraduate degree	P-value
Q1	126 (26.81)	51 (24.29)	44 (20.09)	19 (16.24)	0.05*	107 (21.10)	133 (26.13)	0.05	37 (27.21)	110 (24.55)	93 (21.53)	0.32
Q2	198 (42.13)	87 (41.43)	82 (37.44)	30 (25.64)	0.01*	222 (43.79)	175 (34.38)	0.002*	46 (33.82)	195 (43.53)	156 (36.11)	0.03*
Q3	259 (55.11)	119 (56.67)	122 (55.71)	67 (57.26)	0.96	267 (52.66)	300 (58.94)	0.04*	91 (66.91)	247 (55.13)	229 (53.01)	0.01*
Q4	141 (30.00)	59 (28.10)	57 (26.03)	47 (40.17)	0.05*	155 (30.57)	149 (29.27)	0.65	49 (36.03)	129 (28.79)	126 (29.17)	0.24
Q5	154 (32.77)	70 (33.33)	60 (27.40)	44 (37.61)	0.25	156 (30.77)	172 (33.79)	0.30	61 (44.85)	144 (32.14)	123 (28.47)	0.002*
Q6	349 (74.26)	165 (78.57)	162 (73.97)	94 (80.34)	0.36	384 (75.74)	386 (75.83)	0.97	107 (78.68)	349 (77.90)	314 (72.69)	0.13
Q7	209 (44.47)	128 (60.95)	130 (59.36)	83 (70.94)	0.0001*	298 (58.78)	252 (49.51)	0.003*	82 (60.29)	227 (50.67)	241 (55.79)	0.09
Q8	141 (30.00)	81 (38.57)	96 (43.84)	67 (57.26)	0.0001*	203 (40.04)	182 (35.76)	0.15	52 (38.24)	180 (40.18)	153 (35.42)	0.34
Q9	78 (16.60)	49 (23.33)	46 (21.00)	36 (30.77)	0.005*	103 (20.32)	106 (20.83)	0.84	31 (22.79)	102 (22.77)	76 (17.59)	0.13
Q10	345 (73.40)	154 (73.33)	155 (70.78)	72 (61.54)	0.07	350 (69.03)	376 (73.87)	0.08	78 (57.35)	335 (74.78)	313 (72.45)	0.0001*
Q11	118 (25.11)	68 (32.38)	86 (39.27)	46 (39.32)	0.0001*	179 (35.31)	139 (27.31)	0.006*	46 (33.82)	135 (30.13)	137 (31.71)	0.69
Q12	28 (5.96)	9 (4.29)	4 (1.83)	3 (2.56)	0.06	23 (4.54)	21 (4.13)	0.74	6 (4.41)	20 (4.46)	18 (4.17)	0.97
Q13	161 (34.26)	50 (23.81)	56 (25.57)	34 (29.06)	0.01*	157 (30.97)	144 (28.29)	0.35	56 (41.18)	136 (30.36)	109 (25.23)	0.002*
Q14	80 (17.02)	38 (18.10)	43 (19.63)	33 (28.21)	0.05*	118 (23.27)	76 (14.93)	0.001*	31 (22.79)	89 (19.87)	74 (17.13)	0.29
Q15	176 (37.45)	54 (25.71)	77 (35.16)	48 (41.03)	0.01*	182 (35.90)	173 (33.99)	0.52	66 (48.53)	154 (34.38)	135 (31.25)	0.001*
Q16	142 (30.21)	46 (21.90)	37 (16.89)	21 (17.95)	0.0001*	129 (25.44)	117 (22.99)	0.36	45 (33.09)	122 (27.23)	79 (18.29)	0.0001*
Q17	108 (22.98)	38 (18.10)	41 (18.72)	22 (18.80)	0.37	102 (20.12)	107 (21.02)	0.72	23 (16.91)	98 (21.88)	88 (20.37)	0.45
Q18	163 (34.68)	93 (44.29)	111 (50.68)	57 (48.72)	0.0001*	206 (40.63)	218 (42.83)	0.47	42 (30.88)	186 (41.52)	196 (45.37)	0.01*
Q19	346 (73.62)	137 (65.24)	143 (65.30)	95 (81.20)	0.003*	358 (70.61)	363 (71.32)	0.80	108 (79.41)	317 (70.76)	296 (68.52)	0.05*

\*P&lt;0.05: Statistically significant

“Myth” is a generic term for popular beliefs, which have been proven over time to be invalid.<sup>[12]</sup> Myths are more powerful than logic to which it has always been opposed.<sup>[13]</sup> Thus, for correct understanding of an illness, it is vital to enlighten the general public concerning the frequently prevailing myths.

Our study highlights the importance of identifying the prevalence of myths concerning COVID-19 among general population that might facilitate the health regulative authorities to conduct relevant information campaigns, communication of health-care staff with the patients.

Furthermore, with a myriad of data available, it is vital to know which information to trust.

In the present study, the overall mean scores were  $7.17 \pm 3.27$  that signify the participants who had adequate knowledge with less of myths. On the whole, 44.69% of population had high levels of incorrect knowledge and myths concerning the disease. This identifies and places them as vulnerable group, requiring adequate dissemination of knowledge and awareness relating to the facts on COVID-19 by the health authorities. To this end, Government of India has

**Table 4:** Comparison of demographic variables with mean knowledge scores.

Demographic variables	Incorrect knowledge (myths)		P-value
	Mean	SD	
Age groups			
18–30 years	7.07	3.22	0.13
31–40 years	7.12	3.21	
41–60 years	7.09	3.35	
61+ years	7.85	3.36	
Gender			
Male	7.30	3.27	0.23
Female	7.05	3.27	
Educational level			
High school	7.77	3.32	0.007*
Undergraduate degree	7.31	3.23	
Postgraduate degree	6.84	3.26	
Total mean score	7.17	3.27	

\*P<0.05: Statistically significant

**Table 5:** Association between levels of incorrect knowledge (myths) with demographic profile.

Demographic profile	Levels of incorrect knowledge n (%)		Total	p-value
	Low level	High level		
Age groups				
18–30 years	267 (56.81)	203 (43.19)	470	0.10
31–40 years	114 (54.29)	96 (45.71)	210	
41–60 years	128 (58.45)	91 (41.55)	219	
61+ years	53 (45.30)	64 (54.70)	117	
Gender				
Male	275 (54.24)	232 (45.76)	507	0.49
Female	287 (56.39)	222 (43.61)	509	
Education				
High school	67 (49.26)	69 (50.74)	136	0.14
Undergraduate degree	243 (54.24)	205 (45.76)	448	
Postgraduate degree	252 (58.33)	180 (41.67)	432	
Total	562 (55.31)	454 (44.69)	1016	

\*P<0.05: Statistically significant

made information available in vernacular languages, with pictorial representation of messages and also adopted audio communication modes to reach out to all sectors of the society.

About 55.31% of the participants demonstrated significant low levels of myths ( $P = 0.0001$ ). This could be attributed to a convenient population of sample enrolled in the study. The educational status and good knowledge regarding the high infectivity of the COVID-19 virus and its strategies of transmission might have influenced the scores obtained. This

**Table 6:** Multiple logistic regression analysis of levels of incorrect knowledge.

Demographic profile	OR	95% CI for OR		P-value
		Lower	Upper	
Age groups				
18–30 years	0.59	0.39	0.90	0.01*
31–40 years	0.75	0.48	1.20	0.23
41–60 years	0.62	0.39	0.98	0.04*
61+ years	Ref.			
Gender				
Male	Ref.			
Female	1.56	1.03	2.36	0.69
Education				
High school	1.56	1.03	2.36	0.03*
Undergraduate degree	1.29	0.96	1.72	0.08
Postgraduate degree	Ref.			

\*P<0.05: Statistically significant

group can further be encouraged to gain better knowledge through various authentic sources of information, being helpful to educate the others within the society.

A convenient sampling technique was employed to suit the WhatsApp-based method of circulation of the questionnaire which was prepared based on the myths listed by the WHO in their website.<sup>[5]</sup>

Since the emergence of the pandemic, several myths that might have been circulated in the numerous social media platforms or through word of mouth may have influenced the general population. The most frequently believed myth is the usage of multivitamins and immunoboosters to forestall the disease. Consistent with literature our physiology needs adequate amounts of micronutrients such as Vitamins A,C, D, and E and zinc to function normally. Micronutrients are integral to immune system to ensure proper functioning of physical barriers and immune cells.<sup>[14,15]</sup>

However, higher doses of micronutrients have not been proved to boost the system function better<sup>[16]</sup> and till date there are not any evidenced treatment strategies in regard to the COVID-19 disease.

Grant *et al.*, 2020,<sup>[17]</sup> have stated that since Vitamins D and C reduce the risk of microbial and viral infection, it was proposed to be effective in preventing and treating COVID-19.<sup>[18]</sup> However, this needs human clinical trials addressing the dosage and combinations in different population to substantiate the benefits.<sup>[15]</sup>

Ayurveda is an ancient system of medicine of Indian subcontinent. Garlic, ginger, turmeric, and oils are widely used in Ayurvedic preparations and also conjointly as home remedies in India. It is believed that they possess

antimicrobial and anti-inflammatory properties. This could have been the reason for the widely prevailing myth that eating garlic, turmeric, ginger, or applying oil can help prevent COVID-19 reported in the present study. However, there is no evidence from the current outbreak that eating garlic, turmeric, and ginger have protected people from COVID-19.<sup>[5,16]</sup>

Racial/ethnic variations in chronic disease morbidity and mortality are well documented.<sup>[19,20]</sup> The fact that COVID-19 originated from China could be the reason for general public to believe that eating food from Chinese restaurants would increase the risk of getting infected with the virus. This signifies lack of information relating to the disease transmission. Since there is no evidence that the COVID-19 virus is confined to a specific group this can be considered a myth.

The previous studies have shown the importance of weather variables within the transmission of infectious diseases, such as influenza and severe acute respiratory syndrome (SARS). A sharp change of ambient temperature was associated with increased risk of SARS<sup>[21,22]</sup> and influenza transmission is usually increased in the presence of cold and/or dry air.<sup>[23]</sup> However, it has been proven that COVID-19 virus can sustain high temperature and UV radiation.<sup>[24]</sup>

Similarly, cold weather and snow cannot kill or spread the virus and exposing to sun or higher temperatures also does not prevent nor cure COVID-19. The fact that normal human body temperature remains around 36.5°C and 37°C regardless of the external temperature or weather confirms the fact that spread of disease is independent of weather conditions.<sup>[5]</sup>

Finally, the study population believed that washing vegetables and groceries with disinfectants would forestall the COVID-19 disease which lacks any documented evidence. According to the WHO, the vegetables ought to be washed meticulously in any circumstances practicing hand hygiene before and after handling vegetables.<sup>[5]</sup>

In the present study, multiple logistic regression analysis indicated that respondents with high school level of education had 1.56 higher odds of incorrect knowledge as compared to those with postgraduate degree. This attributed to the intense scenario of the pandemic compelling them to actively acquire knowledge of this infectious disease from various channels of information such as televisions, official website of the WHO, and Centre for disease Control. The significant positive association between levels of education and lower incorrect knowledge scores supports this speculation.<sup>[25]</sup>

Younger age group (18–30 years) ( $P = 0.01$ ) and middle age groups (41–60 years) ( $P = 0.04$ ) were at higher odds of myths related to COVID-19 as compared to older age group (61+ years). As stated in the literature, this could be

attributed to better understanding and sensible knowledge of the circumstances.<sup>[25-27]</sup>

The limitations of the present study embody the convenient sampling technique, as opposed to random sampling, may not avoid subjective selection bias and thus diminish the internal validity. The cross-sectional nature of the study design fails to establish cause-effect association highlighting the necessity for a longitudinal study. Smartphone-based application and English language are some of the short comings of the study because of which vulnerable populations of the Indian society under the COVID-19 pandemic such as older adults and rural people at grassroot could not be included within the study. A standardized questionnaire was not employed in the study.

## CONCLUSION

The findings of this study suggest that the health authorities need to focus on the vulnerable population who have shown high levels of incorrect knowledge this might most likely ensue to restricted access to internet and online health information resources. Hence, the authorities and health-care employees need to target such population and provide them with the correct information which might facilitate in prevention and transmission of the disease.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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