A descriptive cross-sectional study on COVID-19 knowledge, attitude, and practices of South Indian population

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Abstract:

BACKGROUND: The 2019-novel coronavirus (2019-nCoV) started as an epidemic later transformed into a pandemic causing a threat to public health globally. Any community to fight the COVID-19 pandemic requires adequate knowledge, attitude of the people, and practice of the government-imposed laws and regulations. Based on these factors, we framed the objectives to find the sociodemographic profile of the study group and to assess their knowledge, attitude, and practice (KAP) toward COVID-19. These results will help the health planners and administrators in each state to find out the gap in health education efforts.

MATERIALS AND METHODS: A descriptive, cross-sectional study was conducted on South Indian population to know KAP toward COVID-19. A convenient sampling technique was used to collect the data using Google forms, and analysis was done using the SPSS software version 21. The questionnaire includes sociodemographic information, KAP questions toward COVID-19, and perception toward national and community responses.

RESULTS: A total of 1644 were participated; the average knowledge score was 17.5 (+1.9). Most of them (92.9%) respondent’s perceived that early detection will have a better outcome from COVID-19, whereas the knowledge compared with practice, there is a significant difference Pearson correlation (0.404) \( P \) is < 0.001.

CONCLUSIONS: Although a high level of knowledge on COVID-19 in the public gradually decreasing the practice of preventive measures, the government should continue the consistent efforts to change the behavioral communication and motivate the public social responsibility to adhere to the health protocols, masking, hand hygiene, social distancing, and vaccination to prevent expected COVID-19 subsequent episodes.

Keywords: Attitudes, behavioral communication, COVID-19, knowledge, pandemic, practices, preventive measures, South India

Introduction

Over the past few years, emergent threats posed by infectious diseases have become public health concerns which have increased the need for prompt disease outbreak warnings. The first outbreak of the 2019-novel coronavirus (2019-nCoV) was identified in Wuhan, Hubei Province during December 2019 which started as an epidemic later became a pandemic causing a threat to public health worldwide. Based on the recommendations of the International Health Regulations (2005) Emergency Committee, on January 30, 2020, the WHO Director-General has declared that the outbreak of novel coronavirus (2019-nCoV) is a global public health emergency. As of

How to cite this article: Patan SK, Chittem SD, Madithati P, Narapureddy BR, Chittooru CS, Reddy Lingala KV, et al. A descriptive cross-sectional study on COVID-19 knowledge, attitude, and practices of South Indian population. J Edu Health Promot 2021;10:420.
February 25, 2021, total confirmed cases and deaths globally were 113,543,465 and 2,518,740, respectively.\[3\]

The uncertainties caused by COVID19 have had consequences in several sectors, and implications on the population’s day to day activities. These COVID 19 consequences would be faced by humanity for a decade or so.\[4\] The common social change brought about by the COVID-19 was hygiene practices and social distancing among the population.\[5\] Although voluntary self-quarantine is not the only solution, complete knowledge is required to control this epidemic situation effectively and efficiently.\[6\] Irrespective of symptoms, usage of the mask by the general population may lead to the reduction of infectivity in the susceptible individuals from the silent COVID-19 cases.\[7\] The World Health Organization has instructed to maintain a minimum physical distance of 1 m, perform hand hygiene, usage of the mask, and refraining from touching the mouth, nose, and eyes.\[8\] Despite the unparalleled measures deployed in tackling the spread of the outbreak, the results of the efforts are largely dependent on the conduct of people. Further, the adherence of the communities of various socioeconomic status people to healthy practices plays a major role in preventing the spread of the disease.\[9\] With this background, the present study aims to recognize whether the general population has gained adequate knowledge, developed a responsible attitude, and practicing safety measures to avoid contracting the disease.

Materials and Methods

Study design and setting
A descriptive, cross-sectional study was conducted to find the knowledge, attitude, and practice (KAP) about COVID-19 from September 15, 2020, to October 25, 2020.

Study participants
The general population of South Indian states who were willing to participate and above the age of 18 years.

Sampling
Convenient sampling technique was used under a restricted environment. The representative target sample size needed to achieve the study objectives, and sufficient statistical power was calculated by a sample size calculator.\[8\] The minimum sample size calculated was 1015 participants, and finally, 1644 study participants were included in the study.

Data collection tool and technique
The questionnaire was carefully designed and developed in English and Telugu languages according to the guidelines provided by the government for the community of COVID-19. The questionnaire was pretested using a pilot study for identifying, assessing, and evaluating the questionnaire before using it on the target population. Proper explanation about the objectives of the study, the pros and cons of the study has been made to the respondents. The data collection is performed and accomplished by final year MBBS students after getting adequate training in data collection and data entry in Google forms. After piloting the study pro forma, the actual data were collected, and the investigators were constantly monitored the data collection.

The questionnaire includes sociodemographic information, KAP questions toward COVID-19 and perception toward national and community responses. The sociodemographic consists of variables such as age, gender, marital status, level of education, residential location, type of family, occupation, and the socioeconomic status was determined based on the monthly income of the individual as per the Modified BG Prasad year 2020.\[9\] The components of the knowledge section include the awareness of COVID-19, the causes, signs and symptoms, and the source of information. Attitude sections focus on COVID-19 preventive measures, adherence to government disease prevention orders, social distancing, use of face masks, feelings, and adaptive measures toward the pandemic. The practice section includes perception toward COVID-19 pandemic, government response, and opinion about Indian prospective.\[10\]

Ethical consideration
The enumerator obtained the telephonic verbal consent after explaining the importance of the study, and steps involved in data collection before proceeding from the age above 18 years respondents, willing to participate and sparing time to provide information, also emphasized that they were free to withdraw at any stage of the study, without giving any reason. The authors assured the confidentiality of personal identification, and other information and opinions provided would be anonymous and confidential. Obtained institutional ethical committee clearance with reference number IEC08/AIMSR/07/2020 from the Apollo Institute of Medical Sciences and Research Murukambattu, Chittoor, Andhra Pradesh, India.

Data analysis
Google forms are used to collect the data and Statistical Package for the Social Sciences (SPSS), IBM Corp, Armonk, NY, USA; version. 21. statistical package software was used to analyze the data. The data were presented by means proportions through descriptive analysis, univariate analysis, Pearson correlations, and other appropriate tests were applied to find the relationship between respondents’ COVID-19 KAP. $P < 0.05$ is considered as statistical significance.
Results

A total of 1758 people responded, out of 1758 responses, 1644 (93.6%) participants were responded completely, 114 (6.4%) were provided incomplete information/withdrawn in the middle of the study.

Out of 1644 respondents, 815 respondents were female and 829 were male. The survey reached a population ranging from 18 to 74 years with a mean age of 35.3 years (±9.7 years). Most of the respondents were graduates 644 (39%) respondents, followed by intermediate/diploma 370 (23%), postgraduates 248 (15%), high school 197 (12%), primary school and middle school were 71 (4%) and 62 (3.7%), respectively, with remaining 52 (3.1%) were illiterates. Among the 1644 half of the responders were unmarried 819 (50%) followed by 771 (47%) were married and the remaining 3.1% were either widows or separated. Many of the responders were living in a nuclear family 1387 (84%) and only 15% of the responders either living in joint family 203 (12%) or three-generation family 54 (3.2%). Referring to the residence, nearly half of the responders were living in the urban areas 768 (47%) followed by semiurban 419 (25%), rural 350 (21%), and the remaining from the metropolitan city 107 (7%). From total responders as per the BG Prasad Socioeconomic Status Scale for the year 2020, more than half of the responders 1081 (66%) belongs to the socioeconomic status class I, followed by socioeconomic status class II 330 (20%), class III 140 (9%), class IV 64 (4%), and remaining class V 29 (2%). Details of the sociodemographic and socioeconomic are provided in Tables 1 and 2.

Assessment of knowledge

A total of 11 questions were used to measure knowledge on the COVID-19 virus. The average knowledge score for the participants was 79.7 with standard deviation = 1.9. About 96.7% of participants were aware of COVID-19 is caused by virus, most of the participants ranges from 78% to 98% aware of symptoms of COVID-19. Among the study participant, three fourth of the participants (67%-98%) were having enough knowledge on effective way of preventing COVID-19. Most of the respondents (97.7%) knew that who are high risk group for the COVID-19, but they were lacking the knowledge on which infective material is responsible for disease transmission. Most of the participants were aware that the disease transmitted with respiratory droplets (98%) and saliva (89%), whereas there was some noticeable confusion among respondents regarding the transmission of the virus by touching and eating. Details are provided in Table 3.

Assessment of attitudes

Regarding the assessment of the parameter attitude specified in Table 4, about 85% (1398) of the participants opined lockdown is the successful way to control the spread of infection and 53.9% (886) are sure that COVID-19 can be successfully controlled. About 92.9% (1528) of the respondents felt that early detection is crucial for the treatment and successful outcome for COVID-19 and 56.2% (924) are convinced that society is fully aware of COVID-19. Coming to the transmission of COVID-19 from household pets to humans or vice versa, only 34.7% (570) of the respondents agreed, whereas 35.7% (587) of the respondents did not agree with the statement. The respondents of about 88.6% (1456) said that the authorities should arrange for treatment for COVID-19 patients in a separate hospital. If the cases of COVID-19 increase, 81% (1331) of respondents voted to implement lockdown measures again. The attitude of successfully controlling COVID-19 was significantly associated with education status and socioeconomic status and not significant with type of family, residential area, and occupation. The complete details related to attitude are provided in Tables 4 and 4a.

Assessment of practices

The assessment of the practices toward COVID-19 revealed that out of total respondents 90.8% (1492) wear mask while going outside, 84.2% (1385) practice hand hygiene with soap or sanitizer, 84% (1381) avoid handshaking, hugging, and kissing while meeting others, and 83.8% (1377) of respondents often maintain social distance in public places, details that are provided in Table 5. Only 13.3% (218) of respondents are frequently going out, whereas most of them avoid going out until and unless if it is required. The differences between demographic groups, it was found that there were significant associations between gender, age group, marital status, literacy status, and occupation for the avoidance of crowded places and wearing mask details that are provided in Table 6.

Discussion

Epidemics and pandemics are periodic phenomena globally. Under these situations, the community should be aware of the disease and be equipped with complete knowledge, attitude, should show preparedness, and correct practices to encounter the challenges. Since the emergence of COVID-19, this pandemic crisis made India one of the major affected countries, forcing to impose lockdown and change health regulations. In a view of preparedness, curtailting the spread, and regulate the public health challenges, the Government of India has implemented standard operating procedures (SOPs) and regulations, but this can be done purely on public awareness on COVID-19. In this context, this study helps to find the level of knowledge, practice, and attitude of the public regarding COVID-19 which is of the highest priority.[11-14]
A total of 1644 individuals from the different states of South India have participated in this study with the number of males 829 (50.5%) and female 815 (49.5%). Many of the participants were the age group of 21–40 years (45%) followed by 41–60 years (26%), <20 years (24%) and >60 years only 4%. The study participants were an almost equal number of married (50%) and unmarried (47%); almost half of the participants have completed their graduation (39%), postgraduation (15%), and only 4% of them were illiterates. More than three fourth (84%) of the study group were living as the nuclear family, very few 12% were in a joint family, and almost negligible amount (3%) living in three-generation families. Nearly half of the study participants are living in the urban areas, whereas one-quarter of the participants were living in the rural communities. These findings agreed with, other earlier studies judgments conducted in different countries Egypt, Kenya, and Nigeria.\(^{[15-17]}\)

### Table 1: Distribution of study participants based on sociodemographic profile

| Variable                        | Female, n (%) | Male, n (%) | Total, n (%) |
|---------------------------------|---------------|-------------|--------------|
| **Age group (years)**           |               |             |              |
| <20                             | 233 (29)      | 169 (20)    | 402 (24)     |
| 21-40                           | 352 (43)      | 384 (46)    | 736 (45)     |
| 41-60                           | 202 (25)      | 231 (28)    | 433 (26)     |
| >60                             | 28 (3)        | 45 (5)      | 73 (4)       |
| **Total**                       | 815 (100)     | 829 (100)   | 1644 (100)   |
| **Marital status**              |               |             |              |
| Unmarried                       | 428 (53)      | 391 (47)    | 819 (50)     |
| Married                         | 341 (42)      | 430 (52)    | 771 (47)     |
| Separated                       | 2 (0)         | 1 (0)       | 3 (0.1)      |
| Divorce                         | 3 (0)         | 5 (1)       | 8 (0.4)      |
| Widow                           | 41 (5)        | 2 (0)       | 43 (2.6)     |
| **Total**                       | 815 (100)     | 829 (100)   | 1644 (100)   |
| **Education (class)**           |               |             |              |
| Illiterate                      | 31 (4)        | 21 (3)      | 52 (3)       |
| Primary (1st-5th)               | 39 (5)        | 32 (4)      | 71 (4)       |
| Middle (6th-7th)                | 24 (3)        | 38 (5)      | 62 (3.7)     |
| High school (8th-10th)          | 79 (10)       | 118 (14)    | 197 (12)     |
| Inter/ diploma                  | 181 (22)      | 189 (23)    | 370 (23)     |
| Graduate                        | 327 (40)      | 317 (38)    | 644 (39)     |
| Postgraduates/professional degree | 134 (16) | 114 (14)    | 248 (15)     |
| **Total**                       | 815 (100)     | 829 (100)   | 1644 (100)   |
| **Type of family**              |               |             |              |
| Joint                           | 85 (10)       | 118 (14)    | 203 (12)     |
| Nuclear                         | 703 (86)      | 684 (83)    | 1387 (84)    |
| Three generation                | 27 (3)        | 27 (3)      | 54 (3)       |
| **Total**                       | 815 (100)     | 829 (100)   | 1644 (100)   |
| **Residential area**            |               |             |              |
| Metropolitan (>1,000,000 population) | 58 (7) | 49 (6)      | 107 (7)      |
| Rural (<10,000 population)      | 167 (20)      | 183 (22)    | 350 (21)     |
| Semimurban (10,000-100,000 population) | 172 (21) | 247 (30)    | 419 (25)     |
| Urban (100,000-1,000,000 population) | 418 (51) | 350 (42)    | 768 (47)     |
| **Total**                       | 815 (100)     | 829 (100)   | 1644 (100)   |

### Table 2: Distribution of study participants based on occupation and socioeconomic profile

| Variable                        | Female, n (%) | Male, n (%) | Total, n (%) |
|---------------------------------|---------------|-------------|--------------|
| **Occupation**                  |               |             |              |
| Homemaker                       | 31 (4)        | 0           | 31 (2)       |
| Professional                    | 56 (7)        | 95 (11)     | 151 (9)      |
| Semiprofessional                | 105 (13)      | 150 (18)    | 255 (16)     |
| Skilled                         | 29 (4)        | 83 (10)     | 112 (7)      |
| Semiskilled                     | 30 (4)        | 119 (14)    | 149 (9)      |
| Unskilled                       | 24 (3)        | 83 (10)     | 107 (7)      |
| Student                         | 319 (39)      | 253 (31)    | 572 (35)     |
| Unemployed                      | 221 (27)      | 46 (6)      | 267 (16)     |
| **Total**                       | 815 (100)     | 829 (100)   | 1644 (100)   |
| **Socioeconomic status**        |               |             |              |
| I                               | 574 (70)      | 507 (61)    | 1081 (66)    |
| II                              | 134 (16)      | 196 (24)    | 330 (20)     |
| III                             | 62 (8)        | 78 (9)      | 140 (9)      |
| IV                              | 28 (3)        | 36 (4)      | 64 (4)       |
| V                               | 17 (2)        | 12 (1)      | 29 (2)       |
| **Total**                       | 815 (100)     | 829 (100)   | 1644 (100)   |
Table 3: Distribution of study participants based on knowledge on COVID-19 disease

| Knowledge                                                                 | True (Freq) (%) | False (Freq) (%) | Don’t know (Freq) (%) |
|--------------------------------------------------------------------------|-----------------|-----------------|----------------------|
| K1. COVID-19 is caused by virus                                          | 1590 (96.7)     | 20 (1.2)        | 34 (2.1)             |
| K2. The major clinical symptoms of COVID-19                              |                  |                 |                      |
| Fever                                                                    | 1610 (98.0)     | 17 (1.0)        | 17 (1.0)             |
| Cough and sore throat                                                    | 1614 (98.0)     | 16 (1.0)        | 14 (1.0)             |
| Body pain                                                                | 1323 (80.5)     | 83 (5.0)        | 238 (14.5)           |
| Breathlessness                                                           | 1549 (94.2)     | 27 (1.7)        | 68 (4.1)             |
| Loss of smell or taste                                                  | 1293 (78.6)     | 120 (7.3)       | 231 (14.1)           |
| K3. COVID-19 is a contagious disease                                     | 1579 (96.0)     | 33 (2.0)        | 33 (2.0)             |
| K4. Preventive measures of COVID-19                                      |                  |                 |                      |
| Not contacting directly with infected person (shake hands/hugging/kissing)| 1622 (98.7)     | 13 (0.8)        | 9 (0.5)              |
| Wearing face masks in public places                                     | 1609 (97.9)     | 31 (1.9)        | 4 (0.2)              |
| Maintain social distancing>1 m                                         | 1582 (96.2)     | 46 (2.8)        | 16 (1.0)             |
| Not sharing articles (fomites) of infected persons                      | 1399 (85.1)     | 156 (9.5)       | 89 (5.4)             |
| Consumption of contaminated food items                                  | 1110 (67.5)     | 392 (23.9)      | 142 (8.6)            |
| K5. Infected material responsible for the transmission of COVID-19       |                  |                 |                      |
| Respiratory droplets                                                    | 1607 (97.7)     | 5 (0.3)         | 32 (12.0)            |
| Saliva                                                                  | 1477 (89.8)     | 64 (3.9)        | 103 (6.3)            |
| Urine                                                                   | 477 (29.0)      | 571 (34.7)      | 396 (36.3)           |
| Fecal matter                                                            | 422 (25.7)      | 572 (34.8)      | 650 (39.5)           |
| Blood                                                                   | 798 (48.5)      | 323 (19.6)      | 523 (31.9)           |
| K6. Age group severely affected (years)                                 |                  |                 |                      |
| Children (<10)                                                           | 1326 (80.7)     | 198 (12.0)      | 120 (7.3)            |
| Adolescent (11-20)                                                      | 383 (23.3)      | 900 (54.7)      | 361 (22.0)           |
| Adults (21-50)                                                          | 602 (36.6)      | 701 (42.6)      | 341 (20.8)           |
| Aged persons (>51)                                                      | 1591 (96.8)     | 28 (1.7)        | 25 (1.5)             |
| K7. There is increasing trend of COVID-19 disease in India              | 1598 (97.2)     | 17 (1.0)        | 29 (1.8)             |
| K8. Currently there is no effective cure for COVID-2019                 | 1286 (78.2)     | 182 (11.1)      | 176 (10.7)           |
| K9. Elderly who has chronic illnesses (HTN, cancer, diabetes, and chronic respiratory diseases) are more likely to get severe disease | 1564 (95.1)     | 17 (1.0)        | 63 (3.9)             |
| K10. Washing hands with water and soap can eliminate the disease cause  | 1570 (95.5)     | 36 (2.2)        | 38 (2.3)             |
| K11. Isolation and treatment of people who are infected with the COVID-19 virus are effective ways to reduce the spread of the virus | 1574 (95.7)     | 11 (0.7)        | 59 (3.6)             |

Table 4: Distribution of study participants based on attitude

| Attitude                                                                 | Yes (Freq) (%) | No (Freq) (%) | Don’t know (Freq) (%) |
|--------------------------------------------------------------------------|----------------|---------------|----------------------|
| A1. In your opinion does lockdown will prevent the transmission of COVID-19 | 1398 (85.0)    | 154 (9.4)     | 92 (5.6)             |
| A2. In your opinion does COVID-19 will finally be successfully controlled | 886 (53.9)     | 381 (23.2)    | 377 (22.9)           |
| A3. In your opinion does early detection of COVID-19 can improve treatment and outcome | 1528 (92.9)    | 25 (1.5)      | 91 (5.5)             |
| A4. In your opinion does awareness regarding COVID-19 disease in society is adequate | 924 (56.2)     | 578 (35.2)    | 142 (8.6)            |
| A5. In your opinion does COVID-19 disease can be transmitted through household pets to humans and vice versa | 570 (34.7)     | 587 (35.7)    | 487 (29.6)           |
| A6. In your opinion do authorities should quarantine COVID-19 patients in special hospitals | 1456 (88.6)    | 87 (5.3)      | 101 (6.1)            |
| A7. In your opinion if the number of COVID-19 cases increases, government should implement lockdown measures again | 1331 (81.0)    | 177 (10.8)    | 136 (8.3)            |

The modes of spread of COVID-19 disease and preventive strategy knowledge were very high in the study group ranging from 85% to 98.7%. This high level of knowledge about COVID-19 recorded in this study might be due to the caliber and education of respondents who participated in the survey. Most of the participants were in the age group of below 60 years, with college (Bachelor) degree or higher educational qualifications, and <40 years educated were using smartphones with the social media, especially WhatsApp, Facebook, and local language news apps. Television is also one of the major sources of information for the age group of above 40 years. Although health authorities have been consistently disseminating correct information on COVID-19 since the first case of infection was reported in China. There are situations with some
Table 4a: Education and socioeconomic status were the predictor variables for attitude scores

| Model                | Unstandardized coefficients | Standardized coefficients ($\beta$) | $t$ | Significant | 95% CI for $\beta$ (lower bound-upper bound) |
|----------------------|-----------------------------|-------------------------------------|-----|-------------|---------------------------------------------|
| Constant             | 5.003                       | 0.315                               | 15.869 | 0.000       | 4.385-5.621                                |
| Age                  | -0.003                      | 0.003                               | -0.033 | -1.162      | 0.246-0.000                                 |
| Education            | 0.106                       | 0.031                               | 3.419  | 0.001       | 0.045-0.167                                 |
| Occupation           | -0.005                      | 0.021                               | -0.007 | -0.224      | 0.823-0.046                                 |
| Type of family       | -0.143                      | 0.098                               | -0.036 | -1.464      | 0.143-0.335                                 |
| Socioeconomic status | -0.213                      | 0.043                               | -0.128 | -4.969      | 0.000-0.298                                 |
| Residential area     | 0.042                       | 0.044                               | 0.024  | 0.950       | 0.045-0.129                                 |

Dependent variable: Attitude score. CI=Confidence interval, SE=Standard error

Table 5: Distribution of study participants based on practice of preventive strategy for COVID-19

| Practices                                                                 | Frequency (%) |
|---------------------------------------------------------------------------|---------------|
| P1. How often will you go outside when compared with that of before COVID-19 pandemic | 218 (13.3)    |
| P2. How often you wear mask while going outside                           | 1492 (90.8)   |
| P3. How often you practice hand hygiene with soap or sanitizer            | 1385 (84.2)   |
| P4. How often you avoid handshaking, hugging, and kissing while meeting with others | 1381 (84.0)   |
| P5. How often you maintain social distance when you go out for market or public places | 1377 (83.8)   |

Table 6: Univariate analysis of sociodemographic variables and knowledge, attitude, and practices related to COVID-19

| Variable                               | n   | Knowledge | P   | Attitude | P   | Practice | P   |
|----------------------------------------|-----|-----------|-----|----------|-----|----------|-----|
| Gender                                 |     | Mean±SD   |     | Mean±SD  |     | Mean±SD  |     |
| Female                                 | 815 | 17.59±1.9 | >0.05 | 4.96±1.5 | >0.05 | 8.95±1.5 | <0.001 |
| Male                                   | 829 | 17.51±1.9 | 4.88±1.5 | 8.49±1.6 |
| Marital status                         |     |           |     |          |     |          |     |
| Single                                 | 873 | 17.51±2.0 | >0.05 | 4.98±1.5 | >0.05 | 8.83±1.5 | <0.001 |
| Married                                | 771 | 17.60±1.8 | 4.86±1.6 | 8.59±1.5 |
| Age group (years)                      |     |           |     |          |     |          |     |
| <20                                    | 402 | 17.40±2.2 | <0.001 | 4.98±1.4 | 0.02 | 8.94±1.4 | 0.01  |
| 21-40                                  | 736 | 17.76±1.5 | 5.00±1.5 | 8.66±1.5 |
| 41-60                                  | 433 | 17.50±2.0 | 4.81±1.5 | 8.62±1.6 |
| >60                                    | 73  | 16.52±3.0 | 4.51±2.0 | 8.58±1.7 |
| Education                              |     |           |     |          |     |          |     |
| Illiterate                             | 52  | 15.12±3.8 | <0.001 | 3.96±2.0 | <0.001 | 7.88±2.2 | <0.001 |
| Primary/secondary/high school          | 330 | 16.86±2.5 | 4.65±1.7 | 8.37±1.7 |
| Inter/diploma                          | 370 | 17.71±1.5 | 5.04±1.4 | 8.75±1.5 |
| Graduate and above                     | 892 | 17.88±1.5 | 5.03±1.4 | 8.87±1.4 |
| Occupation                             |     |           |     |          |     |          |     |
| Student                                | 572 | 17.52±2.0 | <0.001 | 4.99±1.4 | <0.001 | 8.89±1.5 | <0.001 |
| Unemployed                             | 298 | 17.35±1.9 | 4.82±1.6 | 8.83±1.5 |
| Unskilled/semiskilled/skilled          | 368 | 17.22±2.2 | 4.65±1.6 | 8.24±1.6 |
| Professional                           | 406 | 18.04±1.2 | 5.15±1.4 | 8.82±1.4 |
| Type of family                         |     |           |     |          |     |          |     |
| Joint                                  | 203 | 17.66±1.7 | <0.001 | 4.97±1.5 | <0.001 | 8.74±1.5 | >0.05 |
| Nuclear                                | 1387| 16.93±2.9 | 4.83±1.7 | 8.50±1.7 |
| Three generation                       | 54  | 17.09±2.0 | 4.06±1.5 | 8.81±1.5 |
| Socioeconomic status                   |     |           |     |          |     |          |     |
| I                                      | 1081| 17.78±1.6 | <0.001 | 5.09±1.4 | <0.001 | 8.82±1.5 | 0.007 |
| II                                     | 330 | 17.26±2.0 | 4.73±1.5 | 8.48±1.6 |
| III                                    | 140 | 17.41±2.7 | 4.45±1.7 | 8.59±1.4 |
| IV                                     | 64  | 16.88±2.3 | 4.47±1.9 | 8.48±1.6 |
| V                                      | 29  | 15.97±3.2 | 4.07±1.9 | 8.72±1.4 |

Contd...
of the individuals spreading false, and inaccurate information about the COVID-19 causing panic and mistrusting of genuine information.\cite{8,19} Similar studies conducted by Reuben et al. in Nigeria, Zhong et al. in China, and Roy et al. in India found the respondent having less knowledge compared with the respondents in this study, concluding those studies were conducted during the early stage of the diseases at respective places.\cite{18,20,23}

Most of the participants have given the right response to items related to signs and symptoms such as fever, cough, body pains, loss of smell or taste, and breathlessness of COVID-19 (ranging from 78.6% to 98%). A similar study was conducted by Wong et al. in Hong Kong and Agarwal et al. in India also found similar results. Currently, due to the lack of proven treatment, preventive measures such as not contacting infected persons, wearing a face mask, maintaining a social distance of >1 m, hand washing or using sanitizer, and not sharing the objects even after taking the vaccine are ideal for avoiding COVID-19 infection. Similar studies conducted by the different authors from different countries such as Agarwal et al.,\cite{23} Roy et al.,\cite{21} from India, Zhong et al.,\cite{20} from China, Azlan et al. from Malaysia,\cite{22} Wong from et al.,\cite{19} from Hong Kong, and Reuben et al. from Nigeria\cite{18} were observed similar results in the different settings. The high knowledge in this study might be due to the participation of high educated respondents, the advanced stage of the pandemic, and the vigorous health education campaign by the government and other private agencies.

Almost more than half of the study participants showed positive attitudes toward overcoming COVID-19. More than three fourth of respondents that is around 85% believe that the lockdown of the city/country will prevent the virus transmission among the community. However, only 53.9% of the respondents were satisfied with government efforts in mitigating the COVID-19 pandemic successfully in India. Similar studies conducted by Al-Hanawi et al., in Saudi Arabia in China by Zhong et al., and in Malaysia by Azlan et al. were also observed similar findings.\cite{8,20,23}

This study further suggests behaviors such as personal hygiene and social distancing for practice to control the novel COVID-19 in the community. This study observed a good behavioral change among most of the participants. Almost three fourth of the respondents had reported taking precautions of avoiding crowded places, 83.8% were maintaining social distance at a crowded place, 90% of the participants were wearing face masks while going out of the house, 84% avoid shaking hands, unnecessarily touching of other objects, and 84% practicing proper hand hygiene either by hand wash or using sanitizer in this COVID-19 pandemic. Similar results were observed in other studies conducted similarly by Al-Hanawi et al. in Saudi Arabia, Roy et al. and by Agarwal et al. in India, and Azlan et al. in Malaysia.\cite{8,21-23}

**Limitations**

This study was conducted in a restricted environment through the convenient sampling technique. There are the chances of selection bias of the sample as it is focusing on the urbanized communities. The marginalized or slum areas have not been able to participate in the study. Much of the data is collected from the age group of below 60 years that too mostly educated and only from South India. A more systematic, inclusive sampling method can be utilized to improve the representativeness and generalizability of the findings. A further limitation of the present study is the possibility of participants giving socially accepted responses. As this study was conducted telephonically, there is a possibility of participants answering positively for the attitude and practice-based questions, instead of what they were practicing.\cite{23}

**Conclusions**

This study able to provide comprehensive knowledge, attitudes, and practices of the South Indian population toward COVID-19. This study found that the urbanized community is having a high acceptance level of knowledge on COVID-19 with most of them were positive in their perception of overcoming the pandemic. The government and private agencies should continue the consistent efforts to change the negative behavioral attitude to positive behavior of the public by disseminating the information related to health protocols and SOPs in different media to enhance the public understanding of COVID-19 and motivate the public as social responsibility to adhere the health protocols, masking, hand hygiene,
social distancing, and vaccination to prevent expected COVID-19 subsequent episodes.

Acknowledgments
The authors would like to thank Dr. K. R. John for the inception of this study. The authors expressed gratitude to Mr. S. M. Irshad for the English corrections. Authors thank 2017 MBBS batch students at Apollo Institute of Medical Sciences, Chittoor, India, for their excellent contribution in data collection. We thank all the participants who were involved in this study for their cooperation and support.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

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