

Exploring Knowledge, Attitude and Practices Towards COVID-19: A Case Study in Odisha, India

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ABSTRACT

Practice of preventive measures for a disease like Coronavirus (COVID-19) depends on the levels of awareness/knowledge and attitude towards it, which help to control the spread of it. We conducted both online and offline surveys to understand the behavioural responses in terms of the extent of knowledge, attitude, and practice (KAP), and its relation with socio-economic and demographic conditions of respondents from a poor state like Odisha, India. It is observed that although a higher proportion of respondents have ample knowledge about basic information, preventive measures and transmission channels through social media, the Internet, TV, and radio but relatively a fewer percentage of participants have less knowledge about some of important symptoms and social distancing norms as primary measures to prevent its transmission. It has been witnessed that there is prevalence of lot of blind/unscientific beliefs and misinformation in the society about its transmission channels. We also observed a significant difference in the KAP scores across residential locations, education levels, marital status, social groups, occupations, economic status/income levels of the participants. The knowledge on preventive measures and transmission channels are found to be inversely related to the practice of preventive measures. However, knowledge score on basic information, symptoms and attitude about COVID-19 have a positive association with the practice score. Further, making a comparative analysis of scores demonstrates that the knowledge score has a relatively weak association with the practices score as compared to the attitude score.

Keywords: knowledge, attitude, practice, COVID-19, preventive measure

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INTRODUCTION

It is globally known that at the end of 2019, an infectious disease caused by Coronavirus (COVID-19) appeared for the first time in Wuhan, Central China [1,2], which is caused by the family of Coronaviridae (also referred to as 2019-nCoV) virus and associated with the seafood market in Wuhan [3-6]. Later the spread of the virus ravaged the entire world at a very faster rate. Within one and half months' time after the first reported case, it spreads from China to 20 other countries in the world. World Health Organization (WHO) declared it as the public health emergency of international concern (PHEIC) on January 30, 2020 [7,8]. Thus, the WHO directed all the nations to prevent its mass spread through active surveillance, early detection, contact tracing, isolation, and active case management [9,10].

Since they were found to be brutally threatening all over the globe, so WHO had declared it as a global pandemic on March 11, 2020 [11]. The mortality and morbidity from the disease are also rapidly spreading across the world. There were 46.19 lakh positive cases with 3.12 lakh death reported on March 18, 2020 [12]. The rate of transmission of the disease was exponential. The cases got doubled up within a very short

period as the number of viral reproduction ranged from 1.4 to 2.5 or higher, which makes the virus easily transmittable [13].

COVID-19 shows common symptoms such as fever, dry cough and fatigue, and subsequently, it leads to severe symptoms such as chest pain, difficulty in breathing, talking and moving [13]. It transmits directly through human to human body interactions and indirectly from a virus contaminated object to the human body [14]. It spreads from one person to another through the fluid depleted from the mouth and nose while sneezing, coughing and talking [15]. However, the droplets cannot move to more than six feet in the air [14] and cannot sustain more than three hours in the air [16]. Further, a person can get infected when someone makes direct contact with the contaminated objects [16]. Therefore, the medical experts suggest for frequent hand washing, use of sanitizers, wearing of face mask, maintain social distancing and avoid social gathering, covering mouth and nose while sneezing and coughing [7,17,18]. The outbreak of COVID-19 has been continuing into different phases with different mutants active today in different parts of the world.

Various countries have imposed very strict lockdown and shutdown measures along with other measures to control its spread or infections. As a result, the pandemic brought out an unfathomable

situation leading to shutting down of transportation, affecting international connectivity, lockdown of markets and breakdown of social mingling across the world. Just after the declaration of lockdown, students, teachers, workers, migrants, everyone encountered with disastrous catastrophes [19].

The students left school feeling tensed about lacking study materials to complete their studies. The teachers faced challenges in terms of offering online teaching, conducting student's evaluation and semester continuation which they have never been exposed to. The wage-labourers departed the work field, sacrificing their previous labour remuneration. In many situations, it resulted in forceful retrenchment of workers from the industry. The poor migrant workers in third world poor economies had to walk back hundreds of miles away from workplace carrying their luggage and dragging their starved children. For an extended period, a fearful and melancholy picture was professed in everyone's lives and livelihood. Due to international lockdown in many countries around the globe, migrant workers got stuck in countries for years, where they cannot see their own kith and keen. Even people cannot see their close relatives on death bed. Evenly trust and confidence among one another were shortened due to the uneven shock and risk of being infected. Everyone felt suffocated, not merely physically but mentally, with anxiety, mental tense and fretfulness. Overall human, science, arts, commerce all the sector became handicapped for some time.

The pandemic which got initiated as a health calamity germinated to economic calamity. The closedown of transportation sector horribly affected the economic sector. The global supply chain was disrupted and led to market anomalies. Restriction in consumption and contraction in production confined the market process. The financial market reluctantly witnessed rampant volatility and stock indices fell abruptly. The introduction of vaccines around the globe has given some positive hopes but still the mutants are active and killing the people as they could resist against the vaccines and drugs introduced by scientific or medical science discoveries.

Due to strengthening international connection and integration among the countries in this 21st century, the virus blew out across the nations within a limited time. India did not remain elusive from such a quick spread of infections as there was no international restriction in the initial phase of the pandemic. The first confirmed case was reported on January 30, 2020, when a migrant returned to Kerala (India) from Wuhan, China. A few days later, new cases emerged due to the international migration from Italy and Dubai. Consequently, in the later period, those infections multiplied with the number of cases. The nation surpassed 1,071 cases within two months, with 29 deaths. As India is the second-most populous country with a 1.3 billion population, the infection increased exponentially. By mid of April, it crossed more than 10,000 cases and 350 deaths.

Observing the precarious situation, the government of India forcefully adopted stringent measures to prevent and protect the nation. The government declared a nationwide lockdown on March 22 to bring the infection rate under control. Consequently, the railway, airway, and roadway transports brought to complete halt. Educational institutions, religious centres, industrial plants were restricted to open. New testing centres and containment zones were opened. The states were given autonomy to tackle the situation with their possible capacity. Accordingly, every state and local authority focused on spreading awareness, increasing testing rate, establishment of containment zone,

etc. By considering the local situation, the local authority adopted the possible measures to combat the disease. Despite the quick and comprehensive measures, the nation took a long period to control the infection. The spread of COVID-19 infection reached the peak in mid-September 2020, with daily reported new cases reaching around 0.1 million.

Moreover, although the aftermath had witnessed the decline its transmission reflected from declining rate of number of cases until mid-February 2021, but after this period, it started a sharp increase. By the mid of April 2021, the new active case hit its all-time peak with 0.3 million new cases per day, three times the first peak [20]. The number of daily deaths also registered steadfast rise in the second wave. This rise occurred due to the complacent behaviour of people, general elections in five states, and the relaxation in interventions by state governments. As a result, India reached the second maximum in cumulative number of cases after the USA with 32 million.

In the time of epidemics/pandemics, lack of knowledge about symptoms, transmission methods and adequate preventive measures on such an emerging disease can bring more hazardous health risks and panics among the public. In the absence of any exact medical remedy, appropriate behaviour and practices can act as preventive measures and neutralise the spread to a great extent. Thus, the availability of information about its appropriate symptoms and causes of the disease can usefully act as a first aid to the society and thereby serve as an enabling measure for its preparedness among the people and to face similar kinds of pandemics in the future too. However, negative attitude and practices towards an infectious disease can worsen the epidemics and eventually, it may blow it as a pandemic.

The studies have made efforts to gain an understanding about the knowledge/consciousness, attitude and practice (KAP) of people towards various diseases which had occurred in the past, such as Dengue fever [21-23], Middle East respiratory syndrome [24-26], and influenza [27-29]. They came out with the conclusion that proper knowledge about those diseases and positive attitude and good practices towards these infectious diseases can greatly help to curb the spread among the people, and subsequently, reduce the causality/fatality from the disease.

It is pertinent to understand the COVID-19 situation in poor states like Odisha. It was ranked as the least developed state in India by the well-known Raghuram Rajan Committee Report-2013 based on composite index of economic development, which had compared the states on 10 subcomponents including average consumption, education, healthcare, poverty, household amenities, SC-ST population, etc. Among various possible reasons, lack of awareness, inadequate knowledge, negative attitude, and insufficient practices may be the principal reasons for fast spread of COVID-19 specifically in the rural and backward regions like Odisha. This study is an attempt to understand the aspects of knowledge, attitude and perception towards COVID-19 among the people of poor state like Odisha.

MATERIALS AND METHODS

A cross-sectional data has been collected from all over Odisha through the online and offline predesigned questionnaire. The questionnaire is constructed based on previous KAP studies related to H1N1, Ebola diseases, including symptoms and preventive measures of COVID-19. The questions related to the symptoms of the disease were

Table 1. Socio-economic/emographic characteristics of selected sample

Characteristics	N(%)	
Survey type	Offline	310(70.45)
	Online	130(29.55)
Age	Below 18 ears	30(6.82)
	18-60 years	375(85.23)
	More than 60 years	35(7.95)
Gender	Male	290(65.91)
	Female	150(34.09)
Location	Urban	70(15.91)
	Rural	370(84.09)
Marital status	Married	281(63.87)
	Single	159(36.13)
Educational qualification	Illiterate	100(22.72)
	Primary school	71(16.14)
	High school	97(22.05)
	Higher secondary	35(7.95)
	Graduation	51(11.59)
	PG and above	86(19.55)
Social groups	ST	75(17.05)
	SC	88(20.00)
	OBC	220(50.0)
	General	57(12.96)
Religion	Hindu	424(96.36)
	Non-Hindu	16(3.63)
Occupation	Farmer	116(26.36)
	Agricultural labor	14(3.18)
	Casual labor	85(19.32)
	Regular employee	34(7.73)
	Self-employed	47(10.68)
	Student	96(21.82)
	Housewife	48(10.91)
	HUT	52(11.82)
House type	Kuchha	189(42.95)
	Pucca	199(45.22)
	Migrants	104(23.63)
Migration status	Non-migrants	336(76.36)
	BPL	314(71.36)
Economic status	APL	126(28.63)
	Inside the house	119(27.42)
Water facility	Outside the house	169(38.94)
	Away from the house	146(33.64)
	Yes	61(14.09)
Chronic disease	No	372(85.91)
	Below 5,000	147(34.43)
Income groups	5,000-10,000	121(28.34)
	10,000 -20,000	70(16.39)
	20,000-50,000	59(13.82)
	50,000 & above	30(7.03)

Note. Source: The authors' calculation from field survey data

prepared based on the information available in WHO¹ and ICMR websites². The recommendations from the experts were also considered for finalizing the questionnaire. Before conducting the final survey, we

carried out a pilot survey, and with some minor modification, we conducted the final survey.

33 questions were asked to the respondents to understand the knowledge about COVID-19 and awareness about its symptoms. The questions consist of knowledge about the symptoms (eight questions), knowledge about preventive measures (13 questions), knowledge about the transmission of the virus (seven questions), and other basic knowledge (five questions). Similarly, seven questions were asked on attitude and practices towards preventive measures. Additionally, various questions related to their socio-economic and demographic characteristics of respondents were asked. The offline and online surveys started in the mid-May 2020 and ended in end of June 2020.

The offline survey is limited to mainly two poorest districts of Odisha, namely Nuapada and Bolangir, which constitute two districts of the KBK region³ of Odisha where people are underdeveloped, unaware and more vulnerable relative to other districts of Odisha. As it was not feasible to do the population-based surveys, so purposively five-gram panchayats namely Khasbahal, Tukla, Ranimunda, Bhuslad, and Jamkhunta, were selected from the mentioned two districts. From these five-gram panchayats, a total of 300 samples (60 samples from each panchayat) were collected. Besides, the online method was chosen to increase the sample size and to include diversities in location in which the educated mass having smartphones have only responded. A well-structured google form was created similar to the offline survey questionnaire, and the link was shared through social media and mail such as Facebook, Whatsapp, email, etc. Through the online link, 140 numbers of participants responded to it. Participation was voluntary, and the responses were recorded anonymously.

EMPIRICAL ANALYSIS

Socio-Economic & Demographic Characteristics of the Sample

The frequency and percentage of socio-economic and demographic characteristics of participants are reported in Table 1.

Our total sample consists of 440 individual respondents, comprising of the participants' from diverse areas and economic status, socio and demographic characteristics. Among the participants, 70.45% (310) of them were surveyed through offline, and 29.55% (130) of them were surveyed through online. A major proportion of (85%) the samples consisted of working-age population (18-60 years), and only 15% of the respondents were from the age group of below 18 and above 60-year age. Similarly, our sample population consisted of rural and urban locations in the ratio 84:16 percent, respectively.

Further, out of our total samples, 34.09% of the respondents were females, and the rest were males. Similarly, only 36% of the samples were unmarried or singles while rest were married. The total sample surveyed population consisted of 22.72% illiterates, 16.14% with primary education, 22.05% with secondary education level, 7.95% with higher secondary education, 11.59% with graduate level education, 19.55% with post- graduation and above level of education. More interestingly, among different social groups, half of our sample

¹ <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>

² <https://www.icmr.gov.in/>

³ KBK region consists of eight districts of Southern and Western Odisha are regarded as the most backward region by the planning commission. This area is very much infamous for the prevalence of starvation death, chronic poverty, malnutrition, hunger, and periodic out-migration. For more details visits <http://www.kbk.nic.in/>

participants were from other backward castes (OBC), which constitute a marginalised section of the society or one fifth (20%) of them were from schedule castes (SC), 17.05% of them were from schedule tribe (ST), and rest 12.96% of them belonged to the upper caste (general) groups. Almost 97.47% of the respondents belonged to the Hindu religion, while 3.63% were from other religions or were with non-Hindu background.

A significant percentage (71.36%) of respondents were with poor financial family background and come under the below poverty line (BPL), whereas only 28.63% of participants belonged to the above poverty line (APL). Similarly, 76.36% of the participants were non-migrants, while the rest belonged to migrant group. While looking into respondents' occupational patterns, more than one-fourth (26.36%) of the total participants were farmers and around one-fifth of the respondents were casual labourers and students each. However, the remaining 32.5% of respondents belonged to the occupation groups such as agricultural labour, self-employees, regular employee and house-wife, etc. It is also observed from **Table 1** that only 14% of the total respondents suffered from chronic diseases such as diabetics, blood pressure, other cardiovascular diseases, etc.

While considering the housing condition, it is reported that 45.22% and 42.95% of the participants reported that they have Pucca and Kuchha houses, respectively to live in and around 12% of respondents reported that they have a house made of clay and straw. Considering water access, less than one-third of the participants reported that they have access to water availability within their houses; the rest of the respondents reported that water is not available within their house, half of them used to collect water from nearby places, and half of them used to collect water quite away from their house. More than one-third of the total participants' average household monthly income (AHMI) is below five thousand, and the next one-third of them also have AHMI of 5,000 to 10,000. Moreover, around 16% and 14% of the respondents have an AHMI of 10,000 to 20,000 and 20,000 to 50,000, but only 7% of respondents have more than 50,000 rupees as their AHMI.

METHODS OF ANALYSIS

To analyze the extent of the knowledge, attitudes and practice (KAP) towards COVID-19 among the general population of Odisha and their underlying determinants, we segregate into two sections. The first section examines the extent of knowledge, attitudes and practices towards COVID-19 among the people, for which simple descriptive analysis has been provided. Furthermore, in subsequent section, determinants of KAP are explored by employing empirical tests on knowledge, attitude and practice separately. The study used classical tests of hypothesis such as t-test⁴, one-way ANOVA⁵, Tukey multiple

Sources of Information about the COVID-19

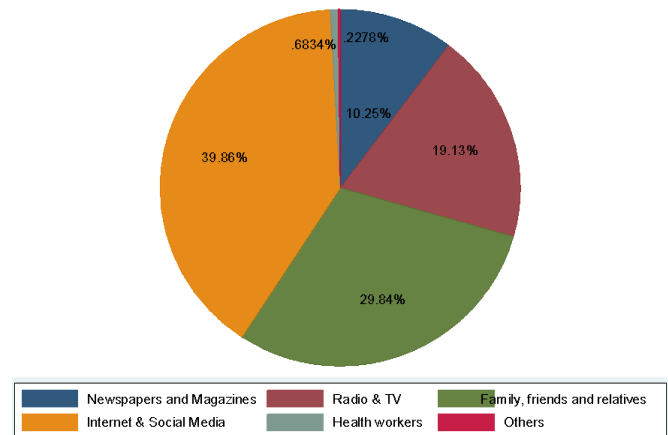


Figure 1. Sources of information about COVID-19

comparison test⁶, and Pearson correlation test. These tests were used to check up the association of socio-economic and demographic characteristics with KAP. The Pearson correlation test is employed to examine the relationship between knowledge, attitude and practices.

Sources of Information About COVID-19

Figure 1 depicts the sources of information that people know about different aspects of COVID-19.

It is observed from **Figure 1** that the internet and social media is one of the most popular sources of information as 39.86% of the respondents report the internet and social media as their source of information to know about the disease. A second primary source of information is family members, friends and relatives, followed by radio and television. Among all the participants, 29.84% and 19.13% of respondents reported that they came to learn information about COVID-19 from family members, friends, and relatives and, radio and television, respectively. Around 10% of total respondents stated that print media such as newspapers and magazines are the source of information.

However, a very negligible (less than 1%) fraction of respondents reported that they know about the disease from health workers and other sources. This indicates that lot of people have access to print media such as newspaper and magazines to secure information about daily news including health aspects. A major percent also gets to learn from their friends and family members and still a major good percentage came to learn through health workers which could indicate governmental efforts to reaching to the people for awareness of the disease.

⁴ t-test is popularly known as student t-test, and a classical hypothesis tests used to compare the mean between two groups to check whether the means are significantly different from each other or not [30, 31].

⁵ One-way ANOVA is called as one-way analysis of variance. This technique is used to compare the mean among at least three groups using F-distribution. It tests whether the sample in all the groups are drawn from a population with the same mean values [32].

⁶ Tukey multiple comparison test is also called Tukey's honestly significant difference test or Tukey's HSD. It is one of several tests that can be used to determine which means amongst a set of means differ from the rest. Two group means can be compared by using a t-test. When we have more than two groups, it is inappropriate to simply compare each pair using a t-test because of the problem of multiple testing. The correct way to do the analysis is to use a one-way analysis of variance (ANOVA) to evaluate whether there is any evidence that the means of the populations differ. If the ANOVA leads to a conclusion that there is evidence that the group means differ, we might then be interested in investigating which of the means are different. This is where the Tukey multiple comparison test is used. The test compares the difference between each pair of means with appropriate adjustment for the multiple testing.

Table 2. Knowledge about symptoms of COVID-19

Symptoms	Correct[N(%)]	Incorrect[N(%)]
Fever	316(71.98)	123(28.02)
Dry cough	364(82.92)	75(17.08)
Tiredness	282(64.53)	155(35.47)
Chest pain	216(49.43)	221(50.57)
Difficulty in breathing	321(73.29)	117(26.71)
Headache	232(53.09)	205(46.91)
Diarrhoea	93(21.28)	344(78.72)
Loss of test and smell	131(29.91)	307(70.09)

Note. Source: The authors own calculation from field survey

Table 3. Knowledge about transmission methods of COVID-19

Transmission methods	Correct[N(%)]	Incorrect[N(%)]
Shaking hand	413(94.51)	24(5.49)
Touching items in a public place (contaminated objects)	412(94.28)	25(5.72)
Touching mouth, nose, & eye	405(93.32)	29(6.68)
Sneezing & coughing	415(95.18)	21(4.82)
Bathing at the same place	344(78.9)	92(21.1)
Through non-veg food	109(25.06)	326(74.94)
Through pets & animals	121(27.88)	313(72.12)

Note. Source: The authors own calculation from field survey

The Extent of the Knowledge, Attitudes, & Practice (KAP) Towards COVID-19

Knowledge towards COVID-19

The construction of knowledge variable about various aspects of COVID-19 is broadly categorised into four groups. The first group of variables relates to the knowledge about symptoms of COVID-19. This knowledge ensures that whether the respondents are aware about its symptoms of disease correctly or not. The second group of questions relates to the information about the methods of its transmission, which helps them to stay away from doing certain regular activities and people to prevent the transmission. In third group, all the questions are asked related to its preventive measures and based on the field experience, the study has incorporated some measures which people have considered as a preventive measure, but in reality, it was not. In the last group, the knowledge section comprises of some basic information about covid-19 and its related information such as the origin of the COVID-19 virus, exact distance of social distancing, and about availability of drugs and vaccines for COVID-19 cure.

Knowledge about the symptoms of COVID-19

Table 2 elucidates the knowledge about symptoms of COVID-19 among the respondents. It is observed that more than 70% of all the participants were reasonably aware about correct symptoms of COVID-19 such as dry cough, fever and difficulty in breathing. However, only 64.53%, 53.09%, and 49.43% out of the total participants knew about tiredness, headache, and chest pain are the symptoms of COVID-19, respectively. On the other hand, significantly a less proportion of respondents around 21% and 29% had correct information about diarrhoea and loss of tastes and smells as symptoms of this disease. Contrary, a major fraction of the total participants did not have information about these symptoms due to COVID-19.

Knowledge about the transmission methods of COVID-19

The next set of variables deal with the knowledge about how COVID-19 infect from one person to another. **Table 3** illustrates that

Table 4. Knowledge about preventive measures of COVID-19

Knowledge preventive measure	Correct[N(%)]	Incorrect[N(%)]
Wearing mask	427(97.27)	12(2.73)
Maintain social distance	429(98.17)	8(1.83)
Washing hand	426(97.71)	10(2.29)
Self-quarantine	413(94.08)	26(5.92)
Avoiding social gathering	376(86.24)	60(13.76)
Taking alcohols	361(83.95)	69(16.05)
Staying in high temperature	174(40)	261(60)
Lighting candle	285(66.13)	146(33.87)
Ringing bell	287(65.38)	152(34.62)
Praying God	248(56.88)	188(43.12)
Doing yoga	196(45.16)	238(54.84)
Taking Go-mutra	353(80.96)	83(19.04)
Taking some fruits	218(50)	218(50)

Note. Source: The authors own calculation from field survey

more than 90% of the participants are aware about the possible channels of transmission of the virus through of shaking hands, touching mouth, nose, and eye touching.

In a public place (contaminated objects), sneezing and coughing can accelerate the infection among the public. Based on our pilot survey, we have also learned that some misconceptions are also prevalent in the society about the possible sources of transmission. A major proportion of participants reported that COVID-19 disease could spread from one person to another if someone eats non-vegetable foods and through the infected pets and animals to the human beings. However, out of total participants, only 25% and 29% are aware that that COVID-19 never spread by eating non-vegetable foods and through the infected pets and animals to human body, respectively.

Knowledge about the preventive measures of COVID-19

Another set of variables tells about the knowledge on preventive measures of COVID-19 disease. These variables examine the consciousness of the respondents about how to prevent the transmission of infection. The survey also observed that misunderstanding about some of the preventive measures prevails among majority of participants. Thus, this study also incorporates some methods which do not constitute measures of prevention of COVID-19 infection, such as taking alcohols, staying in high temperature, lighting candles, ringing bell, praying God, etc.

Table 4 illustrates the percentage of respondents aware of the true preventive measures of COVID-19 infection. A significant proportion of respondents reasonably had the knowledge that wearing of mask (97.27%), maintaining social distancing (98.17%), washing hands (97.71%), self-quarantine (94.08%), and avoiding social gathering (86.24%) can prevent COVID-19 infection. However, still many have blind beliefs, and misinformation about COVID-19 preventive measures.

About 80 percent of respondents know that the infection cannot be prevented by taking alcohols and Go-mutra. On the other hand, more than half of the respondents misunderstand that through lighting candles, ringing a bell, praying to God, and taking some fruits, infection can be controlled. Additionally, around 40% and 45% of the respondents reported that the infection of the disease could be prevented by staying in high temperatures and practising yoga, respectively.

Table 5. Knowledge about the basic information on COVID-19

	Correct[N(%)]	Incorrect[N(%)]
First COVID-19 found	386(87.73)	54(12.27)
Cured	362(82.65)	76(17.36)
Vaccine	318(72.44)	121(27.57)
Drugs	270(61.78)	167(38.22)
Social distance	111(25.28)	328(74.71)

Note. Source: The authors own calculation from field survey

Table 6. Attitude towards preventive measure of COVID-19

Preventive measure	Negative attitude	Neutral	Positive attitude
Use of mask	45(10.23)	28(6.36)	367(83.41)
Maintaining social distancing	45(10.25)	50(11.39)	344(78.36)
Frequent hand wash	40(9.09)	37(8.41)	363(82.5)
Use of sanitizers	64(14.65)	110(25.17)	263(60.18)
Staying at home	53(12.05)	39(8.86)	348(79.09)
Covering mouth & nose	41(9.32)	39(8.86)	360(81.82)
Avoid social gathering	40(9.11)	46(10.48)	353(80.41)

Note. Figures in the parenthesis are in percentage

Source: The authors own calculation from field survey

Another section of question on knowledge about COVID-19 consisted of basic information such as countries where it was reported first, cure procedure, availability of drugs and vaccines, the meaning of social distancing, etc. **Table 5** shows that 87.73% of the respondents have reported that COVID-19 disease was first reported in China. Moreover, 82.65% of respondents know that a person can be cured completely even after getting infected due to COVID-19. However, 12.27% of them think that it is not possible to get completely cured. While the survey was undergoing, out of total sample of respondents, 72.44% and 61.78% reported no availability of vaccines and drugs in the market throughout the world, respectively. It is observed that only one-fourth of the total respondents understand the exact distance of social distancing (at least two meters).

Attitude towards the preventive measures of COVID-19

While looking into people's attitude towards COVID-19, we only considered their attitude towards preventive measures and their attitude towards the risk of infection. To capture people's attitudes, we have ordered the attitude of the people by using five-point Likert scales⁷.

Table 6 describes the people's attitude towards preventive measures for the virus. It is observed from **Table 6** that major fractions of respondents have positive attitude towards all the preventive measures. However, more than 80% of them have a positive attitude towards using masks, frequent hand wash, covering mouth and nose while sneezing and coughing, and following social distancing. Moreover, approximately 79%, 78%, and 60% of them also have a positive attitude towards staying at home, maintain social distancing and use of sanitisers, respectively. On the contrary, more than 10% of the respondents have a negative attitude towards each of the measures such as staying at home and using sanitisers and masks. Also, around 10% the respondents have a negative attitude towards following other preventive measures of COVID-19. It is also seen that one out of four

Table 7. Practices of preventive measures of COVID-19

Practice of preventive measures	Never/very less	Moderately	More frequently
Wearing mask	114(25.91)	86(19.55)	240(54.54)
Maintain social distance	103(23.41)	119(27.05)	218(49.55)
Frequent hand washing	48(10.91)	118(26.82)	274(62.27)
Use of sanitizers	229(52.04)	73(16.59)	138(31.37)
Staying at home	100(22.73)	102(23.18)	238(54.09)
Covering while sneezing/ cough	54(12.36)	69(15.79)	314(71.86)
Avoiding gathering	108(24.66)	79(18.04)	251(57.31)

Note. Figures in the parenthesis are in percentage

Source: The authors own calculation from field survey

respondents has neither positive nor negative attitudes on the use of sanitizers. However, more than 10% of the total respondents are neutral in their attitude towards avoiding social gatherings and in maintaining social distancing. Nevertheless, less than 10% (around 8%) of the respondents have a neutral attitude towards all other preventive measures of COVID-19.

Practice of COVID-19 preventive measures

As COVID-19 disease easily gets transmitted very rapidly from one person to another, thus in order to control the infection, preventive measure plays a vital role in the face of non-availability of scientific cure measures. Thus, it is pertinent to understand the importance given to various preventive measures which is perceived to be better than cure and practice of preventive measures is one of the means to control the infection. The practice of various preventive measures is captured in our survey by asking various pertinent questions regarding the practice of preventive measures as prescribed by WHO and advisory issued by the Ministry of Health, Government of India.

Table 7 depicts the practices of various preventive measures by the respondents. It is observed that more than 70% of the respondents cover their face while sneezing and coughing most of the time and always and more than half of the respondents wear the mask, wash their hands frequently, avoid gathering, maintain social distancing, stay at home for most of the time or almost always in order to prevent the infection. Nevertheless, only 31.37% of the respondents use sanitizers most of the time.

In contrast, more than half (52.04%) of respondents either never use or rarely use sanitizers. This could be on account of their lack of access to these products, not a usual habit to use and lack of resources to buy these products. Among all the respondents, 25.91%, 23.41%, 24.66%, and 22.73% of the respondents either never practice or rarely wear masks, avoid gathering, maintain social distancing, and stay at home, respectively. However, only 10.91% of them never wash their hands frequently, and 12.36% never cover their face while sneezing and coughing. This shows that the practices such as wearing mask, social gathering which can be easily visible to the public and monitored by law, people are compelled to follow, but the one which can't be monitored by public (law or police) such as frequent hand washing, use of sanitizers, people easily relax those norms. Further, maintaining some practices might involve additional monetary burden as well.

⁷ Likert scale is a most widely used scaling approach to give a quantitative value to any kind of subjective or objective dimension. Cronbach's alpha is used to measure the internal consistency and reliability of all the likert scale variables. All the α for all the likert scale variables are lies between 0.60-0.75, which indicates the acceptable level of reliability of all those variables.

Similarly, it is also witnessed that more than one-fourth of the total respondent follow preventive practices such as maintain social distance (27.05%), frequent hand washing (26.82%), and staying at home (23.18%) half of the time. Moreover, out of the total participants, 19.55%, 18.04%, 16.59%, and 15.79% of them remain neutral with respect to wearing the mask, avoid social gathering, use of sanitizers, and cover their face while sneezing and coughing half of the time, respectively.

Association of socio-economic & demographic characteristics with KAP toward COVID-19

The knowledge about COVID-19 has been divided into four groups such as knowledge about basic information, symptoms, preventive measure, and transmission methods. Six questions were asked to the respondents on the basic knowledge about the COVID-19. And to analyze the association between different individual factors (socio-economic and demographic characteristics) and knowledge about basic

information, a score has been calculated. It is found that the mean score on basic knowledge varies across religion, social groups, various occupations, and different levels of education. This is found to be statistically significant as confirmed by the t-test and oneway-ANOVA test (Figure 8 and Figure 9). The Tukey test results show that the mean score is relatively higher for the participants who have attended high school, graduation and post-graduation and the above as compared to the illiterate. Similar results are also observed for the general category people as compared to ST. The regular employees, self-employed, and students secure higher mean scores on basic knowledge about COVID-19 than the farmers and other occupation groups, and their difference is also found to be significant as reflected from the significance of the Tukey test statistic.

While the knowledge about the symptoms of COVID-19 are taken into consideration, the t-test and oneway-ANOVA test results also confirm a significant difference in the knowledge about the symptoms of COVID-19 among the participants across gender, by location of their

Table 8. Association of socio-economic and demographic characteristics and knowledge on COVID-19

		Knowledge about symptoms			Knowledge on preventive measures			Knowledge on transmission measure			Basic knowledge			
		Mean score	t-test/ANOVA test	Tukey test	Mean score	t-test/ANOVA test	Tukey test	Mean score	t-test/ANOVA test	Tukey test	Mean score	t-test/ANOVA test	Tukey test	
Age#	<18 ears	4.72			7.37			5.48			5.17			
	18-60 years	4.45	0.6467		7.79	0.6		4.99	1.78		3.94	0.92		
	>60 years	4.14			8.06			5.17			5.54			
Gender	Male	4.52	0.945		7.82	0.362		5.04	0.034		4.93	-0.828		
	Female	4.29			7.73			5.04			4.79			
Location	Urban	5.53	4.031***		7.69	-0.369		5.23	1.209***		4.67	-0.484		
	Rural	4.24			7.80			5.00			4.32			
Marital status	Married	3.96	5.56***		8.05	-2.944		4.99	0.931		3.75	-0.72		
	Single	5.30			7.32			5.12			4.49			
Education level#	Illiterate	2.71	19.99***		7.82	4.38***		4.68	2.4***		1.99	20.85***		
	Primary school	4.01			8.25			4.92			0.893		2.17	1.17
	High school	4.57			8.45			5.29			3.04**		2.58	4.08***
	Higher secondary	5.57			7.71			5.31			2.31		2.31	1.65
	Graduation	5.33			7.22			5.10			1.73		3.29	7.54***
	PG & above	5.61			7.00			5.14			2.22		3.17	8.01***
Social groups#	ST	3.57	12.93***		7.92	1,58		4.77	2.15*		2.42	5.38***		
	SC	4.73			7.31			5.00			1.03		2.53	0.67
	OBC	4.21			7.96			5.06			1.56		2.49	0.5
	General	6.07			7.68			5.39			2.51**		3.11	3.56***
Religion	Hindu	4.42	0.805		7.85	-2.642		5.04	0.056		4.04	1.855***		
	Non-Hindu	4.93			6.19			5.06			4.93			
Job#	Farmer	3.82	9.86***		7.92	2.68**		4.91	2.02*		2.30	15.19***		
	Labour	3.60			8.21			4.81			2.21		-0.65	
	Regular employee	5.38			7.81			5.16			2.86		2.92**	
	Self-employed	5.20			8.20			5.11			3.18		4.86***	
	Student	5.48			7.05			5.21			3.10		5.68***	
	House-Wife	4.29			7.81			5.46			2.07		-1.28	
Economic status	BPL	4.06	5.22***		7.85	-0.852		5.00	0.87		4.08	0.449		
	APL	5.39			7.63			5.13			4.57			
Chronic disease	Yes	5.86	4.886***		7.72	-0.178		5.39	2.161***		5.16	0.734		
	No	4.22			7.78			4.97			4.10			
Income groups#	below 5,000	3.25	14.75***		7.80	2.26**		4.90	1.79**		2.52	9.76***		
	5,000-10,000	4.07			8.12			4.88			2.24			
	10,000-20,000	4.51			7.96			5.16			2.46			
	20,000-50,000	5.70			7.32			5.10			3.02			
	50,000 & above	5.69			7.15			5.40			3.11			

Note. # refers to the one-way ANOVA test in the test, ***, **, & * represents the level of significance at 1 %, 5%, & 10%, respectively

Table 9. Association between socio-economic and demographic characters and attitude and practice of preventive measure

		Attitude			Practice		
		Mean score	t-test/ ANOVA test	Tukey test	Mean score	t-test/ ANOVA test	Tukey test
Age#	<18 Years	27.55			22.93		
	18-60 years	27.40	0.37		23.68	3.26**	0.6
	>60 years	26.76			20.80		-1.32
Gender	Male	26.62	1.17		23.02	1.69*	
	Female	27.34			24.12		
Location	Urban	27.74	1.30*		26.76	4.85***	
	Rural	26.70			22.76		
Marital status	Married	26.92	0.32		22.00	6.26***	
	Single	26.74			25.87		
Educational qualification#	Illiterate	25.83			20.31		
	Primary school	25.85		0.02	21.54		1.31
	High school	28.78	4.12***	3.44***	23.27	15.40***	3.44***
	Higher secondary	27.97		1.81	22.86		2.15***
	Graduation	25.16		-0.65	26.25		5.72***
	PG & above	27.28		1.65	27.06		7.64***
Social groups#	ST	26.57			21.56		
	SC	26.74	0.61		23.83	8.27***	2.28*
	OBC	26.74			22.93		1.62
	General	27.88			26.88		4.75***
Occupation#	Farmer	26.89			20.73		
	Labour	26.92			22.67		2.3
	Regular employee	26.03	0.72		24.30	11.75***	3.08**
	Self-employed	28.36			24.93		3.86***
	Student	26.68			26.86		7.23***
Migration status	Housewife	26.48			22.35		1.54
	Migrants	26.37	-0.95		22.56	1.52*	
Economic status	Non-migrants	27.87			23.67		
	BPL	26.77	0.46		22.63	4.13***	
Chronic disease	APL	27.07			25.43		
	Yes	28.05	1.65**		26.04	3.53***	
Income groups#	No	26.65			22.90		
	below 5,000	27.45			21.92		
	5,000-10,000	26.67		-0.45	22.45		0.6
	10,000-20,000	28.30	4.33***	1.41	23.83	5.82***	2.04
	20,000-50,000	27.21		0.16*	24.02		1.99
Religion	50,000+	24.13		2.81**	26.65		4.32***
	Hindu	26.87	-0.077		24.63	0.77	
	Non-Hindu	26.75			23.35		

Note. # refers to the one-way ANOVA test in the test, ***, **, & * represents the level of significance at 1 %, 5%, & 10%, respectively

residence, marital status, education level, social groups, occupations, income groups, and economic status. It is also found that the mean score on knowledge about the symptoms of COVID-19 is less and the difference is statistically significant for illiterate and the participants with less than Rs 5,000 monthly income compared to other groups of people. However, the mean score on knowledge about the symptoms of COVID-19 is higher and significant for SC and general categories compared to ST, and the regular employees, self-employed, and students compared to the farmers.

While the knowledge on preventive measures about COVID-19 are concerned, the t-test results confirm that even though there is a difference in the mean score of knowledge about the preventive measures across locations of residences, gender, marital status, religion, chronic disease and economic status but they are observed to be statistically insignificant. However, the one-way ANOVA test concludes that the difference in the mean score exists across the participants with different levels of education, occupations and income

level only, but in answering which sub-groups have a statistically significant different mean score, it is not observable from our results as all the results of Tukey test are found to be insignificant. In case of knowledge on transmission methods of COVID-19, it is found from both the t-test and one-way ANOVA test that mean scores vary by locations of residences, education levels, social groups, occupations and income groups. Even though the mean score varies across different subgroups, the Tukey test confirms that the mean score is higher for general category and high school education level compared to ST and illiterate, respectively.

In order to evaluate the perception and attitude towards the preventive measures for the disease, we have prepared a five point Likert scale question for the participants. To analyze the association between socioeconomic and demographic characteristic and attitude towards COVID-19, attitude score has been calculated. The score varies from 7 to 35, where 7 indicates extremely negative attitude and 35 refers to a highly positive attitude. From the t-test and one-way ANOVA test,

it is found that there exists a statistically significant difference in the mean attitude score by locations of residences, educational levels, chronic diseases and income groups. And even though there arise differences in mean attitude score to some extent for all other groups but those are statistically insignificant. It is also observed that people with high level of incomes have a less positive attitude towards COVID-19 preventive measures. This could be because of the fact that they have greater access to health facilities as on account of their affordability. Surprisingly participants with a high school level of education have a greater positive attitude towards the COVID-19 preventive measures, implying low-income people with certain education might be very much cautious than the illiterates and high income groups of individuals.

Based on the frequency of doing preventive measures to avoid the coronavirus infection, the participants were asked seven questions, and a five-point scale has been used to gauge the practice of preventive measures. The practice score has been calculated by adding all the scales obtained on seven questions, and the practice score varies from 7-35, where seven refers to no practice at all and 35 refers to maximum practice. From both the t-test and one-way ANOVA test results, it is observed that there is a statistically significant difference in the mean practice score across all the socio-economic and demographic characteristics except religion. The mean practice score is observed to be higher for the participants with less than 18 years of age, having studied more than high school level of education, SC, general, regular employee, self-employed, students, and rich people compared to their respective sub-groups.

Correlation among KAP towards COVID-19

Although we observed in general a weak association among KAP scores in the analysis, however, the attitude score is found to have relatively a stronger relation with the practice score than the knowledge score. The basic knowledge about COVID-19, knowledge about symptoms and attitude towards preventive measures are positively associated with the practice of COVID-19 preventive measure. Interestingly, the basic knowledge on preventive measure and transmission methods is inversely associated with the practice of COVID-19 preventive measure (with $r=-0.018$ and $r=-0.197$). Nevertheless, other knowledge such as knowledge about symptoms ($r=0.07$), transmission method ($r=0.015$) and basic knowledge ($r=0.022$) have a direct association with the attitude towards COVID-19 preventive measure.

RESULTS AND DISCUSSION

Unawareness and lack of proper knowledge about any contagious disease can lead to more unconcerned attitudes and less practices. So this study is an attempt to explore the KAP towards COVID-19 disease among general population of Odisha, India, through both the online and offline cross-sectional survey based study. To the best of our knowledge, it is one of the first attempts, which carries out an offline survey on KAP towards COVID-19 in a poorest state like Odisha within India.

Social media and the internet are the major sources of information, and family, friends and relatives are the second most popular sources of information about various aspects of COVID-19, followed by radio and television. Our study found that 39.86% of the respondents had acquired

the information from internet and social media. However, it was observed that 66.03 % of the respondents whose major source of information were social media [33]. In contrast, we found a relatively lower percentage of people who acquired the information from the same source which can be attributed to a larger proportion of the respondents belonged to the rural area.

In this study, more than 60% of people know that fever, difficulty in breathing and dry cough are the symptoms of COVID-19, but still, a significant proportion of the participants (more than 70%) don't know that Diarrhoea and loss of taste and smell are also the symptoms of COVID-19. On the other hand, around 90% of the participants know the transmission channels of COVID-19; three-fourths of the total participants think that COVID-19 infection can spread through non-vegetable foods and pets and animals which are not correct. Regarding the misconception about the preventive measure of COVID-19, consumption of alcohols (16%), staying at high temperature (60%), lighting candle (34%), ringing bell (35%), praying God (43%), and drinking go-mutra or cow urine (19%) are on account of blind beliefs and misinformation. The participants think by following these actions, the COVID-19 infection can be prevented. Around half of the participants also believe that by doing yoga and taking some specific foods, the COVID-19 infection can best be avoided. However, only a quarter of the total participants understand the exact meaning of social distancing.

The empirical analysis shows that the higher mean score on knowledge is significantly associated with location of residence, marital status, education level, occupations, social groups, economic status, and income level. This finding is similar to the findings of [13,20,33]. Participants belonging to the general category, male, and urban area are scoring higher mean knowledge in all aspects of COVID-19 such as symptoms, preventive measures, transmission methods and other basic information about the coronavirus. People with chronic diseases like blood pressure, diabetics, Alzheimer's, etc. are more aware about various information relating to COVID-19 disease than people without any disease. Similarly, people living in the APL (above poverty line) category are more aware than those from BPL (below poverty line) groups [34]. The reason may be that the poor people are less educated, and they have less access to education and sources of information such as internet, social media, radio, television, etc.

A greater percentage of people (more than 80%) have more positive attitude towards all the preventive measures of COVID-19 disease except use of sanitizers. However, only 60% of the participants have a positive attitude toward the preventive measures. Furthermore, one-fourth of the total participants are neutral in their attitude towards sanitizer use, and others have a negative attitude towards it. This may be for the reason that the rural people are neither much aware nor able to afford the sanitizer for lack of sufficient income.

Participants with less than 18 years old, female, students, self-employed, general category, APL and living in urban area show more positive behaviour towards adopting preventive measures than their counterparts. However, on the contrary the participants with a higher level of incomes show a less positive attitude towards COVID-19 preventive measure. This may be because of the fact that these individuals have greater access to better health facilities on account of their better affordable capacity comparing the poor respondents. Surprisingly, the score of knowledge on preventive measures is inversely associated with attitude towards the same. Thus, it can be

inferred that people with more knowledge on preventive measures show less positive attitudes towards COVID-19 preventive measures. It is observed that the practices of COVID-19 preventive measures vary across different socio-economic and demographic characteristics of the participants as there exist significant differences in the practice scores across different groups of participants. Female, urban people, unmarried, general category, students and people from APL family background have reported higher practice scores. It is also found that respondents with higher education and higher incomes practice more preventive measures regularly to avoid COVID-19 infection. The effective control of COVID-19 highly relies on proper practice of preventive measures and this is highly associated with positive attitude towards it. Our findings also bring the evidence that the attitude towards preventive measures has a strong association with its practices. This finding echoes in tune with the findings in previous studies [35-37]. The knowledge about the basic information and symptoms of COVID-19 directly relates to the practice of preventive measures, and the reverse holds for knowledge about transmission methods and preventive measures.

CONCLUSION

This study tries to investigate the KAP towards COVID-19 among general population of Odisha with the help of both the online and offline surveys through structured questionnaire. It observes that social media and the Internet, family, friends and relatives, and radio and televisions are the three major sources of accessing information regarding the COVID-19. The study observed that the people have more knowledge about the disease preventive measures and transmission methods but are relatively less aware of some of symptoms of COVID-19 and social distancing. Still a greater percentage of participant are strongly guided by their blind-beliefs and misinformation about COVID-19 preventive measures such as consuming alcohols (16%), staying at high temperature (60%), lighting candles (34%), ringing bells (35%), praying to God (43%), taking gomutra (19%), etc. which are the unscientific means to get cure from COVID-19. It also established the fact that the knowledge, attitude and practice regarding COVID-19 also vary across gender, location of residence, marital status, education levels, occupations, social groups, economic status or income levels.

Moreover, it is evident that people with a higher level of income have a less positive attitude towards the COVID-19 preventive measure, we conclude that this could be on account some high income individuals have greater access to health facilities as they can afford better health care facilities on account of their resource endowments comparing poor individuals. The knowledge about preventive measures and transmission methods are inversely related to the practice of preventive measure. However, knowledge on basic information about COVID-19, symptoms and attitude has a positive association with practice. The knowledge score has a relatively weak association with the practice score comparing its relation with the attitude score. The community-based health programs and health education programs on COVID-19 and similar other infectious diseases would be quite useful and desirable to encourage individuals to have an optimistic attitude and maintain safe practices for limiting the rate of spread or infection.

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