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Effectiveness of e- learning among college students on knowledge regarding COVID – 19

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Abstract

Background:*Novel Corona Virus Disease (COVID-19) originated from China has rapidly crossed borders, infecting people throughout the whole world.* ***Aim:*** *To evaluate the effectiveness of e - learning on knowledge regarding COVID-19 among college students.* ***Methods:*** *One group pre-test and post-test design was used to assess the effectiveness of e-learning on knowledge regarding COVID-19 among the college students of locally selected degree colleges of Rajahmundry, nonprobability convenient sampling technique was used to select the sample. In the present study, sample consisted of 50-degree college students, Rajahmundry, Andhra Pradesh, India.* ***Results:*** *This study results shows that in pre-test 48(96%) college students had moderate knowledge and only 2 (4%) had adequate knowledge. This knowledge is gained mainly through mass media, and post-test reveals that 41(82%) had adequate knowledge and only 9 (18%) had moderate knowledge. This was also evident that the knowledge of the participant improved significantly after e-learning programme on COVID-19.* ***Conclusion:*** *The study concludes that the knowledge regarding COVID-19 among the college students, e-learning programme on COVID-19 was effective in improving knowledge regarding COVID-19 among college students. Although the government has taken major steps to educate the public and limit the spread of the disease, more effort is needed to educate and support the public.*

Keywords: *COVID-19, e-learning, knowledge, College students, WHO,CDC*

I. INTRODUCTION

1.1 BACKGROUND

COVID-19 started in December 2019, like a viral outbreak in Wuhan city of central Hubei province of China.(1) A cluster of about 40 cases of pneumonia of unknown etiology was reported, some of the patients being vendors and dealers in the Huanan Seafood market there. World Health Organization along with Chinese authorities started working together and the etiological agent was soon established to be a new virus and was named Novel Corona Virus (2019-nCoV).(2)

Over a period of few weeks, the infection spread across the globe in rapid pace.[3] Looking at the stretch of countries this outbreak spread to, the World Health Organization declared it a public health emergency[4] of international concern on January 30 and called for collaborative efforts of all countries to prevent the rapid spread of COVID-19[5]

On 11th February, WHO announced a name for the new corona virus disease: COVID-19 [5], so named due to the outer fringe of envelope proteins resembling crown ('*corona'* in Latin), are a family of enveloped RNA viruses[6]. On March 2, the European Centers for Disease Control and Prevention (CDC) raised the SARS-CoV-2 risk level from moderate to high. On March 11, 2020, WHO declared COVID-19 a pandemic by then about 114 countries were affected[4]. and recommended aggressive action by all countries in the world, warning that most countries were not prepared to handle the spread of SARS-CoV-2.[7]

As of May 3, 2020, there had been cases of the disease in around 210 countries or territories across 6 continents. China was initially the country most impacted by the disease, however the United States, Spain, Italy, Germany, and France now have the most cases worldwide. As of this time, there had been over 3.4 million cases of COVID-19 worldwide, with over 1.1 million of these cases found in the United States.

As of May 3, 2020, (fig:1) there had been 3,580,167 people infected worldwide, and 245,000 deaths due to the virus, with the United States reporting the highest number of deaths of any country worldwide, followed by Italy and the United Kingdom.[8]

As of May 4,2020, India has reported 42836 cases of COVID-19 and 1389 deaths. Whereas Andhra Pradesh had 1650 confirmed cases with 33 deaths.[9],[10] And these numbers are increasing continuously around the world,

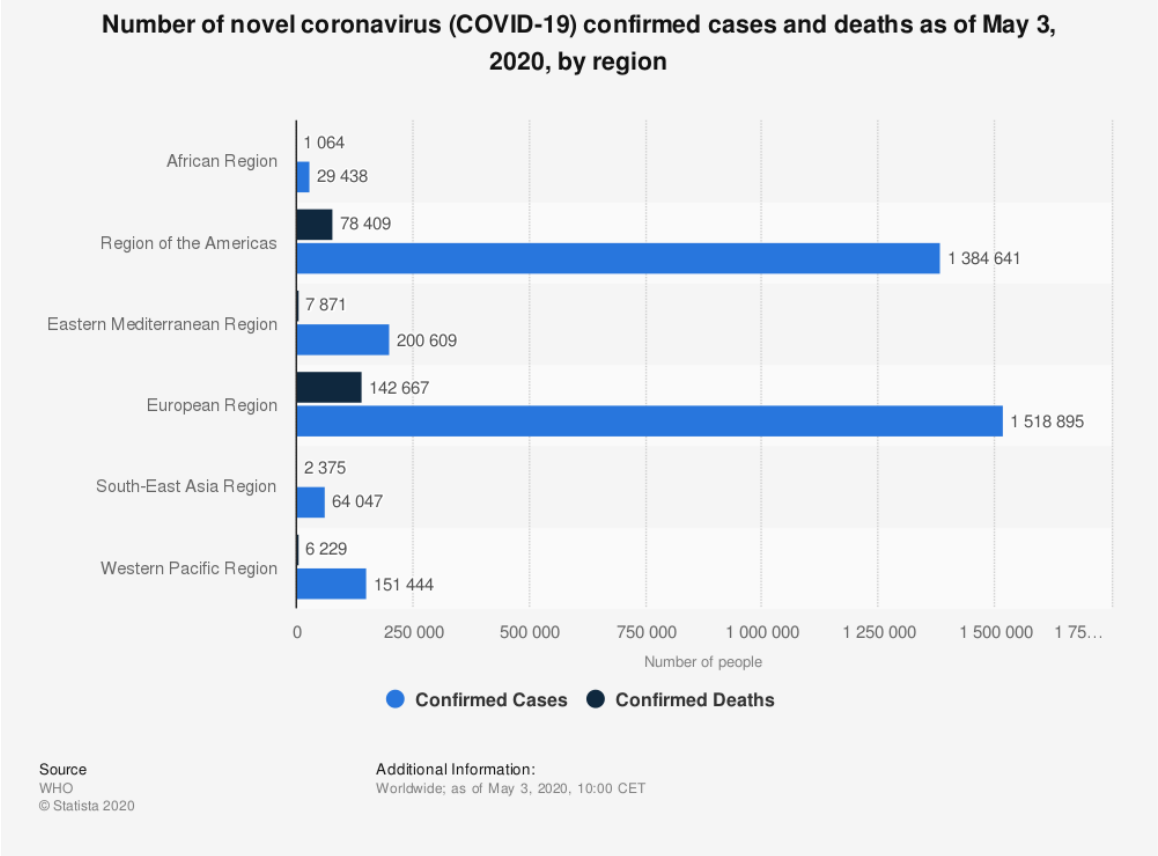

Fig: 1 number of COVID-19 cases worldwide

Because COVID-19 infection is a highly contagious disease and has affected a large population, the total number of deaths caused due to this virus has exceeded that caused by any of its predecessors.[9]

The incubation period is 1 to 14 days (mean: 5-6 days) in most cases, but can be as long as 24 days.[10] The most commonly seen characteristics of COVID-19 are fever, cough and abnormal chest computed tomography (CT)[11],[12]. SARS-CoV-2 can affect any demographic, including senior citizens, children and pregnant women.[13]

The reproduction number, or "R naught" (R0), is a mathematical term that defines contagiousness.[14] Specifically, it is the number of people that one sick host can infect. If the R0 is less than one the disease will disappear. If the R0 ≥ 1 then the disease will spread between people. Estimates of the R0 of SARS-CoV-2 have ranged from 2.24 to as high as 3.58[15] although the World Health Organization estimates it is between 1.4 and 2.5.[16]

Epidemics and pandemics are a periodic phenomenon. People in the community face several challenges during such periods. Lack of awareness often leads to an unconcerned behaviour which may adversely affect the preparedness to meet these challenges[17]

All epidemics and pandemics have their unique characteristics in terms of causality, progression and control measures[18]. Till the moment, there is no proved treatment or vaccination against SARS-CoV-2. Strong infection control measures are the primary intervention to minimize the spread of the virus in both health care settings and the community.[19] Public awareness of dealing with highly infectious respiratory diseases plays a vital role in limiting the spread of the infection, especially in middle and low-income countries, where health systems have, at best, the moderate capacity to respond to outbreaks[20]

Vaccine development is estimated to require months, and thus management of the crisis depends primarily on people's adherence to the recommended measures taken. These measures are largely affected by knowledge.[21] It is crucial to provide health education and create awareness during such situations for effective prevention of disease spread.[18]

Studies showed that more than 70% of public health emergencies in China occurred in schools and colleges, with most emergencies being infectious disease events.[22] Therefore, strengthening the attention of students and schools presents significance in preventing and treating infectious diseases.

Infectious disease knowledge and behaviours are key elements that ensure student health and safety. Therefore, ensuring sufficient knowledge and awareness of pandemics among college students, in addition to recognizing factors shaping their risk perceptions and communication practices, are vital for the prevention and control of disease.[23]

Health education can improve student knowledge on infectious diseases and promote the development of appropriate behaviours toward infectious disease prevention and control. Health promotion is based on health education, which is founded on health knowledge.[24]

Numerous empirical studies also showed that health education can improve the knowledge and which influences change in unhealthy attitudes and behaviours, effectively curbing infectious diseases and epidemics. [25],[26] Previous studies mainly stated the positive effect of health education on prevention and control of infectious diseases among students. [27]

The recent rise in infectious disease outbreaks worldwide, particularly in developing countries in Asia, is prompting that this is the time to educate the school and college going students about these pandemics in advance to avoid the fatal situations which occurred globally

The electronic communication media enables information to reach much wider audiences than possible through means such as traditional media. During the Coronavirus disease 2019 pandemic, the World Health Organization (WHO), the Centers for Disease Control and Prevention (CDC) in the United States, and many

countries utilizing the Internet to disseminate COVID 19-related messages rapidly to the public and health care providers.

1.2 AIM OF STUDY

To evaluate the effectiveness of e - learning on knowledge regarding COVID-19 among college students

II. METHODOLOGY (MATERIALS AND METHODS)

2.1 STUDY DESIGN

One group pre-test and post-test design which belongs to pre experimental design.

2.2 STUDY AREA

The study was conducted at selected degree colleges, Rajahmundry.

2.3 STUDY POPULATION

The study population includes degree college students of Rajahmundry.

2.4 INCLUSION CRITERIA

The degree college students who are

- willing to participate.
- able to read and write English.
- Having internet access

2.5 EXCLUSION CRITERIA

The degree college students who are not available during the study.

2.6 SAMPLE SIZE

The sample size for the study was 50-degree college students.

2.7 SAMPLING TECHNIQUE

In this study nonprobability convenient sampling technique was used to select the samples based on inclusion and exclusion criteria.

2.8 DATA COLLECTION TOOL

Development of the tool: An online semi – structured questionnaire was developed by using google forms, As there was an urgent need to reach the students and public, and shouldnot gather students together in large groups as it would increase the risk of spread of infection. Hence, a decision was made to use e- learning to disseminate the health information on COVID-19 rapidly and efficiently to the students.
Online teaching plan on COVID-19 was developed.

The online semi structured questionnaire comprised of two sections

Section I: It deals with selected socio demographic variables consists of 5 items which includes age in years, gender, religion, year of study, source of information.

Section II: Knowledge regarding COVID-19 was assessed by answering 25 multiple-choice questions. Questions were given one point for correct response and zero point for unanswered questions or incorrect answers. The maximum score was 25, and the minimum was 0

Knowledge Questionnaire related to COVID-19 includes

A.	General Information	3 questions
B.	Clinical features	5 questions
C.	Diagnosis and treatment of the disease	6 questions
D.	Prevention and control measures	6 questions
E.	PPE	5 questions

to interpret the score, it was categorized into

Inadequate knowledge	≤ 50,
Moderately adequate knowledge	51-75%
Adequate knowledge	> 75%.

2.9 DATA COLLECTION TECHNIQUE

College students were informed through mail prior to their participation that their participation is anonymised, voluntary, and that their data will be treated as confidential. Also, a brief description about the study purpose was provided.

An online semi – structured questionnaire was developed by using google forms, the link of the questionnaire was sent through e-mails, WhatsApp and other social media to the samples. On receiving and clicking the link the participants got auto directed to the information about the study,

Online teaching plan on COVID-19 was developed to provide e-learning. which includes the General Information, Clinical features, Diagnosis and treatment of the disease, and Personal Protective Equipment.

After the online consent was obtained from the participants pre-test was conducted through an online semi – structured questionnaire, and online teaching was given to the participants about covid-19. And a post test was conducted with the same questionnaire on the seventh day

2.10 STUDY VARIABLES

- Independent variable : e-learning teaching plan was developed on COVID-19
- Dependent variable : Knowledge on COVID -19
- Attribute variables
  - Age in years,
  - Gender,
  - Religion,
  - Year of study,
  - Source of information.

2.11 PILOT STUDY

A pilot study was conducted on college students who were not included in samples; modifications of the instrument and method were accordingly performed.

2.12 ETHICAL CONSIDERATIONS:

- Approval from the concerned authority of selected colleges was obtained
- The researcher took online informed consent from all participants.

2.13 DATA ANALYSIS

The data analysis was planned to include descriptive and inferential statistics.

Descriptive statistics

1. Frequency and percentage distribution were used to analyse the demographic data of college students
2. Mean, Mean percentage and standard deviation were used to assess the level of knowledge among college students regarding COVID - 19.
3. Finally, the scores are grouped into three categories inadequate knowledge, moderate knowledge and adequate knowledge.

Inferential statistics

1. Paired't' test to assess the effectiveness of structured teaching programme on knowledge regarding covid-19 and its prevention.
2. Chi- square test to study the association between post-test knowledge with selected socio demographic variables of college students.

III. RESULTS

In the present study, the obtained data were tabulated, organized, analysed, and interpreted using descriptive and inferential statistics based on the objectives of the study. The findings were presented on tables and diagrams.

Characteristics of respondents based on age, gender, religion, year of study and source of information are shown in the table below

TABLE: 1 Frequency and percentage distribution of college students according to their demographical variables.

Sl.no	Demographic variables	Frequency (f)	Percentage (%)
1	Age in years		
	a) 18-19	01	02
	b) 19-20	39	78
	c) 20-21	10	20
	d) 21-22	-	-
2	Gender		
	a) Male	29	58
	b) Female	21	42
3	Religion		
	a) Hindu	31	62
	b) Christian	12	24
	c) Muslim	07	14
	d) Others	-	-
4	Year of study		
	a) First year	24	48
	b) Second year	23	46
	c) Third year	03	06

5	Source of information		
	a) Mass media	21	42
	b) Internet	16	32
	c) Health professionals	13	26

The table-1 depicts the frequency and percentage distribution of students with respect to age, majority of the subjects 39 (78%) were belongs to the age group between 19 to 20 years, 10 member (20%) were in the age group of 20 to 21 years, one member(2%) in the age group of 18-19 years and none of them belongs to the age group of 21-22 years.

With regard to the gender, majority of the respondents 29 members (58%) were male and 21 members (42%) were females.

With regard to religion 31 members (62%) were belonging to Hindu religion, 12members (24%) were Christians and seven members (14%) were Muslims and none of them belong to other religion

Regarding year of study 24 (48%) were first year, 23 members (46%) were second year and 3 members (6%) were in third year

With regard to source of information 21 members (42%) of them received information from mass media, 16 members (32%) received from internet and 13 members (26%) received information from health professionals.

Table – 2: Frequency and percentage distribution of pre- test level of knowledge according to area wise among college students regarding COVID - 19.

S.No	Knowledge Variables	Level of Knowledge					
		Inadequate <=50%		Moderately adequate (51 – 75%)		Adequate >75%	
		f	%	f	%	f	%
1	General Information	2	4	36	72	12	24
2	Clinical features	1	2	36	72	13	26
3	Diagnosis and treatment of the disease	1	2	30	60	19	38
4	Prevention and control measures	3	6	47	94	0	0
5	PPE	5	10	45	90	0	0

The table 2 shows that only 19 (38%) of the participants had adequate knowledge regarding diagnosis and treatment of the disease and only 12 (24%) of the participants had adequate knowledge regarding general information and none of them had adequate knowledge regarding prevention and control measures, PPE and majority of the participants had moderate knowledge.

Table 3: Frequency and percentage distribution of post-test level of knowledge according to area wise among college students regarding COVID-19.

Sl.No	Knowledge Areas	Level Of Knowledge					
		Inadequate <=50%		Moderately adequate (51 – 75%)		Adequate >75%	
		f	%	f	%	f	%
1	General Information	2	4	20	40	28	56
2	Clinical features	0	0	17	34	33	66
3	Diagnosis and treatment of the disease	0	0	4	8	46	92
4	Prevention and control measures	0	0	24	48	26	52
5	PPE	0	0	12	24	38	76

The table 3 shows that majority of the participants 46 (92%) of them had adequate knowledge regarding diagnosis and treatment of the disease and only 28 (56%) of the participants had adequate knowledge regarding general information. Majority of the participants showed the increased level of knowledge regarding PPE.

Table 4: Frequency and percentage distribution of students according to pretest and posttest level of knowledge regarding COVID-19

Knowledge on COVID – 19	Level of knowledge		
	Inadequate knowledge	Moderate knowledge	Adequate knowledge
Pre test	0	48	2
Post test	0	9	41

The table 4 shows that the distribution of pre-test level of overall knowledge regarding COVID-19 among college students. Out of 50 students 48 had moderate knowledge and only 2 students had adequate knowledge. The post-test reveals that majority of the participants 41(82%) had adequate knowledge and only 9 (18%) had moderately adequate knowledge regarding COVID-19. Which shows the increased level of knowledge regarding COVID-19.

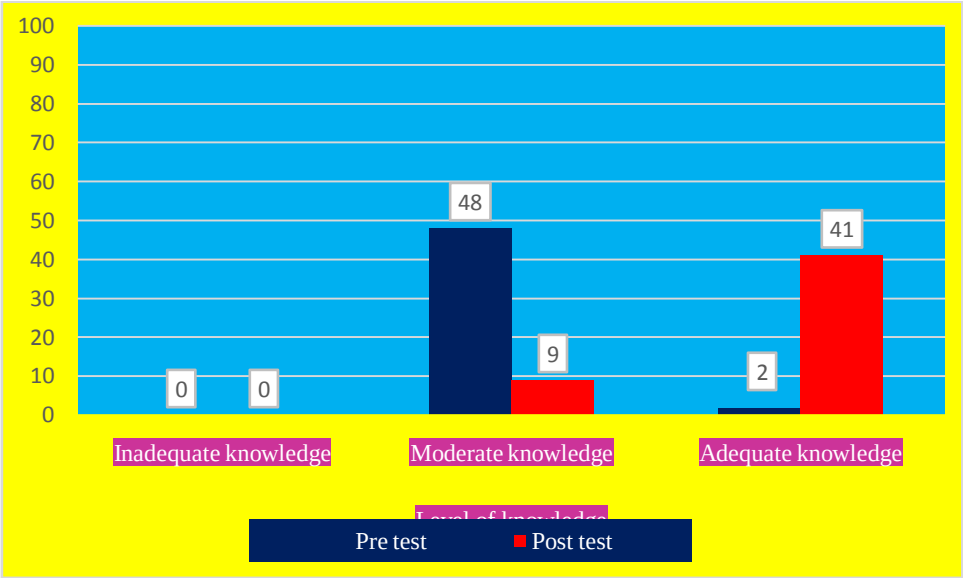

Fig:2 Frequency distribution of college students according to pre-test and post-test level of knowledge regarding COVID-19

IV. DISCUSSION

Our study has shown that the e- learning program was a positive factor that affected knowledge scores among college students. College students are mainly engaged in learning basic knowledge and applying this knowledge to examinations. Even though Most of the students in our study have moderate knowledge of COVID-19. This was better than the other observations found in studies conducted in India and other parts of the world, students have showed interest and enthusiasm to learn more about COVID 19 through e-learning

Relevant studies [28,29] showed that implementation of health education for school and college students were conducive for students to consciously adopt healthy behaviors and lifestyle, eliminating or mitigating risk factors that affect spread of infectious diseases like COVID-19, preventing infectious diseases, and promoting health and improving quality of life. Therefore, we believe in the significance of conducting e- Learning on COVID-19 among college students to further improve their knowledge on prevention of COVID-19 diseases and their overall health quality.

V. CONCLUSION

5.1 LIMITATIONS

The study is limited to the people who had smart phones, e-mail IDs and the ability to read and write in English. This represents the educated population, so it should not be generalized to the whole population. The knowledge and awareness need in uneducated people may be different from the findings of our study.

5.2 CONCLUSION

Students found the e-learning on COVID-19 is most useful. Implications for public health education. In the event of an infectious disease outbreak, health professionals play an important role in disseminating information in a timely and rapid manner to public on how to protect themselves and prevent further spread of the disease to the community. The Internet would be an ideal medium for disseminating health information rapidly and efficiently to those groups of individuals who are educated, technology-savvy, and are at high risk of spreading the infection. Our online teaching method on COVID-19 can be adapted by other colleges or even workplaces with good Internet support, to disseminate timely messages in a variety of disciplines. Pre and post

tests were conducted before and after the e-learning programme which shows that increased level knowledge regarding COVID-19. In conclusion, the e-learning on COVID-19 is an efficient and convenient method to disseminate important health information rapidly to large populations during an outbreak, when gathering together in crowded places is discouraged. We also find it feasible to institute measures to ensure participation by all students.

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