Effect of Educational Intervention on Secondary School Students' Knowledge, Practices and Attitudes Regarding COVID-19

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Abstract

Background: Coronavirus pandemic disease 2019 is considered an emerging disease that is highly infectious, caused by coronavirus in December 2019 in Wuhan city, China. Corona virus affected educational process all over the world and led to the schools closures, universities, and colleges, within the middle of March 2020. **Aim**: Evaluate the effect of educational intervention on secondary school students' knowledge, practical knowledge and attitudes regarding the COVID-19. **Methods:** quasi-experimental design was adopted. Purposive sample of 260 students were selected at secondary school students in Sohag City from 20 April to 2 May 2020. The tools utilized in this study consisted of a self-administered questionnaire that contained four parts to assess secondary school students' demographics, knowledge regarding COVID -19, the attitudes toward COVID -19 and reported practice regarding COVID -19 and health education Arabic booklet. The questionnaire was designed using Google forms regarding the COVID-19, and the link of the survey was presented to the respondents via Facebook and WhatsApp groups. **Results:** A significant difference was found between secondary students' knowledge attitudes, and practices pre and post intervention. Most of students had a poor pretest knowledge and attitude level, which improved after intervention. More than half of them had poor pretest practice levels which improved after educational intervention implementation. **Conclusion:** It concluded that secondary students' knowledge, attitude, and reported practice improved after exposure to the educational intervention. Educational intervention providing was significantly effective in increasing knowledge level, attitude, and practice among secondary school students regarding COVID-19. **Recommendations:** Encourage cooperation between educational institutions, medical care providers, and health personnel to educate secondary school students regarding COVID-19.

Keywords: COVID -19, educational intervention, knowledge, attitudes, practices, students.

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Introduction:

By the end of January 2020, the World Health Organization (WHO) was declared that public health emergency of international concern and called for the collaborative efforts of all countries to avoid the rapid COVID-19 spreading **(Tang et al., 2020)**.. WHO is declared that COVID-19 was a global pandemic on 12 March, which has spread widely and rapidly, from Wuhan city to other parts of the world, and threatens the lives of many people **(World Health Organization, 2020)**.

Extraordinary efforts have been implemented to control the COVID-19 spread in Egypt. Its clinical presentation starting from being an

asymptomatic infection and developing into severe disease and is accompanied with a high mortality rate (**Carsetti et al., 2005**). During the time of writing (May 16, 2020), over 4,425,485 COVID-19 infected person and 302, 059 deaths have been registered worldwide (**WHO, 2020**). In Egypt, there are 11,228 positive individuals and 592 deaths (**Ministry of Health-Egypt, 2020**).

Coronavirus is characterized by rapid transmission that occurs through close contact with an infected person and is not the only method of transmission (**WHO Coronaviruses, 2020**). Some of the signs of coronavirus include fever, dry cough, fatigue, myalgia, dyspnea, sore throat, runny nose, and sneezing. Images that illustrate the Morphology of Coronaviruses; the club-shaped viral spike polymers, colored red, create the look of a corona surrounding the vision when observed with an electron (**Shereen et al., 2020**). Research shows that older people and those with underlying medical problems such as cardiovascular diseases, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illnesses from coronavirus (**World Health Organization, 2020**).

All aspects of human activities globally affected by the outbreak of COVID-19 ranged from education, research, sports, entertainment, transportation, worship, social gathering/interactions, economy, businesses, and politics. Indeed, the entire world was in distress as a result of COVID-19 threats (**Taber, 2020**).

There was closure in most parts all over the world, and persons were work from home to reduce coronavirus spreading and the incidence of infected persons with coronavirus. There was required an increased need for protective gowns, sanitizers, face masks, and hand gloves (**National Health Commission of the People's Republic of China, 2020**). Substantial efforts to control the disease were made by health authorities through various measures. Public education is considered important measures that can help control diseases. Efforts to control COVID-19 spreading, including non-medical interventions and preventive practices such as social-distance and self-isolation (**Jordan, 2020**)

There were no reliable treatments for Coronavirus, but the studies were in the same line around the world in order to discover a vaccine against the virus. However, recent events show that behavioral change can help the controlling of the spread of COVID-19 (**The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team, 2020**). Preventive measures suggested to help control the COVID - 19 pandemic include improved individual habits such as hygiene, including constant hand washing with alcohol, close coughing and sneezing, and other protection practices such as wearing mask, avoiding face touching, social distance, and to reduce contacts with other people by isolation at home and avoiding travels and gatherings. Coronavirus is considered a problem that requires more effort coordination and cooperation to encourage successfully contain of the outbreak and to know how to avoid its adverse

effects. Consequences of COVID-19 may be more severe; if people do not comply with public health regulations and advice **(WHO, 2020).**

With no definite therapy for COVID-19, it becomes important that people must stringently aware with advisories of social distance and hand washing **(Pal and Bhansali, 2020 & Pal and Bhadada, 2020 and Banerjee et al., 2020).**

Personal' knowledge, and the practices regarding COVID-19 are affected by adherence to these control and preventive measures, following the "KAP theory". It is a health behavior changing theory wherein this change in human behavior included three successive topics, namely, gaining the right knowledge, generating attitudes and adopting practice (**Fan et al., 2020**). **Fan et al., (2020) & Matsumoto et al., (2015) & Rana et al., (2020), Khalil and Abdalrahim, (2014)** have illustrated that the KAP level in individuals is accompanied with more effective prevention and management care of the disease and promotion of human's health, because KAP deficiency are associated with poor health and maladaptive disease preventive behavior **(Matsumoto et al., 2015 and Ricardo et al., 2018).**

The nurse plays an important role in preventing the spread of the illness by encouraging students with adherence, which is influenced by the student's knowledge, their attitudes, and practice toward COVID-19 and providing health education about COVID-19 prevention and control. Evidence shows that student knowledge is important in managing

pandemics (**Chirwa, 2020 and Chirwa 2019**). Many facts about students' perceptions and practices can be gained by assessing students' knowledge about coronavirus which helps to identify attributes that affect the students' adoption of healthy practices and responsive behavior (**Podder et al., 2019**). There is a need to improve the student's knowledge, attitudes, and practice toward COVID-19 at this critical moment. Because they are from the health team and play important roles in the patient care, which includes the decision-making process for patients within the other multidisciplinary health team, being responsible in nursing care, advising and prevention, health educator, and assessment of patient care (**Babiker et al., 2014**). Here, the study was to evaluate the effect of educational intervention on secondary school students' knowledge, attitudes and reported practice regarding the COVID-19.

Significance of the study:

In Egypt, changes every day of life have been rapid, with virus outbreaks, and an increasing death rate. Coronavirus is considered pandemic in Egypt as part of ongoing worldwide coronavirus pandemic. The Ministry of Health and Population Egypt confirmed that the first infected person with COVID-19 in Egypt was on February 14, 2020 **(Ministry of Health and Population Egypt, 2020)**. As the coronavirus disease rapidly spread all over the world, so that, there is an emergent need to improve students' knowledge, attitude, and practical

knowledge to help prevent and control disease among them. The emerging pandemic coronavirus (COVID-19) is considered a specific and unusual phenomenon. There are, however, no academic studies about the impact of educational intervention on secondary school students' knowledge, practices and attitudes regarding COVID-19 in Egypt. Therefore, the present study represents the first effect of educational intervention regarding COVID -19 conducted in secondary school students in a city in Egypt within the first month of the COVID-19 outbreak. This study aimed to evaluate the effect of intervention regarding COVID -19 on knowledge, attitudes, and reported practice among secondary school students in Egypt in the initial stage of the coronavirus pandemic (COVID-19) outbreak. Additionally, assessing students' knowledge is important in clarifying gaps and strengthening ongoing prevention efforts facilitating outbreak management of COVID-19 in Egypt and controlling the disease spread among students.

Aim of the study:

The study was aimed to evaluate the effect of educational intervention on secondary school students' knowledge, attitudes and reported practice regarding the COVID-19.

Research hypothesis:

1) Secondary school students who will be exposed to educational intervention regarding COVID -19 will have improved in their knowledge, and the total knowledge score will be higher post-intervention compared to pre-intervention.

2) Secondary school students' who will be exposed to educational intervention regarding COVID -19 will have improved in their attitude, and the total attitude score will be higher post-intervention compared to pre-intervention.

3) Secondary school students' who will exposed to educational intervention regarding COVID -19 will have improved in their reported practice, and the total practice score will be higher post-intervention compared to pre-intervention.

Subjects and Methods:

Research Design:

Quasi-experimental research design was adopted in the present study.

Settings:

The current study was carried out at Sohag city in Egypt.

Subjects:

A purposive sample was used to achieve the aim. It includes 260 secondary school students in Sohag city through Google form spreadsheet, who meet the following inclusion criteria: secondary school students, aged 15 to 18 years, from both sexes and welling to participate in the study.

Tool and techiques of data collection:

After a comprehensive literature search and based on the most recent available information from the World Health Organization, the Center for Disease Control and Prevention (USA)

and the Egypt Ministry of Health and a pre-validated questionnaire by **Zhong et al., (2020)** were modified by the researchers as follows:

1-A self-administered questionnaire:
- It was composed of four parts.

Part (1):- Demographic data included age, sex, school level, and residence.

Part (2): To assess knowledge regarding COVID -19, consisted of (30) items that include (COVID -19 definition, risk factors of COVID -19, sign & symptoms of COVID -19, treatment, methods of transmission, 19, and preventive measures of COVID – 19.

Part (3): To assess attitude regarding COVID -19, consisted of (6) items.

Part (4): To assess reported practice about COVID -19, consisted of 14) items.

- A health education Arabic booklet prepared by the researchers, including educational intervention program regarding COVID -19.

Scoring system:

(A) The scoring system for the current study was as follows:

- Knowledge about COVID -19. It contains 30 questions; they were answered on a YES/NO basis option. A correct answer was assigned 1 point, and an incorrect answer was assigned zero points. The total knowledge score was ranged from zero to 30, with high scores indicating good knowledge about COVID-19. Items were evaluated for internal reliability, using Cronbach's alpha coefficient of 0.72 **(Fetters and Tilson, 2018)**

The total scores of students' knowledge were divided into three levels:

- Scores above (≥ 70 %) considered good

- Scores between 50% – < 70% were considered fair

- A score of less than 50% was considered poor.

(B) Attitude toward COVID -19. It contains 6 questions; in the section on attitudes, scores were calculated based on the respondents' answers to each attitudinal statement, 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, and 5 = strongly agree. Scores were calculated by averaging respondents' answers to the six statements. Total scores ranged from six to 30, with high scores indicating positive attitudes. The Likert scales were assessed for internal reliability, using Cronbach's α. Cronbach's alpha coefficient was 0.81, indicating internal reliability.

The total scores of student attitude were divided into three levels:
- A score above (≥ 70 %) considered good
- Scores between 50% – < 70% were considered fair.
- A score of less than 50% was considered poor.

(C) The scoring system for student reported practice was classified as a student's practice about COVID -19 with 14 items. In the section

on practices, respondents were asked to respond "yes" or "no" to the items. A score of one was given to answers that reflected good reported practice, and a score of zero was given for answers that reflected bad reported practice. The total score ranged from zero to 14, with high scores indicating better reported practice.

The total scores of adolescent student reported practice were divided into three levels:-

- A score above (≥ 70 %) considered good

- The scores between (50% – < 70%) considered fair

- A score of less than 50% was considered poor.

Validity and reliability:

Face and content validity of the tools for clarity, comprehensiveness, appropriateness, and relevance by a board of five experts' professors in pediatric nursing and community health nursing at Sohag university hospital with more than ten years of experience in their field were assessed; the board ascertained the face and content validity of the tools after modifications. Reliability was assessed through Cronbach's alpha reliability test α= 89%. The tools' reliability was estimated by using the Pearson correlation coefficient test to compare variables. The Pearson correlation coefficient for the variables ranged between (P. < 0.5) and (P. < 0.001), which indicated a highly significant positive correlation between variables of the subjects.

Ethical consideration:

Each secondary student was informed about the aim and the benefits related to the study in the first part before starting the questionnaire where every student could not be starting the questionnaire without consent to participate in data collection in the current study. Each student informed them that participation in the current study was voluntary and that they had the right to withdraw from the study at any time before completing the questionnaire with no consequences, without giving any reason and that their responses would be held confidentially.

Data collection:

The researchers used the online Google form spreadsheet to create the research. The researchers shared the link to the students to collect data that included an online questionnaire. The link presented in Whats App groups. On the front page of the online questionnaire, students were informed about the objectives and expected outcomes of the study. All the students' responses were gathered in an online spreadsheet to evaluate the effect of the educational intervention regarding COVID-19 on knowledge, attitudes, and reported practice among secondary school students. Numbers of the telephones for all students under study were taken for follow up. The online questionnaire used three times. For the first time, it was used as a pre-educational intervention application to assess the secondary school students' knowledge, attitude, and reported practice regarding COVID-19.

Then, it was used another time as an immediate post-educational intervention application and repeated follow-up after three month to evaluate the effect of the program.

The time spent for secondary school students' completing the online questionnaire was approximately 6-8 minutes; the sample was collected from 20 April to 2 May 2020. The online questionnaire was designed in English and translated into Arabic. The questionnaire was designed as a multiple-choice question (quiz). We provided the correct answers to all questions wrongly answered by the respondents as feedback. All questions and responses were based on the latest recommendations by the WHO. The educational intervention included simple and clear information about COVID-19. It also included the preparation of teaching materials, i.e. Photos, videos about ideal hand washing and PowerPoint presentation about COVID-19 and its preventive measures for protection, and the health education Arabic booklet was designed by the researchers, including educational intervention regarding COVID-19 that was introduced to secondary school students in Whats App groups. The booklet was presented to students. This booklet contained all the information needed to know and acquire about COVID-19 such as photos that clarified the information. The evaluation took place three month after the educational intervention, to examine the secondary school students' knowledge, attitude, and reported practice using a pre-posttest online questionnaire.

Statistical analysis:

The data obtained were reviewed, prepared for computer entry, coded, analyzed, and tabulated. Data entry and analysis were performed using the SPSS 17.0 statistical software package. Data are expressed as the mean, SD, number, and percentage. ANOVA test used to determine significance for numeric variables, and using Person's correlation for a numeric variable in the same group, $P > 0.05$ was not significant, $P < 0.05$ was significant, $P < 0.01$ was moderately significant and $P < 0.001$ was highly significant.

Results:

Out of 260 students who answered the questionnaires, (57.3%) were female and (42.7%) were male. Age of the participants ranged from 15 to 18 years old. (40%) were 16 to 17 years of age. Regarding residence, nearly three - quarters (74.00%) of students were living in urban areas and 26% of them living in rural areas (Table 1).

Figure (1) shows an illustrated educational level among students and that most relevant of them (35.0%) were on the third level.

Regarding students' sources of information about corvid-19, the results reflected that the main source of information about COVID-19 was social media (73%), followed by television (49%), which Facebook is the most frequently cited source of knowledge among social media followed by Whats App (Figure 2).

Table (2) shows the secondary school students' knowledge about COVID-19 pre/post and after three

month of educational intervention implementation. This table indicated that there was an improvement in secondary school students' knowledge compared to pre- educational intervention knowledge. There was a highly significant difference between pre/post and after three month of educational intervention implement-tation to the secondary school student's knowledge regarding COVID-19 (P-value <0.000). Out of all subjects, 260 (100%) had poor pretest knowledge level. In the posttest, 234 (90.0%) secondary school students had a good knowledge level, followed by 182 (70.0%) who improved after educational intervention implementation. There were highly significant differences (p= <0.000) in the secondary school students' total knowledge mean scores as pre/immediate post and after three month of educational intervention implementation regarding COVID -19 (Table 2).

There was an improvement in secondary school students' attitudes compared to pre- educational intervention knowledge. There was a highly statistically significant difference between pre/post and after three month of educational intervention implementation to the secondary school student's attitude regarding COVID-19 (P-value <0.000). Secondary school students' attitudes were measured with 6 items. The highest negative result was answered regarding the COVID-19-related attitude item: "feel anxious when you think of coronavirus disease / COVID-19". The highest positive result was answered regarding COVID-19-related attitude items: 'regular hand washing, maintaining social distancing and use of masks can protect'. However,

the lowest positive attitude result answered is related to the attitude item: 'Egypt's strict measures can help win the battle against COVID-19 pre intervention implementation which improved after intervention implement-tation (Table 3). There were highly significant differences (p= <0.000) in the secondary school students' attitude mean scores as pre/immediate post and after three month of intervention implementation regarding COVID -19 (Table 3). Out of all subjects, 202 (77.7%) had a poor pretest attitude level followed by fair (20.0%) and good 6 (2.3%). In the posttest, all 260 secondary school students had a good attitude level, which improved after intervention implementation (Table 3).

There was improvement among secondary school students' reported practice regarding COVID -19 pre/immediate post and after three-month from intervention implementation, where there were highly significant differences (P=0.000) with regard to reported practice of all the preventive measures from COVID -19 (Table 4). In the pretest educational intervention, many preventive measures not practicing, secondary school students showed a low-performance rate, as out of 260 (8.5%) participants were not practicing social distancing; (8.5%) hand washing; (0.0%) use disinfectants; (22.8%) use of masks; (40.0%) recently go to a crowded place; (7.0%) stay at home and (90.0%) shake hand upon the meeting of friends/family members/other, which improved after the intervention implementation, and secondary school students showed a high-performance rate. There were significant differences (p= <0.000) in the secondary school students' reported

practice mean scores as pre/immediate post and after three month of educational intervention implementation regarding COVID -19. Out of all subjects 150 (57.7%) had poor pretest reported practice levels, followed by fair (38.3%) and good 10 (4.0%). In the posttest, all secondary school students had good reported practice levels, which improved after the intervention implementation. It illustrated that secondary school students' mean scores for total reported practice regarding COVID -19 before and after the educational intervention implementation were improved, and there were statistically significant differences (p= <0.000) where the mean practice was 10.17 before the educational intervention compared to 12.84 after three month from the intervention implementation (Table 4).

A highly statistically positive correlation was found between total knowledge scores, attitude, and reported practice at the post and after three-month educational intervention implementation (P=0.004, P=0.005) (Table 5).

Table (1): Percentage distribution of secondary school students according to their characteristics (N=260)

Characteristics of secondary school students	N=260	%
Gender		
- Male	149	57.3
- Female	111	42.7
2-Age(years)		
• 15<16	78	
• 16 <17	104	30.00
• 17 ≥18	78	40.00
		30.00
3-Residence:		
• Urban.	192	74.00
• Rural.	68	26.00

Figure (1): Percentage distribution of secondary school students according to their educational level (N=260).
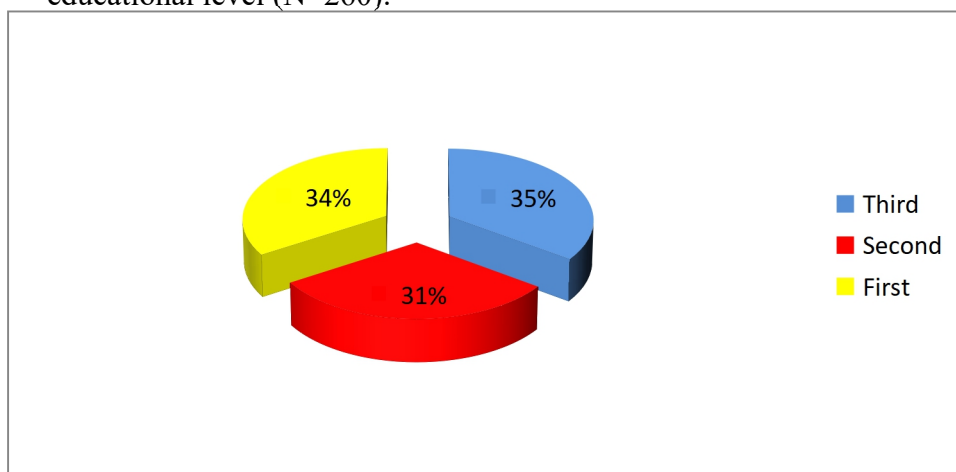
Figure (2): Percentage distribution of secondary school students according to their source of information about COVID-19 (N=260).

	Social media	T.V	Family	Friends	Doctors
Series1	73	49	48	48	20
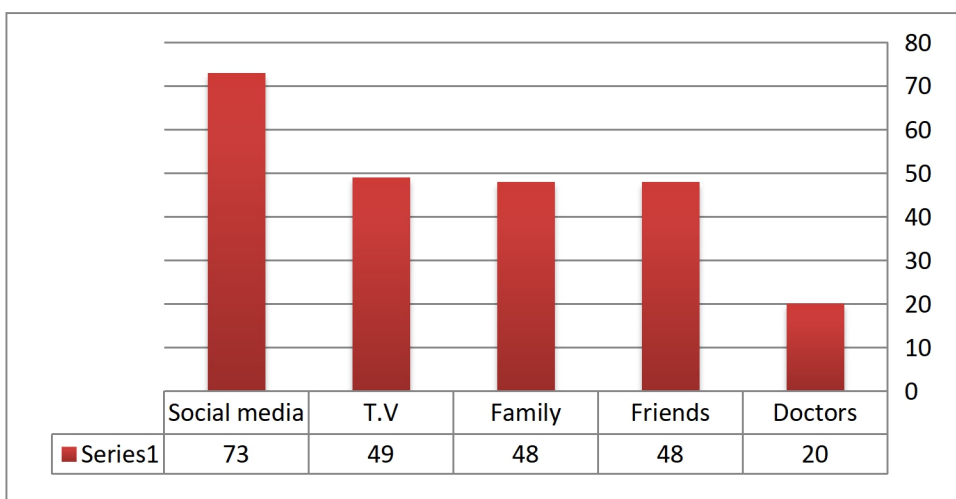
Table (2): Comparison of secondary school students' level of knowledge related to COVID-19 as pre/immediate post and after three-month educational intervention implementation (N=260)

Items	Pre educational intervention		Immediate-post educational intervention		After three month educational intervention		P-value
	No.	%	No.	%	No.	%	
- Poor > "50 "	260	100%	0	0.0	0	0.0	0.000
-Fair "50- 70"	0	0.0	200	61.4	182	70.0	0.000
-Good"≥ "70"	0	0.0	210	80.6	234	90.0	0.000
Total knowledge	**5.68±0.69**		**16.17±3.10**		**24.04±8.04**		0.000

Table (3): Comparison of secondary school students 'level of attitude related to COVID-19 as pre/immediate post and after three month educational intervention (N=260)

Levels	Pre- educational intervention		Immediate-post educational intervention		After three month educational intervention		P-value
	No	%	No	%	No	%	
- Poor > "50 "	202	(77.7%)	0	0.0	0	0.0	0.000
- Fair "50: 70"	52	(20.0%)	0	0.0	0	0.0	0.000
- Good"≥ "70"	6	(2.3%)	260	(100%)	260	(100%)	0.000
Total attitude	**1.17±1.60**		**4.06±1.73**		**5.84±1.12**		**0.000**

Table (4): Comparison of secondary school students' levels of reported practice related to COVID-19 as pre/immediate post and after three month of educational intervention (N=260)

Levels	Pre-educational intervention		Immediate-post educational intervention		After three month educational intervention		P-value
	No	%	No	%	No	%	
- Poor > "50 "	150	(57.7%)	0	0.0	0	0.0	0.000
-Fair "50: 70"	100	(38.3%)	0	0.0	0	0.0	0.000
-Good"≥ "70"	10	(4.0%)	260	(100%)	260	(100%)	0.000
Total reported practice	**10.17±1.60**		**19.06±1.73**		**24.84±2.12**		**0.000**

Table (5): Correlation coefficient between total secondary school students' knowledge, attitude and practical knowledge scores regarding COVID -19 during pre/immediate post and after three month of educational intervention implementation(N=260)

Items	Practice					
	Pre-program		Immediate-post		After three month	
	R	P	R	P	R	P
Total knowledge post-educational intervention	0.035	0.814	---	---	---	---
Total attitude post- educational intervention	---	---	0.243	0.004***	0.412	0.005***

Discussion:

The world is now facing a Coronavirus pandemic which is considered highly infectious. Several preventive measures have been mentioned to prevent its spread among students. However, for these preventive measures to be effective, the students require appropriate and sufficient knowledge. Knowledge, attitude, and reported practice are crucial to prevent and control the disease. Health care teams include nurses and are responsible for providing knowledge, delivering good quality management, and protecting individuals from an illness

during the epidemic prevalence period (**Askarian et al., 2013**).

The present study revealed that more than half of the participants were female and less than half were male. The age of the participants ranged from 15 to 18 years old. These results were nearly supported by the study conducted by **Dafni and Maddalena, (2020)**, who found in his study in Italy that age of the participants ranged from 14 to 19 years old and that females were more than half of the participants

The present study indicated that the main source of information about COVID-19 was social media. These results followed the results of **Hamaza et al., (2020)** in her cross-sectional study on awareness and knowledge of COVID-19 among senior pharmacy students.

These results are also strongly supported by **Khan et al., (2014)** whom found that the main source of Middle East respiratory syndrome (MERS) information was reported to be the internet and social media. This indicates that secondary school students are conducting on the internet, social media, and online information as is becoming one of the principal and rapid ways to obtain information, compared with other resources. The Egyptian Ministry of Health and Population and the World Health Organization (WHO) have provided information about COVID-19 through their websites, and they are recommending people to be aware of updates relating to knowledge about COVID-19 (**World Health Organization, 2020 and Hoda, 2016**). Similarly, a previous study mentioned that the internet was the main source of information about COVID- 19 (**Feng et al., 2020**). This reflects the importance of the Internet in promoting health, especially during infectious diseases and pandemics. Technology presence in these lock-down months plays an important role in providing knowledge and helps students continue their learning. More attention should be given to utilizing technology, particularly social media resources, especially Facebook or Whats App, as they help promote public health education among students.

The current study indicates that there was an improvement in secondary school students' knowledge compared to pre-educational intervention knowledge. A highly statistically significant difference was found between pre/post and after three month of the intervention implementation to the secondary school student's knowledge regarding COVID-19 (P-value <0.000). This may be related to the effect of teaching programs regarding COVID-19 on the knowledge, of students and the booklet, which covered all identified needs and knowledge gaps about the topic among secondary school students. Students need to have sufficient and correct knowledge about COVID-19 from a biological and scientific point of view and not only socially as correct information during the pandemic is considered the key point on which attention in this research to focus.

The present study revealed that out of all subjects had poor pretest knowledge levels; in the posttest, most of the secondary school students had good knowledge levels, which indicated the importance of the intervention that was effective in improving the students' knowledge. This reflected the desire of

the students to increase their awareness and know and the importance of good practicing during COVID – 19 as a method for prevention and protection against infection with coronavirus.

The current study illustrated that there was an improvement in secondary school students' attitudes compared to pre-educational intervention knowledge. There was a highly statistically difference between pre/post and after three month of the intervention implementation to the secondary school student's attitude regarding COVID-19 (P-value <0.000). This is due to the correlation between the students' attitude and knowledge which indicates that sufficient knowledge reflects their positive attitude among students towards COVID-19.

The current study revealed that secondary school students' attitudes were measured with 6 items. The highest negative result was answered regarding the COVID-19-related attitude item: "feel anxious when you think of coronavirus disease / COVID-19". This was a country such as Egypt, where stress and anxiety may occur because basic prevention measures are unavailable (**World Health Organization, 2020**), and there is insufficient information about the disease. The knowledge that is a prerequisite for achieving positive attitudes and promoting positive behaviors among students is necessary, which helps individuals' cognition to invest a sense towards the infection regarding COVID-19.

The current study revealed that there was improvement among secondary school students' practical knowledge

regarding COVID -19 pre/immediate post and after three-month educational intervention implementation, where there were highly significant differences (P=0.000) with regard to practice of all the preventive measures from COVID - 19. This is related to the correlation between the secondary school students' attitude and practical knowledge, which indicates that their positive attitude is affecting their action towards COVID-19.

The current study revealed that in the pretest educational intervention, many preventive measures not practicing and secondary school students showed a low-performance rate, as out of 260 (22.8%) of participants were not practicing the use of masks. These results follow the results of **The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team, (2020**) who reported in her study that the students showed poor practice when using masks as a protective measure. This was related to the lower level of knowledge about the importance of wearing masks. This is also supported by previous study (**World Health Organization, 2020**), which mentioned that only approximately one-third of the participants were wearing face masks.

The current study reflected that, out of all subjects, more than half of them had poor pretest reported practice levels, and in the posttest, all secondary school students had good reported practice levels that improved after educational intervention implementation.It illustrated that secondary school students' mean scores for total reported practice regarding COVID -19 before and after the educational intervention

implementation were improved, and there was a highly statistically significant difference (p= <0.000) where the mean practice was 10.17 before the educational intervention compared to 12.84 after three month from educational intervention implementation. This finding supported the third stated research hypnosis which stated that secondary school students' who have exposed to intervention regarding COVID -19 will have improved in their reported practice, and the total reported practice score will be higher post-intervention than pre-intervention.

The current study reflected that there was a highly statistically significant positive correlation between total knowledge scores, attitude and their reported practice at the post and after three-month educational intervention implementation. This can be explained by the fact that research hypnosis was achieved and concluded the success of the educational intervention, and it had an impact on secondary school students' knowledge, attitude and reported practice regarding COVID -19 and values the need for a well-organized educational intervention to promote the knowledge, attitude and reported practice of secondary school students and emphasized the readiness of students to gain more information.

Conclusion:

It concluded that secondary school students' knowledge, attitude, and practice improved after exposure to the intervention. Intervention provision was significantly effective in increasing knowledge level, attitude, and practice among secondary school students

regarding COVID-19. Therefore, the stated research hypnosis was statically supported. Secondary school students have poor knowledge about COVID-19. It is reflected in their negative attitude and poor healthy preventive practices towards COVID-19 that have improved after the educational intervention. This will help protect them from COVID-19.

Recommendations:

1. Training programs for students well prepared to provide instructions about prevention and control about COVID-19 through verbal and written instructions.

2. Encourage cooperation between educational institutions, medical care providers, and health personnel to educate secondary school students about COVID-19 that will help in increasing awareness, decreasing the spread of disease, prevention, and control.

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