

Effect of Guideline Protocol Regarding COVID-19 Preventive Measures on Awareness of Hospitalized School Age Children

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Abstract

Background: Lack of awareness about the fast-spreading coronavirus disease 2019 (COVID-19) pandemic represents a global threat. There is growing evidence of the challenges with adherence to COVID-19 prevention measures and the effect of the prevention measures on the health of populations especially those with comorbidities. **Aim of the study:** was to evaluate the effect of guideline protocol regarding COVID-19 preventive measures on awareness of hospitalized school age children. **Subjects and Method: Research design:** One group pre-posttest quasi-experimental design was adopted to carry out this study. **Setting:** The study was conducted in the medical wards at Zagazig University Pediatric Hospital, Zagazig, Egypt. **Subjects:** 72 hospitalized school-aged children. **Tools of data collection:** Structured Interview Questionnaire to collect data about studied children characteristics and evaluate their awareness regarding COVID-19 preventive measures. **Results:** The study reveals that 2.8% of the studied group had satisfactory general awareness score before the guideline protocol compared to 98.6% post the protocol with highly statistically significant difference at ($P < 0.001$) throughout study phases. **Conclusion:** The guideline protocol regarding COVID-19 preventive measures for hospitalized school age children had great effect on improving their awareness. **Recommendations:** Pediatric nurses must provide awareness and public knowledge regarding the novel COVID-19 with simple Arabic illustrative educational booklets, pictures and videos about COVID-19 for all children in all health care settings to prevent the spread of this pandemic disease.

Key words: COVID-19, Preventive Measures, Guideline Protocol, Awareness, and School Age Children.

Introduction

The coronavirus disease of 2019 (COVID-19), which is caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), was first emerged in the Wuhan province of China, in December 2019. SARS-CoV-2 is a 30 kilobase enveloped single-stranded RNA virus that has been the third beta coronavirus pandemic after severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS)⁽¹⁾.

Coronavirus Disease 2019 (COVID-19) is spreading rapidly around the world with devastating consequences on patients, health care workers, health systems, and economies⁽²⁾. Covid-19 has been shown to attack humans of all ages ranging from adults to children⁽³⁾. As of May 10, 2022, more than 2,710,7825 confirmed cases and more than 1,877 deaths have been reported globally among children aged 5 to 14 years⁽⁴⁾. Children and adolescents under 20

years of age account for 33% of the 2020 population, 21% of the reported COVID-19 cases, 0.4% of the reported COVID-19 death⁽⁵⁾.

Egypt is one of the lower-middle-income countries with limited resources which require a simple and practical preventive guideline to reduce the spread of COVID-19 pandemic among children with comorbidities, as well as to protect health care workers from catching infection⁽⁶⁾.

Compared with adults, children and adolescents who are infected with SARS-CoV-2 are more commonly asymptomatic or have mild, non-specific symptoms. Similar to adults with SARS-CoV-2 infections, children and adolescents can spread SARS-CoV-2 to others when they have no symptoms or have mild, non-specific symptoms⁽⁷⁾. This is quite alarming and risky for all population who comes

in close contact to the asymptomatic COVID-19 cases.

Children are less likely to develop severe illness or die from COVID-19. However, a high proportion of the fatal cases of pediatric COVID-19 are in children with underlying medical conditions, most commonly chronic lung disease, obesity, and neurological and developmental disorders⁽⁸⁾.

The primary mode of transmission of SARS-CoV-2 is via exposure to respiratory droplets carrying the infectious virus from close contact or droplet transmission from infected⁽⁹⁾. SARS-CoV-2 can also be transmitted longer distances through the airborne route, but the extent to which this mode of transmission has contributed to the pandemic is unclear⁽¹⁰⁾. The Centers for Disease Control and prevention stated that individuals can be infected with SARS-CoV-2 via contact with surfaces contaminated by the virus, but the risk is low and is not the main route of transmission of this virus⁽⁷⁾.

The symptoms of COVID-19 are alike in children and adults, but the frequency of symptoms differs⁽¹¹⁾. COVID-19 appears to be milder in children than in adults, but severe cases have been reported in children⁽¹²⁾. Fever and cough are the most common reported other findings were nausea/vomiting, diarrhea, dyspnea, nasal symptoms, rashes, fatigue, abdominal pain, Kawasaki-like signs, neurologic symptoms, conjunctivitis, and pharyngeal erythema⁽¹³⁾.

COVID 19 is evolving science and lot of research are in progress regarding characteristics of the virus and its treatment. Hence prevention plays a major role to fight the spread of infection. This can be achieved by education and training. The golden rules to fight against the spread of infection are frequent hand hygiene, respiratory and mask etiquette, social distancing. Although 80–90% COVID positive are mild and can be managed with home isolation still it's not possible due to poor housing condition

in a densely populated country like Egypt. Mild and asymptomatic cases in the community remain undiagnosed and act as a super spreader affecting a wide majority of susceptible and vulnerable population⁽¹⁴⁾. Hence, this study was undertaken with the objective to improve awareness of hospitalized school age children regarding COVID-19 and its preventive measures.

Significance of the Study:

While most children have had mild or no symptoms, thousands have died. Children with underlying medical conditions are more likely to experience severe effects of COVID-19, but even healthy children can be severely affected. Children can spread COVID-19 to others and can have long-term effects that last months. For these reasons, children need to be protected from COVID-19 Therefore, this study aimed to develop guideline protocol regarding COVID-19 preventive measures to upgrade awareness of hospitalized school age children.

Aim of the study:

The aim of the study was to evaluate the effect of guideline protocol regarding COVID-19 preventive measures on awareness of hospitalized school age children.

Research questions:

- What is the level of awareness among hospitalized school age children regarding preventive measures of COVID-19?
- Does guideline protocol regarding COVID-19 preventive measures enhance awareness of hospitalized school age children?

Subjects and Methods:

Research design:

One group pre-post test quasi-experimental design was adopted to carry out this study.

Study Setting:

The study was conducted at pediatric hospital at Zagazig University Hospitals, Egypt.

Study Subjects:

A purposive sample composed of 72 school age children attending the previous setting and their parents who accepted to participate in the current study according to the following criteria:

Inclusion criteria:

Age: from 6 to 12 years, Sex: both sexes and didn't suffer from coronavirus during data collection.

Exclusion criteria:

Any child with conditions that interfere with the cognitive or physical ability of the child (down syndrome, disturbed level of consciousness, ADHD, developmental delay, etc.).

The sample size was determined to be 72 by applying for the "Open Epi software package" program, at confidence interval 95% and power 80%.

Tool for data collection:

In order to fulfill the objectives of the study A Structured interview questionnaire was used to collect necessary data. It was developed by the researcher after extensive review of the related literature; it contained thirty-one (31) questions and consisted of three parts:

Part I: Characteristics of hospitalized school age children. It involved 15 questions about demographical data such as child's age, sex, educational status and grade, crowding index, mother/ father education, and residence, and medical history such as diagnosis, length of stay, and if the child knows anyone had been infected with COVID-19.

Part II: General awareness of the hospitalized school age children regarding COVID-19: This part of the questionnaire consisted of 14 closed ended questions that assess general awareness of the hospitalized school age children regarding COVID-19

including questions about source of information, preferred method for learning about COVID-19 and medical aspects of the disease such as definition, signs & symptoms, prognosis, modes of transmission, vaccination.

Part III: General awareness of the hospitalized school age children regarding COVID-19 preventive measures: This part of the questionnaire consisted of 2 closed ended questions that assess general awareness of the hospitalized school age children regarding COVID-19 preventive measures including how we can protect ourselves and others from COVID-19 and what to do if a member of the household is infected with COVID-19.

Scoring system:

Scoring system for awareness assessment was 51 scores. Each right answer obtained one score, and the wrong answer or no response received a score of zero. The total score was converted to 100% and then categorized as follows: the total score of awareness less than 50% (less than score of 25.5) was considered as unsatisfactory while a score of 50% and more (score of 25.5) was considered as satisfactory level of awareness.

Content Validity and Reliability:

Content validity for the tool was established by a group of the panel who were three specialists from nursing faculty staff who revised the tool and ascertained its clarity, significance, and comprehensiveness. Accordingly necessary modifications were done.

Testing reliability of the proposed tool was done by Cronbach's Alpha test, it was (0.75).

Guideline protocol Development:

Guideline protocol was developed to educate hospitalized school age children about COVID-19 preventive measures.

Aim of the Guideline protocol:

The Guideline protocol aimed to improve hospitalized school age children's general awareness regarding COVID-19 preventive measures.

Objectives of the guideline protocol:

At the end of this preventive guideline protocol, each child would be able to:

1. Define coronaviruses and origin and actual size of (SARS-CoV-2).
2. Identify symptoms of COVID 19.
3. Describe methods of COVID 19 transmission and how this virus enters the body.
4. Identify prognosis of COVID 19 cases.
5. Recognize people at risk of severe illness from COVID 19.
6. Identify available case management.
7. Identify general preventive measures and how to protect ourselves and others.
8. Describe available vaccines, its side effects and how to manage.
9. Identify importance of hand washing and when to wash hands.
10. Recognize how to practice wearing mask and taking it off.
11. Describe how to practice cough etiquette.
12. Identify healthy lifestyle.
13. Describe what to do if a member of the household is infected with COVID-19.

The protocol was developed through the following phases:**(1) Assessment phase:**

During this phase, the researcher reviewed local and international literature and a pilot study was carried out on 10% of hospitalized school age children (7 children).

(2) Planning phase:

Based on the results obtained from the assessment phase, pilot study and reviewing the related relevant literature, the protocol was developed by the researcher. Detected

needs, requirements and deficiencies were translated into aims and objectives of the guideline protocol in the form of a booklet .

Various teaching methods were selected to suit teaching individually in a form of lectures, group discussion, and role play. Teaching media were prepared as handout (booklet), and colored posters, as well as video tapes.

(3) Implementation phase:

After interviewing the hospitalized school age child (pretest), The guideline protocol was implemented through two sessions in which each school age child was interviewed separately to facilitate the learning process in a way that meets the educational needs of each child. The length of each session varied according to the content, time available and the school age child's response and ranged from 20- 30 minutes. Sessions were explained in simple Arabic language that suits the level of the studied school age children's understanding. Motivation and reinforcement during each session were used to enhance children's active participation and foster learning.

(4) Evaluation of the impact of the intervention

The studied school age children were re-interviewed after one week of implementing the guideline protocol and reassessed (post-test) using the same measurements (Tools) used in the pre-test to answer the current research questions.

Field work:

Data collection took a period of 4 months from November 2021 to February 2022. The researcher attended the study settings two days/week for data collection and implementation of the guideline protocol.

After identifying the subjects who fulfilled the criteria of the study, the researcher started with explaining the aim and process of the study briefly and obtained oral consent from

parents of every hospitalized school age child who were willing to participate. The researcher also, determined the place of meeting and timetable. Each hospitalized school age child was interviewed individually in the presence of his/her parent to collect the necessary data (personal and medical history), assess their awareness regarding COVID19 and its preventive measures (pretest) which took 10-20 minutes. During the first session the researcher educate the school age child about COVID19, its origin, signs and symptoms, mode of transmission, and high risk people. Second session was after 20-30 minutes break and involved educating about COVID19 preventive measures as hand hygiene, cough etiquette and using a face mask.

Assessment of the hospitalized school age children' awareness regarding preventive measures of COVID-19 were reassessed after one week of the intervention using the same tool (posttest).

Pilot study:

Pilot study was conducted on 7 (10 %) of children and they were excluded from the total number of students to insure the clarity and comprehensiveness of the tool.

Administration and Ethical consideration:

This study was approved by the Ethics Committee of Zagazig University. To carry out the study in the selected setting, an official permission was obtained from the director of Zagazig University Hospitals for data collection.

All ethical issues were taken into consideration during all phases of the study, the aim and process of the study was explained to every hospitalized school age child and an oral consent was obtained from those who accepted to participate in the study. The researcher emphasized on the patient's right to withdraw from the study at any phase; also provided

assurance of maintaining an anonymity and confidentiality of the patients' data that used for the research purpose only.

Statistical Analysis:

All data were collected, tabulated and statistically analyzed using SPSS 20.0 for windows (SPSS Inc., Chicago, IL, USA 2011)).

Quantitative data were expressed as the mean \pm SD, median (range) and qualitative data were expressed as absolute frequencies (number) & relative frequencies (percentage). Mc nemar test was used to compare between two dependent groups of categorical data. Wilcoxon signed ranks test was used to compare between two dependent groups of non-normally distributed variables. Percent of categorical variables were compared using Chi-square test or Fisher's exact test when appropriate. Cronbach alpha coefficient was calculated to assess the reliability of the scales through their internal consistency. P-value < 0.05 was considered statistically significant, p-value < 0.01 was considered highly statistically significant, and p-value \geq 0.05 was considered statistically non-significant (NS).

Results:

Figure (1) illustrates that 60% of the study group did not know people who had COVID-19 before.

Figure (2) represents preferred method to learn about COVID-19. 43% of the children reported they would prefer to get information in a video form.

Figure (3) represents common source of information regarding COVID-19 among the studied school age children. It was found that family and friends represented a common source of information for 83.3% of the studied children.

Table (1) shows characteristics of the studied school age children. Regarding the age, it was found that 37.5% of the studied children aged from 10 to 12 years with a mean age 8.82 ± 1.95 years. Concerning gender, 52.8% was males. It is revealed from the same table that 87.5% of the studied school age children was students. Studied school age children from rural areas represented 73.6%. It was found also that 94.4% of the studied children lived with a crowding index of two or less. Regarding the length of stay, it was found that 43% of the studied children was hospitalized for two days or less with a mean length of stay 6.46 ± 8.44 days. As regards parents' education, it was found that 52.8% of studied children's fathers had university education compared to 37.5% of mothers. Regarding diagnosis of the studied children. It was found that 47.2% of studied children had renal disease followed by children with blood disease who consisted of 33.3% of the studied children.

Table (2) sheds the light upon the studied children's general knowledge about COVID-19 throughout the study phases such as definition and prognosis. It was found that there was a significant improvement in children's knowledge about COVID-19 definition, prognosis, how it can enter the body, whether it can be asymptomatic and whether asymptomatic infected person can infect others after the intervention by a highly statistically significant difference ($P < 0.001$) throughout the study phases.

Table (3) presents studied children's knowledge about COVID-19 Symptoms throughout the study phases. It was found that there was a significant improvement in children's knowledge about COVID-19 Symptoms after implementation of the guideline protocol. The difference was highly statistically significant ($P < 0.001$).

Table (4) sheds the light upon the studied children's knowledge about

COVID-19 Methods of transmission throughout the study phases. It was found that there was a significant improvement in children's knowledge about COVID-19 methods of transmission after implementation of the guideline protocol. The difference was highly statistically significant ($P < 0.001$).

Table (5) shows the studied children's knowledge regarding COVID-19 Vaccines throughout study phases. It was found that there was an improvement in children's knowledge regarding COVID-19 vaccines availability after implementation of the guideline protocol. Moreover, there was a marked improvement in the children's knowledge regarding the side effects of COVID-19 vaccines, and how to deal with the side effects after implementing the guideline protocol. The difference was highly statistically significant ($P < 0.001$).

Table (6) illustrates knowledge of studied school age children regarding COVID-19 preventive measures throughout study phases. It was found that there was a marked improvement in children's knowledge regarding how to protect themselves and others from COVID-19 after implementation of the guideline protocol. The difference was highly statistically significant ($P < 0.001$).

Table (7) presents knowledge of studied school age children regarding self-protection against household infected person throughout study phases. It was found that there was a marked improvement in children's knowledge regarding What to do if a member of the household is infected with COVID-19 to limit the spread of infection after implementation of the guideline protocol. The difference was highly statistically significant ($P < 0.001$).

Table (8) portrays the total score of children general awareness about COVID-19 throughout study phases. It was found that 2.8% of the studied group had satisfactory general awareness score pre-intervention

compared with 98.6% post-intervention. The result was highly statistically significant ($P < 0.001$).

Discussion:

A global pandemic requires a global effort to end it, none of us will be safe until everyone is safe⁽¹⁵⁾. Egypt is one of the biggest countries in the Arab region, Africa, and the Middle East. With more than 100 million citizens, Egypt is among the most populous countries in Africa⁽¹⁶⁾. This high number of citizens could be associated with a great risk of spread and mortality, especially among those with chronic diseases. High proportion of the fatal cases of pediatric COVID-19 are in children with underlying medical conditions, most commonly chronic lung disease, obesity, and neurological and developmental disorders⁽¹⁷⁾. Here comes the importance of educating children, especially in hospitals, on COVID-19 and ways to prevent it.

Results of the present study revealed that more than one third of the studied children ranged in age from 10-12 years with a mean of 8.82 ± 1.95 years. In relation to gender, the results showed that more than half of the studied children were boys compared to less than half were girls. According to Finelli et al.⁽¹⁸⁾, data regarding the gender-based differences in COVID-19 suggests that male patients are at risk of developing severe illness and increased mortality due to COVID-19 compared to female patients. Nearly the same results were found in Nafee et al.⁽¹⁹⁾, Amer and Mohamed⁽²⁰⁾, and Shaikh and Likhite⁽²¹⁾. Also, these results were consistent with Xue et al.⁽²²⁾ who conducted a study of Knowledge, attitudes, and practices towards COVID-19 among primary school students in Hubei Province, China.

Regarding the common source of information on COVID-19 among the studied school age children. It was found that family represented a

common source of information for more than three quarters of the studied children and then TV, which represented a common source of information for nearly three-fifth of the studied children. These results were consistent with YILDIZ⁽²³⁾ who conducted a study of Determining the level of knowledge regarding COVID-19 and protection measures of children between aged 8-12 years in Turkey and found that children learned their knowledge on COVID-19 generally from television or families. These results disagreed with Elsakka and Khalil⁽²⁴⁾ who reported in their study about Knowledge, perception and practice of children and adolescents towards COVID-19 pandemic in Egypt that social media was the most common source of information about COVID-19.

The family as the main source of information in the current study could be explained in the light of its results. As more than half of the fathers of the studied children had a university education, while more than three quarters of their mothers had a secondary or university education, which made them able to educate their children and make them aware of this pandemic. In addition to TVs which are more available in all Egyptian homes, especially the countryside, than social media.

In response to the current pandemic, child psychologists and health scientists have joined forces with, educators, artists, and writers to produce innovative communication materials which ranged from children's books, videos to infographics and comics. Those are a powerful way to teach kids about COVID-19⁽¹⁹⁾.

This study illustrated that the highest percentage of the studied children, nearly two quarters, opted video as the preferred method to learn about COVID-19 followed by booklet, picture, and the least one was lecture. These results were consistent with Shaikh and Likhite⁽²¹⁾ who conducted a study about Awareness, perception

and safety practices about COVID-19 in school children of 6-16 years using COVID-19 quiz in India and found that more than half of children would prefer to get information in pictures/video form, while less than the fifth opted lectures and information from parents/teachers. New information can be represented in the form of children friendly videos, cartoons, or pictures so that they are kept well aware of new advances regarding COVID-19.

WHO ⁽²⁵⁾ define Coronavirus (Covid-19) as a virus that causes respiratory tract infections, ranging from the common cold to serious illnesses. This definition was reported by nearly two-thirds of the studied children before implementation of guideline protocol which improved after implementing the protocol. Statistically significant difference was found throughout study phases.

From the researcher's point of view, the children's knowledge of what the Corona virus is, was a result of the rapid spread and the world's fear of the epidemic that dominated in a few days in several countries. On the other hand, the higher score may be because the children were asked whether this definition is true or false and were not asked to mention the definition themselves.

These results were in harmony with Karunakaran and Gheena ⁽²⁶⁾ who conducted a study about awareness related to the spread of Covid-19 to children in India and found that more than half of children were aware about COVID-19 .

These results disagreed with Nafee et al. ⁽¹⁹⁾ who conducted a study about Effect of a comic story on orphan children's knowledge and hand washing practice about pandemic of COVID-19 in Egypt and stated that all children' information about COVID-19 definition were incorrect or incomplete correct answer pre comic story implementation comparing to correct and complete answer post comic story implementation .

The knowledge of children in the current study in relation to symptoms of COVID-19 was not complete before the conduction of the guideline protocol. The most reported symptoms before intervention were fever and cough. These findings could be explained by the fact that fever and cough are the most common reported symptoms for COVID-19 ⁽¹³⁾. In the same context, Amer and Mohamed ⁽²⁰⁾ who conducted a study about Effect of nursing instructions about COVID-19 preventive measures on knowledge and reported practice of hospitalized school age children in Egypt and found that knowledge of hospitalized school age children in relation to symptoms of COVID-19 was not complete before the conduction of the nursing instruction.

The results of the current study revealed that after applying the guideline protocol, school age children were knowledgeable about the prominent symptoms of COVID-19 like fever, cough, fatigue, shortness of breath, loss of taste or smell, sore throat, headache, diarrhea, and muscle pain, more than half of the studied children gave a complete correct answer. Statistically significant difference was found throughout study phases. This improvement can be attributed to the guideline protocol in which the children were trained.

Moreover, in relation to COVID-19 modes of transmission, the present study revealed that nearly two thirds of the studied children reported droplets from sneezing or coughing as the main mode of transmission while only one-fifth reported that touching contaminated surfaces could spread COVID-19. There was statistically significant improvement in studied children awareness regarding mode of transmission post intervention (P=0.001).

In the same line, Abdelhafiz et al. ⁽²⁷⁾ conducted a study about Knowledge, perceptions, and attitude of Egyptians towards the novel Coronavirus disease (COVID-19) and

their results showed that the most reported mode of transmission was droplets from cough and sneezing by infected person followed by surfaces touched by affected person .

These findings could be explained by the fact that the primary mode of transmission of SARS-CoV-2 is via exposure to respiratory droplets carrying the infectious virus from close contact or droplet transmission from presymptomatic, asymptomatic, or symptomatic individuals harboring the virus ⁽⁹⁾. On the other hand, The Centers for Disease Control and prevention ⁽²⁸⁾ stated that individuals can be infected with SARS-CoV-2 via contact with surfaces contaminated by the virus, but the risk is low and is not the main route of transmission of this virus.

These results were inconsistent with Ferdous et al. ⁽²⁹⁾ who conducted study about Knowledge, attitude, and practice regarding COVID-19 outbreak in Bangladesh and found that the most reported mode of transmission was close contact with an infected person (93.7%). Amer and Mohamed ⁽²⁰⁾ also reported that more than half of children believed that COVID-19 could not be transmitted through coughing and sneezing, while more than three quarters were not aware about transmission through contact with contaminated object or surface.

Vaccines to prevent SARS-CoV-2 infection are considered the most promising approach for curbing the pandemic ⁽³⁰⁾. In Egypt, a vaccine is available to prevent COVID-19 for people 12 years and older ⁽³¹⁾.

Concerning vaccine availability, the current study revealed that most of the studied children were aware of the availability of vaccination for COVID-19. While about half of them were aware that it was not yet available for children under 12 years old in Egypt. These results could be attributed to the great efforts made by the Egyptian government to make the vaccine available and to educate Egyptians about its importance in reducing this

pandemic through the media, health convoys and health units.

Also, this was in the same line with Vatovec and Hanley ⁽¹⁾ in their study about awareness, attitudes, and compliance with COVID-19 measures among Vermont residents who stated that more than half of respondents were aware about availability of safe and effective vaccine for COVID19 reporting that vaccination is the most effective way to prevent COVID-19 and its complications.

In the face of this epidemic, the whole world has made huge efforts to cope with this disease ⁽³⁰⁾. For that WHO ⁽³³⁾ has advised hand hygiene, masking, physical distancing, respiratory etiquette, avoiding touching the face, adequate ventilation of indoor spaces, cleaning and disinfecting objects and surfaces that are frequently touched for protection from this infection.

Nearly three quadrants of the studied children were aware about masking and hand hygiene precautions before intervention compared to all of them post intervention. This is a very good improvement and an assuring sign that they would be able to keep themselves safe in community.

In the same line, Shaikh and Likhite ⁽²¹⁾ reported that nearly all participants of the survey answered as " Yes" for these safety measures. Moreover, Matovu et al. ⁽³⁴⁾ in their study about COVID 19 awareness, adoption of COVID 19 preventive measures, and effects of COVID 19 lockdown among adolescent boys and young men in Kampala, Uganda found that more than 85% of the studied children were aware about masking and hand hygiene precautions .

These results could be explained by the fact that in the current state of the COVID-19 threat, permanent hand hygiene combined with mask-wearing is an approach that has been proven to slow the spread of the virus ⁽³⁵⁾.

Concerning physical distancing, more than one third of the studied

children were aware of physical distancing as a preventive measure for COVID-19 pre intervention compared to nearly all of them post intervention. This result was in harmony with Wasave et al. ⁽³⁶⁾ who conducted a study about Knowledge, awareness, and practices towards COVID-19 among the marine fishers of Maharashtra State of India and found nearly the same result.

These results disagreed with Matovu et al. ⁽³⁴⁾ who found that 70% of the participants was aware about social distancing as a preventive measure for COVID-19. Moreover, Roy et al. ⁽³⁷⁾ who conducted a Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic and found that most of the participants (more than 4/5th) agreed with social distancing.

The result of the current study was explained by the fact that Egyptians were not strictly practicing social distancing to prevent transmission of COVID 19 ⁽³⁸⁾.

Regarding other preventive measures, it was found that low percentage of the studied children was aware about cough etiquette, good ventilation, avoiding travel across cities with high COVID-19 transmission rates, avoiding people with symptoms such as cough and fever, and avoiding crowded places as well as avoiding touch to face with unwashed hands and staying home if having symptoms. There was a marked improvement in children's awareness regarding those preventive measures after implementation of the guideline protocol. This difference was highly statistically significant ($P < 0.001$) and could be attributed to the guideline protocol in which the children were trained.

These results were consistent with Amer and Mohamed ⁽²⁰⁾ who reported that more than half of the school age children were not alert to the hazard of touching the face, and not sneezing into their elbow or tissue. Majority of

the participants were knowledgeable about coughing and sneezing etiquette after nursing instructions. Moreover, Matovu et al. ⁽³⁴⁾ reported that less than one quadrant of the respondents reported that avoiding touching the mouth, eyes and nose with unwashed hands was a COVID-19 prevention measure.

On the contrary, Shaikh and Likhite ⁽²¹⁾ found that most of the studied children believed that covering mouth while coughing or sneezing, not touching mouth, nose, eyes, and face, staying away from those who have cough or fever are Safety measures for preventing COVID-19. From the researchers' point of view, the behavior of the children was very normal and can be explained as the practice of coughing or sneezing into elbow was not well known among people before COVID-19.

The disease is spreading rapidly and new cases being found every day. Hence, it is important for children to know how to behave in case a family member is infected or if they are home quarantined. CDC ⁽³⁹⁾ Guidelines for such scenarios are isolation, proper masking, hand hygiene, good ventilation, and sanitization to be the best strategy for safeguarding oneself.

When asked about safety precautions about the same before the guideline protocol, most of children reported that they would wear a mask and avoid direct contact with the infected person. About one third of them chose to avoid sharing personal items and wash hands more frequent. While other precautions including maintaining more than 6 feet distance, not touching face with unwashed hands, surface sanitizations, wearing gloves, and limiting visitors were unknown for majority of the studied children.

In the current study, the studied children's awareness improved significantly post intervention, as more than two-thirds of them knew all the safety precautions regarding how to deal with an infected family member.

These findings could be explained by the fact that interventions such as social distancing, masking, and hand hygiene have been the primary preventive strategies to avoid infection with SARS-CoV-2⁽⁴⁰⁾.

This result goes in the same line with Naser et al.⁽⁴¹⁾ who conducted a study of Knowledge and practices during the COVID-19 outbreak in the Middle East and found nearly the same result regarding direct contact with the infected person. On the contrary disagreed with Abdelhafiz et al.⁽²⁷⁾ who reported that most of the participants agreed with maintaining an appropriate distance from anyone with symptoms.

The results of the current study displayed that there was marked enhancement in studied children total awareness score after the application of the guideline protocol. The total score of general awareness increased from less than three percent pre intervention to more than ninety eight percent post intervention. The difference was highly statistically significant ($P < 0.001$).

This Finding agreed with Athira Krishnan et al.⁽⁴²⁾ who conducted a study on Developing communication tools for creating awareness of COVID-19 pandemic among school going children in Kerala and reported that Significant difference was found in the level of awareness about the COVID-19 among children post intervention. Moreover, this result was consistent with Nafee et al.⁽¹⁹⁾ who found that the implementation of a comic story had improved children's total score of knowledge regarding COVID-19 with statistically significant

differences in relation to pre and post comic story implementation

The significant change in the studied children awareness score after implementation of the intervention in the current study may be occurred due to the nature of the guideline protocol. In which several teaching methods were used to impart knowledge about the disease and its preventive measures including educational sessions, booklet, pictures, and videos.

The Covid-19 virus was a pandemic devastated within a short period to many parts of the world. Effective and efficient controlling of the pandemic requires strict adherence to precautionary measures.

Conclusion:

Based upon the findings of the present study, it could be concluded that the guideline protocol regarding COVID-19 preventive measures for hospitalized school age children had great effect on improving their awareness regarding COVID-19 and its preventive measures

Recommendation:

Based on findings, the study recommended:

1. Use of innovative methods of health education in teaching COVID-19 preventive measures for all children in all health care settings should be held.
2. Pediatric nurses must provide awareness and public knowledge regarding the novel COVID-19 with simple Arabic illustrative educational booklets, pictures and videos about COVID-19 for all children in all health care settings to prevent the spread of this pandemic disease.

Does Anyone You Know Have Been Infected With COVID-19

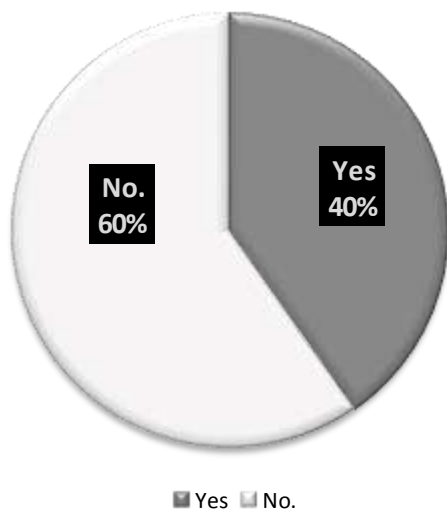


Figure 1: History of COVID 19 Infection

PREFERRED METHOD TO LEARN ABOUT COVID-19

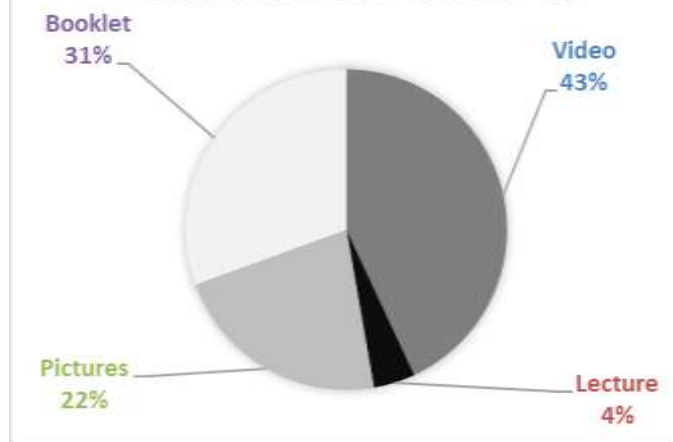


Figure 2: Preferred method to learn about COVID-19

What is your source of information regarding COVID-19

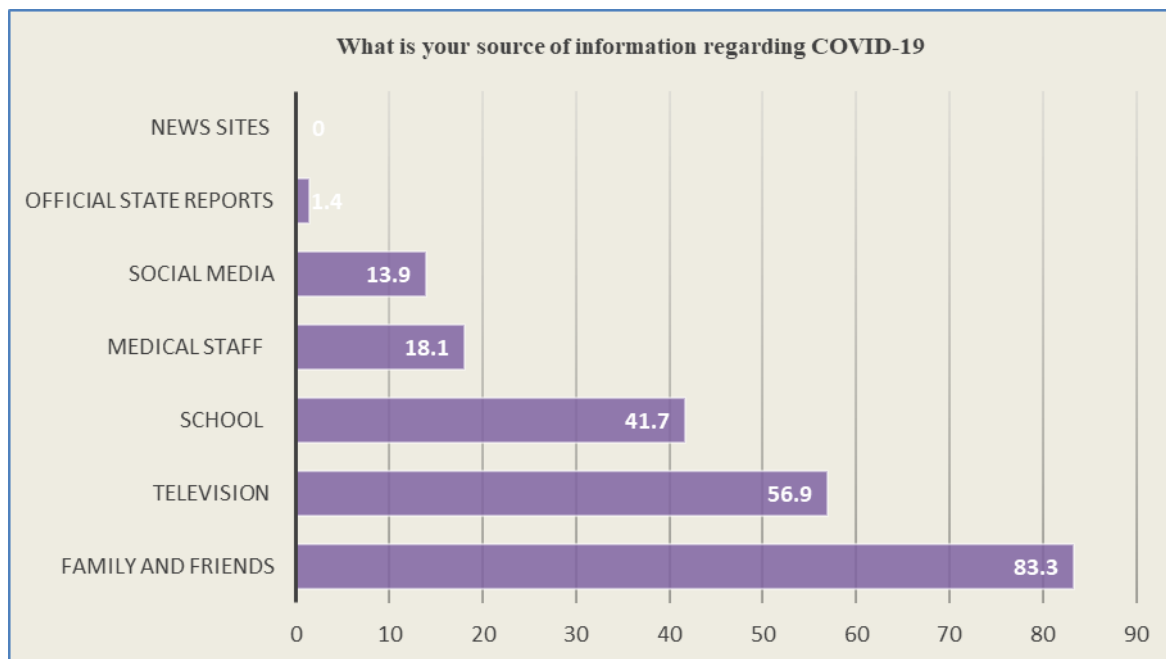


Figure 3: common source of information regarding COVID-19

Table (1): Characteristics of the studied children

Child characteristics	No. (72)	Percent (%)
Age in years		
6-	23	31.9
8-	22	30.6
10-12	27	37.5
Mean± SD	8.82± 1.95	
Gender		
Male	38	52.8
Female	34	47.2
Educational status		
Student	63	87.5
Not student	9	12.5
Educational grade (n=63)		
First grade primary school	9	14.3
Second grade primary school	7	11.1
Third grade primary school	15	23.8
Fourth grade primary school	9	14.3
Fifth grade primary school	8	12.7
Sixth grade primary school	15	23.8
Residence		
Rural	53	73.6
Urban	19	26.4
Crowding index		
≤2	68	94.4
>2	4	5.6
Length of stay(days)		
≤2	31	43
2-10	30	41.7
10+	11	15.3
Mean± SD	6.46± 8.44	
Range	(1-44)	
Father Educational level		
Illiterate- Read and write	4	5.6
Primary school preparatory	4	5.6
Secondary	10	13.9
University	14	19.4
Postgraduate	38	52.8
Postgraduate	2	2.8
Mother Educational level		
Illiterate- Read and write	8	11.1
Primary school preparatory	0	0.0
Secondary	9	12.5
University	28	38.9
Postgraduate	27	37.5
Postgraduate	0	0.0
Diagnosis♣		
Renal disease	34	47.2
Blood disease	24	33.3
Cardiac disease	4	5.6
Neurological disease	3	4.2
Others	7	9.7

SD: Standard deviation, No: Number

♣ Other diagnoses include: abdominal pain (2), pancreatitis (2), adenoiditis (1), eczema (1), and hypophosphatemia (1)

Table (2): Children's Knowledge about COVID-19 throughout study phases (n=72).

Items	Study phase				MC p-value
	Pre		Post		
	No.	%	No.	%	
Definition of COVID-19					
Right answer	44	61.1	69	95.8	0.001**
Wrong answer	13	18.05	3	4.2	
Don't know	15	20.8	0	0.0	
COVID-19 can be asymptomatic					
Right answer	15	20.8	63	87.5	0.001**
Wrong answer	48	66.6	9	12.5	
Don't know	9	12.5	0	0.0	
How can the corona virus enter your body? *					
Through the eye	4	5.6	63	87.5	0.001**
Through the mouth	17	23.6	72	100.0	0.001**
Through the nose	23	31.9	68	94.4	0.001**
All the above	4	5.6	60	83.3	0.001**
Don't know	42	58.3	0	0.0	
People with COVID-19 who don't show any symptoms can infect others					
Right answer	7	9.7	70	97.2	0.001**
Wrong answer	25	34.7	2	2.8	
Don't know	40	55.6	0	0.0	
Prognosis of COVID-19 *					
Complete recovery without hospitalization	17	23.6	71	98.6	0.001**
Some patients become seriously ill and need oxygen	25	34.7	58	80.6	0.001**
Some patients become critically ill and may die	48	66.7	71	98.6	0.001**
All the above	13	18.1	56	77.8	0.001**
Don't know	13	18.1	0	0.0	

* More than one answer, MC: McNemar test, **: statistically highly significant (p<0.001)

Table (3): Children's Knowledge about COVID-19 Symptoms throughout study phases (n=72).

COVID-19 Symptoms *	Study phase				MC p-value
	Pre		Post		
	No.	%	No.	%	
Fever	41	56.9	72	100.0	0.001**
Cough	44	61.1	71	98.6	0.001**
Fatigue	16	22.2	63	87.5	0.001**
Shortness of breath	16	22.2	71	98.6	0.001**
Loss of taste or smell	20	27.8	58	80.6	0.001**
Sore throat	8	11.1	58	80.6	0.001**
Headache	16	22.2	56	77.8	0.001**
Diarrhea	11	15.3	54	75.0	0.001**
Muscle pain	4	5.6	54	75.0	0.001**
All the above	0	0.0	40	55.6	0.001**
Don't know	14	19.4	0	0.0	

* More than one answer, MC: McNemar test, **: statistically highly significant (p<0.001)

Table (4): Children's Knowledge about Methods of transmission of COVID-19 throughout study phases (n=72).

Methods of transmission ♣	Study phase				MC p-value
	Pre		Post		
	No.	%	No.	%	
Droplets from sneezing or coughing	45	62.5	72	100.0	0.001**
Touching contaminated surfaces	10	13.9	70	97.2	0.001**
Direct contact with an infected person, such as shaking hands	23	31.9	66	91.7	0.001**
All the above	5	6.9	64	88.9	0.001**
Don't know	16	22.2	0	0.0	

♣ More than one answer, MC: Mcnemar test, **: statistically highly significant (p<0.001).

Table (5): Children's Knowledge about COVID-19 Vaccines throughout study phases (n=72).

Items	Study phase				MC p-value
	Pre		Post		
	No.	%	No.	%	
Is there a vaccine for COVID-19?					
Right answer	64	88.9	72	100.0	0.001**
Wrong answer	4	5.6	0	0.0	
Don't know	4	5.6	0	0.0	
Currently, are COVID-19 vaccines available for children 6 to 12 years old in Egypt?					
Right answer	32	44.5	65	90.3	0.001**
Wrong answer	35	48.6	7	9.7	
Don't know	5	6.9	0	0.0	
What are the side effects of COVID-19 vaccines? ♣					
Tiredness and headache	22	30.6	61	84.7	0.001**
Pain at the injection site	14	19.4	66	91.7	0.001**
Muscle ache	4	5.6	50	69.4	0.001**
Fever and chills	8	11.1	46	63.9	0.001**
All the above	0	0.0	37	51.4	0.001**
Don't know	42	58.3	3	4.2	
How to deal with the side effects of anti-COVID-19 vaccines? ♣					
Paracetamol	8	11.1	59	81.9	0.001**
Cool, wet washcloth over the injection site	1	1.4	53	73.6	0.001**
All the above	1	1.4	45	62.5	0.001**
Don't know	64	88.9	5	6.9	

♣ More than one answer, MC: Mcnemar test, **: statistically highly significant (p<0.001)

Table (6): Children's Knowledge regarding COVID-19 preventive measures throughout study phases (n=72)

Items	Study phase				MC p-value
	Pre		Post		
	No.	%	No.	%	
How can we protect others and ourselves from COVID-19? ♣					
Keep hands clean	54	75.0	72	100.0	0.001**
Maintain physical distancing	25	34.7	70	97.2	0.001**
Wear a mask	51	70.8	72	100.0	0.001**
Cover your mouth and nose when sneezing or coughing with a flexed elbow or a clean tissue	14	19.4	71	98.6	0.001**
Avoid touching the eyes, nose, and mouth with unwashed hands	1	1.4	69	95.8	0.001**
Maintain good ventilation	1	1.4	64	88.9	0.001**
Avoid crowded places	12	16.7	66	91.7	0.001**
Eat healthy food	5	6.9	64	88.9	0.001**
Exercise routinely	1	1.4	67	93.1	0.001**
Sleep well	0	0.0	57	79.2	0.001**
Avoid people with symptoms such as cough, fever, or loss of smell	18	25.0	60	83.3	0.001**
Stay home and tell an adult when you feel any flu-like symptoms	1	1.4	57	79.2	0.001**
Avoid travel across cities with high COVID-19 transmission rates	27	37.5	61	84.7	0.001**
All the above	0	0.0	48	66.7	0.001**

♣ More than one answer, MC: McNemar test, **: statistically highly significant (p<0.001).

Table (7): Children's Knowledge regarding self-protection against household infected person throughout study phases (n=72).

Items	Study phase				MC p-value
	Pre		Post		
	No.	%	No.	%	
What do you do if a member of the household is infected with COVID-19 to limit the spread of infection? ♣					
Avoid direct contact with the infected person	59	81.9	72	100.0	0.001**
Wear gloves when touching an infected person or any of their waste	8	11.1	65	90.3	0.001**
Keep a distance of at least 2 meters from the infected person	3	4.2	69	95.8	0.001**
Wear a mask	51	70.8	72	100.0	0.001**
Do not share any personal items with the infected person	26	36.1	70	97.2	0.001**
Wash hands frequently	25	34.7	70	97.2	0.001**
Do not touch the eyes, nose, and mouth with unclean hands	2	2.8	71	98.6	0.001**
Clean surfaces frequently	6	8.3	60	83.3	0.001**
Stay at home and reduce home visits in case of close contact with the infected person	12	16.7	49	68.1	0.001**
All the above	0	0.0	48	66.7	0.001**
Don't know	2	2.8	0	0.0	

♣ More than one answer, MC: McNemar test, **: statistically highly significant (p<0.001).

Table (8): Total score of children general awareness about COVID-19 throughout study phases (n= 72).

General Awareness	Study phase				MC p- value
	Pre-Intervention		Post Intervention		
	No.	%	No.	%	
Satisfactory level	2	2.8	71	98.6	
Un-satisfactory level	70	97.2	1	1.4	
Mean± SD	14.75±5.09		45.38±6.16		<0.001**

MC: Mcnemar test, **: statistically highly significant (p<0.001)

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