

## Original Article

# Knowledge, Perception and Practice of Children and Adolescents towards COVID-19 Pandemic in Egypt

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## Abstract

**Background:** As research about COVID-19 continues, a lot of facts keep on changing and many myths are also prevalent regarding the prevention and management of the infection.

**Objective(s):** The aim of the present study was to assess the current knowledge, perception and practice towards COVID-19 pandemic among children and adolescents in Egypt.

**Methods:** A cross-sectional study was conducted on 512 children and adolescents, aged 6-18 years living in different Egyptian cities, during the first half of July 2020, by an anonymous online questionnaire; designed to assess knowledge, perception and practices of children and adolescents towards COVID-19 disease.

**Results:** The study included 512 participants. The mean age was  $13.39 \pm 3.24$  years and 65.2% were females. About half of the participants perceived the situation in Egypt as bad, and 41.5% as getting worse, 47.7% thought that media is not telling the truth, 6.7% thought people were respecting lockdown, 40.2% had expectations that COVID-19 will end soon and 37.5% expected that they will return to school regularly in the next academic year. The general knowledge was good in 58% and poor in 1.2% of participants. The mode of transmission knowledge was good in 58% and poor in 11.7% of participants. The disease prevention knowledge was good in 68.3% and poor in 9.4% of participants. The practice of participants was good in 16.2% and poor in 11.3%. Overall knowledge and practice significantly improved with increased age. Practice was significantly better in females than in males.

**Conclusion:** Knowledge of children and adolescents about COVID-19 pandemic in Egypt was good, while their practice towards the pandemic was fair. It has shown that good knowledge does not necessarily result in good practice.

**Keywords:** Knowledge, perception, practice, COVID-19, adolescents

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## INTRODUCTION

Coronavirus (COVID-19) disease is a new disease and a worldwide pandemic that first appeared in Wuhan, China, in December 2019. It infected millions worldwide.<sup>(1, 2)</sup> On January 30<sup>th</sup>, 2020, the World Health Organization (WHO) declared COVID-19 outbreak as a Public Health Emergency of International Concern.<sup>(3)</sup> On the 11<sup>th</sup> of March, WHO declared COVID-19 to be a pandemic.<sup>(4)</sup> The first case in Egypt was recorded in 15<sup>th</sup> of February 2020.<sup>(5)</sup>

Human-to-human transmission of COVID-19 occurs from infected people to others in close contact through respiratory droplets, direct contact with infected persons, or by contact with contaminated objects.<sup>(6)</sup> As disease spreads globally, adopting guidelines as wearing face mask and social distancing were among the most important measures to interrupt epidemic transmission.<sup>(7)</sup>

Lockdown has been confirmed as an effective strategy to reduce spread of COVID-19.<sup>(8)</sup> Egypt

declared a state of public health emergency and national lockdown on March, 2020.

As research continues, a lot of facts kept on changing and many myths were also prevalent in general population regarding prevention and management of infection, which spread rapidly by social media.<sup>(4)</sup>

Knowledge is a prerequisite for promoting positive attitudes and influencing public degree of adherence.<sup>(4, 9)</sup> 'Concept of Knowledge' refers to individual understanding of any given topic. 'Practice' refers to ways in which individuals demonstrate their knowledge and attitude through their actions.<sup>(7)</sup>

Assessing knowledge, attitude, and practice of people can provide baseline information to determine proper changes in behaviors and provide better insight to address level of knowledge and sufficiency of practice about the disease and development of preventive programs.<sup>(7)</sup>

Children and adolescents in most times prefer to do activities together in groups. It is important to

assess their knowledge which will influence their perception and expectations towards the disease and to the situation in their country. Also, assessing their knowledge will help to ensure that they understand and follow safety precautions to prevent COVID-19.<sup>(10)</sup>

Few studies are available for assessment of knowledge, perceptions and practices of children and adolescents towards COVID-19. The present study aimed at evaluation of the current knowledge and practice towards COVID-19 pandemic among children and adolescents in Egypt.

The aim of the present study was to assess the current knowledge, perception and practice towards COVID-19 among children and adolescents in Egypt.

## METHODS

A cross-sectional study was conducted on children and adolescents aged 6-18 years living in Egyptian cities (Alexandria, Damanhour, Tanta, Cairo, Geiza, Ismailia and Elmenya), after more than four months of the start of COVID-19 disease in Egypt. By using One Proportion Power Analysis that detects a difference of 0.04 between the null hypothesis that the population proportion is 0.1 and the alternative hypothesis that the population proportion is 0.06, which achieves 80% power with a target significance level based on a previous study of perception and practices of school aged children and adolescents towards COVID-19;<sup>(10)</sup> a minimal sample size of 375 children was needed. Data collection was performed using an anonymous questionnaire, designed to assess knowledge, perception and self-reported practice of children and adolescents towards COVID-19 disease. Initially, a structured questionnaire was designed. A pilot study was conducted among 20 children and adolescents before start of actual study. Then, the questionnaire was modified to be more relevant, practical, and understandable to the chosen age group. The questionnaire included four main sections. First section: included socio-demographic data of participants (gender and age). Second section: included perception of participants to the current situation in Egypt; this included 6 items having 3 options: agree, neutral or disagree for answering. Third section: included knowledge of participants about COVID-19 disease. This included 3 sets of questions: a set on general knowledge about the disease itself (did they hear about the disease, cause of the disease, where and when did it start, is it dangerous, is it more dangerous in old age, does it affect any age, does it affect pets, can pets transmit the disease, the cause of lockdown). Another set on knowledge about mode of transmission of the disease and a set about measures for disease prevention. Fourth section: included a set of questions on practice

of participants towards COVID-19 disease. The general knowledge score about COVID-19 disease was assessed by 10 sub-items. Answers were scored between 0-1 points for each question, with total general knowledge score of 10 points. The general knowledge was classified as follows:

- Poor general knowledge = 0<5 points = <50% of total score.
- Fair general knowledge = 5-<8 points = 50%-75% of total score.
- Good general knowledge =  $\geq 8$  points = >75% of total score.

The mode of transmission knowledge score of disease was assessed the same way as general knowledge assessment. Answers were scored between 0-1 points for each question, with total mode of transmission knowledge score of 14 points. Mode of transmission knowledge was classified as follows:

- Poor mode of transmission knowledge = 0<7 points = <50% of total score.
- Fair mode of transmission knowledge = 7-<11 points = 50%-75% of total score.
- Good mode of transmission knowledge =  $\geq 11$  points = >75% of total score.

The mode of disease prevention knowledge score was assessed by the same way. Answers were scored between 0-1 points for each question, with total mode of disease prevention knowledge score of 13 points. Mode of disease prevention knowledge was classified as follows:

- Poor mode of disease prevention knowledge = 0<7 points = <50% of total score.
- Fair mode of disease prevention knowledge = 7-<10 points = 50%-75% of total score.
- Good mode of disease prevention knowledge =  $\geq 10$  points = >75% of total score.

Then calculation of the overall knowledge score was done, which represented the sum of all 3 knowledge areas (general knowledge, mode of transmission knowledge and mode of disease prevention knowledge) scores was done. It included 37 questions with a total score of 37 points classified as:

- Poor overall knowledge = 0<19 points = <50% of total score.

- Fair overall knowledge = 19-<29 points =50%-75% of total score.
- Good overall knowledge =  $\geq 29$  points =>75% of total score.

Practice of participants towards COVID-19 disease was assessed by 15 items with practice score of 15 points. Practice was classified as:

- Poor practice = 0< 8 points =<50% of total score.
- Fair practice = 8-<12 points = 50%-75% of total score.
- Good practice =  $\geq 12$  points = >75% of total score.

The questionnaire was designed and structured via an anonymized check-list style. An electronic form was prepared and sent to caregivers of target group through secure encrypted social media applications. After explaining its purpose, then they passed the questionnaire to their children and adolescents to complete through an attached link. By clicking the link participants will be directed to the questionnaire where questions appeared consecutively. All questions had to be answered. Young children were allowed to answer the questionnaire with the assistance of their caregivers. Completed questionnaires were returned through the same link.

### Statistical analysis

Raw data were coded and entered into statistical package for social sciences system files (SPSS package version 24) which was used for analysis and interpretation of data. Descriptive statistics including percentages and mean were calculated. Bivariate analyses including: Chi-Square and Monte Carlo tests were used to test the significance of results of categorical variables. Significance of results was at 5% level of significance.  $P \leq 0.05$  levels were used as cut off value for statistical significance.

### Ethical considerations

The authors have complied with the international guidelines for research ethics. The study was approved by Ethical committee of Faculty of Medicine, Alexandria University. Caregivers were asked to provide written consents for their children and adolescents to participate in the study. All data from participants were kept confidential.

## RESULTS

The study included 512 children and adolescents, their mean age was  $13.39 \pm 3.24$  years. Females (65.2%) were more than males (34.8%).

**Table 1: Perception and expectations of children and adolescents for COVID-19 in Egypt**

	Studied participants (n=512)	
	%	No.
<b>• The current country condition during the pandemic is bad</b>		
Agree	270	52.7
Neutral	82	16.0
Disagree	160	31.3
<b>• Progress of the country condition during the pandemic is getting worse</b>		
Agree	213	41.5
Neutral	161	31.5
Disagree	138	27.0
<b>• The media in Egypt is telling the truth</b>		
Agree	128	25.0
Neutral	140	27.3
Disagree	244	47.7
<b>• The people in Egypt do not respect the lockdown measures</b>		
Agree	420	82.0
Neutral	58	11.3
Disagree	34	6.7
<b>• The COVID-19 disease will end soon</b>		
Agree	206	40.2
Neutral	130	25.4
Disagree	176	34.4
<b>• The schools will return back regularly in the next year</b>		
Agree	192	37.5
Neutral	116	22.7
Disagree	204	39.8

Perception and expectations of participants for current situation regarding COVID-19 in Egypt showed that about half of participants perceived the situation in Egypt as bad (52.7%) and getting worse (41.5%). 47.7% thought that media is not telling the truth regarding the situation in Egypt. Only 6.7% stated they thought people were respecting lockdown. About 40% of participants had expectations that COVID-19 pandemic will end soon and 37.5% of participants expected that they will return to school regularly in the next year. (Table 1)

**Table 2: Knowledge and practice of children and adolescents about COVID-19 disease in Egypt**

General knowledge	Studied participants (n=512)	
	%	No.
Poor	6	1.2
Fair	209	40.8
Good	297	58.0
<b>Mode of transmission</b>		
Poor	60	11.7
Fair	155	30.3
Good	297	58.0
<b>Mode of disease prevention</b>		
Poor	48	9.4
Fair	114	22.3
Good	350	68.3
<b>Overall knowledge</b>		
Poor	39	7.6
Fair	155	30.3
Good	318	62.1
<b>Practice</b>		
Poor	58	11.3
Fair	371	72.5
Good	83	16.2

Table 2 summarizes different areas of knowledge and practice. The total general knowledge regarding COVID-19 was good in 58%, fair in 40.8 % and poor in 1.2% of participants. Regarding general knowledge sub-items; most of participants gave right answers in almost all items. Questions with high percent of right answers were: - did you hear about the disease (98.0%), where did it start (97.3%), knowing that it is more dangerous in elderly (94.3%) and knowing the cause of lockdown (93.8%). On the other hand, 61.7% gave wrong answers concerning the question addressing possibility of pets transmitting infection.

The mode of transmission knowledge was good in 58%, fair in 30.3% and poor in 11.7% of participants. Regarding mode of transmission knowledge sub-items; most of participants gave right answers in almost all items. Questions with high percent of right answers were: - for cough or sneezing and touching surfaces (92.2% and 91.2% respectively), not leaving good distance with others (89.3%) and going to crowded places (88.5%). More than three quarters (78.9%) gave wrong answers to the question addressing the possibility of catching infections from pets.

The mode of disease prevention knowledge was good in 68.3%, fair in 22.3% and poor in 9.4% of the participants. The highest percent of right answers were for washing hands regularly (96.1%), keeping social distance (92.8%), avoiding touching eyes, nose and eyes while outside (92.4%) and wearing facemasks all the time (89.5%).

The overall knowledge of participants was good in 62.1%, fair in 30.3% and poor in 7.6% of the

participants.

Assessing practice of participants showed that 16.2% had good practice, 72.5% had fair practice and 11.3% had poor practice towards COVID-19 pandemic.

The highest percent of good practice was related to informing the parents when feeling ill (97.9%) or when contacting a diseased person (92.6%), not hugging friends (90.6%) or greeting them with handshake (87.9%).

**Table 3: Correlation between knowledge and practice scores of children and adolescents for COVID-19 in Egypt**

Knowledge scores	Correlation coefficient (r)	P-value
General knowledge score	0.321	0.001*
Mode of transmission knowledge score	0.225	0.001*
Mode of disease prevention knowledge score	0.343	0.001*
Overall knowledge score	0.169	0.001*

All knowledge domains scores had weak significant positive correlation with the practice score (P= 0.001). (Table 3)

Association between overall knowledge and socio-demographic characteristics of participants showed significant positive association with age. Overall knowledge improved with increased age. Association between practice and socio-demographic characteristics of participants showed significant positive association with gender and age. Practice was better in females than males and increased with increase in age. (Table 4)

**Table 4: Distribution of children and adolescents by their overall knowledge and practice of COVID-19 and their socio-demographic characteristics in Egypt**

	Total		Overall knowledge				Chi Square test (p-value)		
	(n=512)		Poor (n=39)		Fair (n=155)			Good (n=318)	
	No.		No.	%	No.	%	No.	%	
• Gender									
Female	334		25	7.5	105	31.4	204	61.1	$X^2 = 0.616$ $p = 0.735$
Male	178		14	7.9	50	28.1	114	64.0	
• Age (years)									$X^2 = 57.390$ $p = <0.001^*$
6	66		20	30.3	19	28.8	27	40.9	
10	160		9	0.6	48	30.0	103	64.4	
14-18	286		10	3.4	88	30.8	188	65.7	
	Total		Practice				Chi Square test (p-value)		
	(n=512)		Poor (n=58)		Fair (n=371)			Good (n=83)	
	No.		No.	%	No.	%	No.	%	
• Gender									$X^2 = 7.176$ $p = 0.028^*$
Female	334		30	9.0	243	72.8	61	18.3	
Male	178		28	15.7	128	71.9	22	12.4	
• Age (years)									$X^2 = 10.385$ $p = 0.033^*$
6-<10	66		5	7.6	56	84.8	5	7.6	
10-<14	160		14	8.8	112	70.0	34	21.3	
14-18	286		39	13.6	203	71.0	44	15.4	

\*significance  $p < 0.05$

## DISCUSSION

Since the start of COVID-19 pandemic, researchers studied many aspects of COVID-19 and their effect on different communities and different age groups.

To the best of our knowledge, this research is the first to study knowledge, perceptions, and practice of children and adolescents towards COVID-19 pandemic in Egypt. It gives evidence of good knowledge of children and adolescents towards COVID-19.

Regarding perception and expectations of children and adolescents towards COVID-19 situation, 52.7% perceived the situation as bad and 41.5% as getting worse. This may be in part due to continuous information in all media and social media about the disease, and may be in part reflection of their caregivers' perceptions. This was consistent with a study by Abdelhafiz *et al.* <sup>(11)</sup> in Egyptian adults; where 86% were worried about the current situation and thought that it represents a life-threatening danger.

In contrast, a study by Xue *et al.* <sup>(12)</sup> in primary school children in China showed that 88.5% of children felt optimistic towards the pandemic and another study in adult Chinese residents; revealed that 90.8% agreed that COVID-19 will finally be successfully controlled.<sup>(13)</sup> Although different from the current study, this points to the fact that children are influenced and tend to follow the attitudes and perception of their caregivers which varies in different communities. This difference in perception of the situation between studies may be attributed to various strategies implemented to control the disease and different attitudes and practices across countries as for example in our study, most of the participants (82%) thought that people in Egypt do not respect the lockdown.

The media is considered the most common source of information about COVID-19, with its pros and cons, it plays an important role in the knowledge, practice and perception of the pandemic, especially during the national lockdown measures where children and adolescents have more time to follow media.<sup>(10, 11, 14-16)</sup> In the present study, about half of participants (47.7%) did not trust information they had from the media. This may be explained by the controversy and uncertainty about information given due to the novelty of COVID -19 disease.

Knowledge and practice toward COVID-19 play an integral role in determining a society's readiness to accept policies and guidelines that are related to behavior change.<sup>(17)</sup> In the present study the overall knowledge was good.

Participants, in the present study, demonstrated good general knowledge (58%) about COVID-19 disease including when and where it started, that it can affect any age and it is a dangerous disease especially

in elderly. This shows that they have good awareness and information about this new disease. Similar results were detected in other studies in India and Cambodia.<sup>(10, 18)</sup> In contrast, in a study in Dadaab, Kenya; responses of children were different and mixed; they did not consider elderly at high risk of severe illness.<sup>(19)</sup> This difference may be attributed to difference in cultures, beliefs, accessibility to information and respecting rules between different populations.

It is important for children to know how COVID-19 spreads, so that they can be alert about protecting themselves from getting infected. More than half (58%) of participants, in the current study, had good knowledge about mode of disease transmission. This is in accordance with other studies in children in India and China.<sup>(10, 12)</sup> However, in a study in Cambodia,<sup>(18)</sup> although 57% of their studied children identified how disease is transmitted, yet significant knowledge gaps seem to persist as over 50% of them reported that the virus could spread with direct contact with infected people and only 33% knew that the virus could spread from touching contaminated objects and surfaces.<sup>(10)</sup>

The WHO has advised avoiding social gatherings, applying social distancing, frequent hand sanitization, use of masks and no touching of eyes, mouth and nose policy for protection from this infection.<sup>(20)</sup>

In the present study; disease prevention knowledge was good in 68.3% of participants. The highest percent of right answers were for washing hands regularly (96.1%), keeping social distance (92.8%), avoid touching eyes, nose and eyes while outside (92.4%) and wearing facemask all the time (89.5%).

Similar results of good knowledge of preventive measures were observed by other studies conducted on children in India and China.<sup>(10)</sup> However, in a study in Dadaab, Kenya,<sup>(19)</sup> most children mentioned washing hands, use of hand sanitizer and wearing masks as methods for prevention (81.6%, 62.7%, 65.2% respectively), but only 40.4% mentioned social distancing as a method of prevention. Also, in a study in Cambodia,<sup>(18)</sup> most of children identified washing hands and wearing facemasks as preventive methods (99.2%, 80% respectively), while only 38% identified social distancing a mean of prevention. This difference in knowledge between studies may be due to different cultures, different media production, different national regulations and difference in understanding and obeying local and international rules.

The present study showed that 62.1% of children and adolescents in Egypt had good overall knowledge about COVID-19 disease. This reflects their awareness and their need to know and to be updated with correct information about what is going on in their country. Also, it reflects their eagerness to follow up major events going on in other countries around the world.

Good knowledge is expected to be reflected in promoting good practice. However, in the current

study practice of most of the participants (72.5%) was fair, while it was poor in 11.3% and good in 16.2% of the participants. Although it was positively correlated with overall knowledge score and all its domains; this correlation was weak. This could be related to influence of caregivers and practice of the general population on children and adolescents' practice. It also may be due to defective health education.

In line with these results; a study in Cambodia <sup>(18)</sup> revealed significant gaps between children's knowledge and their practice of preventive measures. They attributed this to lack of health education and the emphasis in applying preventive measures in the population.<sup>(18)</sup>

The overall knowledge was significantly associated with age of participants; the older the age the better the knowledge. This may be explained by the fact that older children and adolescents are more curious to know and could process information more quickly; thus acquiring better knowledge. This also, may be due to that older children and adolescents are more capable of acquiring knowledge from different sources than younger children. The overall knowledge was not statistically significantly associated with gender of participants. This indicates that both males and females have urge to know and search for information, also, that they both have equal access to all information needed.

This was consistent with the study by Abdelhafiz et al. <sup>(11)</sup> in an Egyptian sample; where similar knowledge mean scores were observed for male and female participants with no statistically significant difference, while, there were statistically significant differences between knowledge mean scores of different age groups of their participants.

In the study by Xue et al. <sup>(12)</sup> knowledge score was higher in girls. It was also higher in students in higher grades at school. While in another study in Cambodia,<sup>(18)</sup> no relation was detected between knowledge and gender. This different in results between studies may be attributed to different societies and cultures with different access to knowledge and to the difference in health education for better practices.

The present study gives evidence that good knowledge is not necessarily associated with good practice, as although 62.1% of the participants had good overall knowledge, only 16.2% had good practice, while 72.5% had fair and 11.3% had poor practice. This may be related to the understanding of known knowledge, cultural and local regulations and traditions of the community. The study shows the importance of following up community practice by the government, good practice education, applying rules

and regulations about applying the right practice measures to guarantee good practice.

In the present study, practice was significantly associated with age; the 10-<14 age group showed the best practice. This may be due to that older children and adolescents could understand information better and process information more quickly thus acquiring better practices. Practice was also significantly associated with gender as 18.3% of participants with good practice were females. This could be explained by that boys usually have higher risk tendency, most of their time are outdoors and they tend to disobey rules more than girls. This may give the differences between them in practice.

In the study by Xue et al. <sup>(12)</sup> practice was associated with higher scores in girls and students in higher grades at school, however in another study in Cambodia <sup>(18)</sup> no relation was detected between practice and gender. This difference may be due to different societies and cultures.

The findings of the present study raise a great concern regarding the importance of providing correct knowledge to children and adolescents and help them accessing information. It is of the same importance as helping them better understanding the knowledge they have regarding outbreaks and pandemics. The present study also raise a great concern regarding following their practice based on the knowledge they have, the need of directing them and regulating their practice in outbreaks and pandemics.

## CONCLUSION

The present study provides good evidence of good knowledge and fair practice of children and adolescents towards COVID-19 pandemic in Egypt. It has shown that good knowledge does not necessarily result in good practice.

This study also identifies factors affecting knowledge and practice of children and adolescents. Both knowledge and practice were influenced by age; overall knowledge and practice significantly improved with increased age. Gender was an influencing factor for practice but not for knowledge. Practice was significantly better in females than in males.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## FUNDING

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