

Effect of Webinar Teaching Program on Mothers' Knowledge and Practices regarding Vitamin D Deficiency among their Children

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Abstract

Abstract: Webinar teaching program play a crucial role in improving and updating the mothers' knowledge and practices regarding their children's health such as vitamin D deficiency and the correction of misleading information as well. Such problem which is largely unknown by majority of the people, has a high prevalence even in developed and sunny countries. **Aim:** To evaluate effect of webinar teaching program on mothers' knowledge and practices regarding vitamin D deficiency among their Children. **Design:** A Quasi-Experimental design (one group pre/posttest). **Setting:** The study was conducted at Kafr El-Sheikh Governorate, Egypt. **Subjects:** A purposive sample of 300 mothers. **Tool 1:** Self-administered questionnaire consisted of 2 parts: Mothers' demographic data, mothers' knowledge about vitamin D deficiency. **Tool 2:** Included 2 parts: Mothers' reported practices checklist regarding vitamin D deficiency, mothers' feedback regarding using the webinar. **Results:** The mean age of the studied mothers was 25.2 ± 4.3 years. All mothers were attending webinar course about vitamin D deficiency for the first time. Webinars had a significant effect on improving both knowledge and reported practices of mothers. A positive significant correlation between knowledge and reported practice scores regarding vitamin D deficiency. **Conclusion:** The online webinar teaching program had a positive effect on improving mothers' knowledge and reported practices regarding vitamin D deficiency among their children. **Recommendations:** Webinar can be used as new technology educational methods for mothers regarding other diseases to improve their knowledge and practices.

Keywords: Teaching, Webinar, Vitamin D Deficiency, Mothers, Knowledge and Practices.

Introduction

Vitamin D (Vit. D) is considered one of the fat-soluble vitamins, which has two forms D2 and D3. It has a very important role as it is acting as a regulator for some minerals as the Calcium and phosphorus as; calcium and Vit. D modulates bone and intestine absorption to regulate calcium plasmatic concentration. These substances are called micronutrients which are considered the cornerstone in bone health,

contractions of muscles, neuron excitability, and blood coagulation as well. (Crincoli et al., 2021). Sunlight is considered the principal source of Vit. D. In addition, the rich sources of Vit. D. are the oily types of fish as; tuna, sardine, mackerel, salmon, cod liver oil, egg yolk and mushroom (Bischofova et al., 2018).

The human breast milk lacks in Vit. D. when compared to the milk of animals. Vit. D deficiency (Vit DD) may cause hypocalcaemia seizures,

particularly in the newborn children and adolescents. If Vit DD occurred at age of six months, the bone deformities (rickets) could be seen (**Tidy, 2017**). Moreover, the children having Vit DD may suffer from the stunted growth, irritability, weight-bearing disorders, infectious disease susceptibility, poor lung expansion, very and weak muscles. If it is go for too little amount, cardiomyopathy, heart failure, and even death can occur (**Elnagar et al., 2020**).

There are many physiological effects of Vit. D in mineral metabolism and extra-skeletal effects, as it was highlighted by many research studies. Vit. D which plays an important role in cell differentiation, growth, preventing cancer cells from over division, cardiovascular disease prevention, and also has anti-inflammatory functions. It was suggested that Vit. D may have a role in blood sugar maintenance, because of its role in the formation, secretion and regulation of insulin, and consequently may affect the susceptibility of developing diabetes mellitus (**Verkaik-Kloosterman et al., 2017**).

Because of the continuous increase in Vit. D deficiency (Vit DD) incidence rate in the children, the need for enhancing the mothers' training regarding such problem becomes a mandatory work. The children's health and especially the infants are strongly associated with their mother's awareness, as they are the main and the primary source of care. Thus, it was urgently crucial to enrich the mothers' knowledge, understanding about the possible leading causes for decreasing

the levels of such important substances.

The Community health nurses (CHN) play a crucial role in educating the mothers having children with Vit. DD about its dangers. They also need to gain this knowledge to educate themselves as mothers about Vit DD which is considered a main first step for disease prevention. Women education regarding importance of the sun exposure and the different sources of Vit. D should be achieved by nurses as a main role (**Ellison & Moran, 2021**). Vit. DD could be rolled out by exposing the children to the sunlight and giving proper supplements of Vit D. To sum up, the children's nutritional contents are influenced basically by the awareness of mothers which it may be healthy or not. So, mothers are the first responsible for the children's nutritional needs (**Amaya-Montoya et al., 2021**).

The 'webinar' has been defined as an interesting internet workshop which may involve presentations, discussions, demonstrations, or any other instructional events that allows the participants from different locations to see and hear the presenter and interact with through asking questions (**Gegenfurtner et al., 2020**). It cannot be denied that all of these technological changes helped people to easily communicate with each other's in different world parts. The modern people can view the latest updates through the internet through mobile devices while just staying at home. And that fortunately served the educational process. Webinars have increasingly attracted the attention in

recent years, especially for the purposes of training (**Ebner and Gegenfurtner, 2019**).

The webinar was more effective in improving and developing participants' knowledge and practices which provide the attendees with some other incentives like live feedback forms, Q&A tools, and polls, and they also provide an opportunity to prerecord the video or voice options (**RAO, 2019**). Webinar creates great opportunities for both learners and educators to experience different interaction levels online helping to information exchange in a real-time and these opportunities are essentially different from other communication approaches. The child care has been put directly onto parents who try to participate in a webinar to get knowledge about how to care for children during emergencies and have the early guiding steps that assure their provision of information (**Testers et al., 2019**).

CHN nurses play an important role in providing a comprehensive education for the mothers regarding their children's health in relation to Vit DD about the specific actions to maintain children's health such as encouraging the healthy dietary change, correction of the misleading information, providing education regarding importance of sun exposure, and the proper time for that (**Ellison & Moran, 2021**).

Significance of the study:

VDD is a global health problem in children and is considered an epidemic worldwide. It is a serious public health problem in both

developed and developing countries, including The Middle East and North African region which includes Egypt has a very high rate of vitamin D deficiency which reaches 81% among various age groups. (**Botros et al., 2019 & Abdel Nabi et al., 2020**).

Several studies have been stated that vitamin D have a synergistic effect on the immune system. Deficiency of Vit D in children will affect prognosis and outcomes in infectious diseases, and making them more susceptible to COVID-19 (**Alpcan et al., 2021**).

Developing and implementing teaching programs that may help to close the gap between the mothers' knowledge and practices regarding Vit DD will correct the misunderstood concepts regarding their children health. Defining the highly important role which done by Vit D in children's health. It is necessary to examine the mothers' knowledge and practices with children regarding Vit D and identify where the gap could be in their knowledge background. (**Shaheen et al., (2021)**).

Many benefits are associated with using online webinars such as accessibility, flexibility, cost-effectiveness, as people can learn at their own place. Thus, it can improve new skills' acquisition and life-long education (**Dhawan, 2020**). So, it was very important to improve the knowledge and practices for mothers' regarding Vit DD through webinars as new methods of technology to maintain and promote health among their children. So, the existent study aimed to examine the effect of teaching

program using webinar regarding Vit DD in children on mothers' knowledge and practices.

Aim of the Study

To evaluate the effect of webinar teaching program on mothers' knowledge and practices regarding vitamin d deficiency among their children through:

- 1- Assessment of the mothers' knowledge regarding Vit DD among children pre and post program.
- 2- Assessment of the mothers' practices regarding Vit DD among children pre and post program.
- 3- Investigating the relation between mothers' knowledge and practices regarding Vit DD.
- 4- Evaluating the mothers' satisfaction regarding Webinar teaching program.

Research hypothesis:

H: Webinar teaching program is expected to have a positive effect on improving mothers' knowledge and practices regarding Vit DD among their children.

Subjects & Methods

Research design: A Quasi-Experimental design (one group pre/post design)

Setting: The present study was conducted in Kafr El-Sheikh Governorate, Egypt.

Subjects: A purposive sample consisted of 300 mothers from the previously mentioned setting, through a Google form spreadsheet presented on Facebook and Whats App groups

for all the mothers who met the following criteria

Inclusion criteria:

- From 18-40 years old
- Having children at the age of 1-10 years
- Willing to participate in the study
- Educated (secondary school or higher)
- Completed the online questionnaire

Tools for data collection:

- Three Tools for data collection were introduced together in one Google form to gain mothers cooperation and researchers tried to make it brief as possible not to be boring and to assure the data accuracy. The tools were sent to mothers via Facebook and WhatsApp groups
- The Three tools were introduced pre and immediate post webinar program.

Tool 1: Mothers' self-administered questionnaire was developed by researcher after related literature reviewing (Verkaik-Kloosterman et al., 2017; Anishlyn et al, 2018; Ebner and Gegenfurtner, 2019; Alamoudi et al, 2019; Abdel Nabi et al., 2020; Soliman et al, 2020), included two parts:

Part (1): Concerned with mothers' demographic data (age, educational level, residence, and occupation, number of children, telephone number).

Part (2): Concerned with mothers' knowledge about Vit. DD. It consisted of 16 multiple-choice question (MCQ) regarding; general knowledge about Vit D (importance of Vit D for

children, normal level, is normal level of vit D differ from adults to children?, sources of vit D, regulators in body, and food rich with vit D). General knowledge about Vit DD (definition, risk factors, causes, signs and symptoms, prevention, complications, and management and therapy of Vit DD). Sun exposure (importance, right time for sun exposure, and body parts should be exposed) and your source of knowledge.

Scoring system: Each question response was corrected by researchers against a model answer as being correct or incorrect answer and was scored as follows; the correct response given score (1) while the incorrect (zero). The total knowledge score was ranged from 0 to 16 categorized to the following three levels:

- Knowledge level > 70% was considered good knowledge
- From 50% to 70% was considered fair knowledge
- <50% was considered poor knowledge

Tool II: part (1): Mothers' reported practices checklist: It was developed by the researcher after literature reviewing to assess mothers' practices regarding Vit DD among children. It was consisted of 13 multiple-choice questions (MCQ) regarding; nutritional habits (introducing foods rich in Vit D, type of foods, frequency of intake). Use Vit D supplementation (regular/ irregular, at what age start) exposure to sun at selected time (regular /irregular, time of exposure, duration, parts of body exposed, use of sun screen) and follow up for Vit DD (routine checkup, and monitoring and

observing signs and symptoms of Vit DD).

Regarding Scoring of the tool: Reported practice statements included "done or not done"; done was scored (1) while not done was scored (zero), the total score of practices ranged from 0 to 13, the total reported practices scores were categorized as follows:

- $\geq 60\%$ was considered satisfactory practices.
- $< 60\%$ was considered unsatisfactory practices

Part (2): Mothers' feedback regarding Webinar teaching program using Zoom link: It included 8 questions regarding attendance of webinar courses regarding Vit DD before time of study, enough contents or not, ideal length, using webinar program as a learning method, if it improved knowledge and practices, a suitable time for attendance, its advantages, and disadvantages.

Tools validity and reliability:

The face and content validity of the tool for clarity, comprehensiveness, and relevance was assessed by five experts in community health nursing with more than 5 years of experience in the teaching field. The tool Reliability of the was tested through Cronbach's alpha test $\alpha = 0.891$

Ethical considerations:

The aim of the research was explained on the first page of the first online questionnaire and the informed consent form was included also on the first page informing each mother that she cannot complete the questionnaire without accepting this consent. The researchers informed the mothers that the study was voluntary, and they were

allowed to refuse or to accept participation and they were assured that their information would be confidential and will be used for research purposes only.

Pilot study:

For testing the clarity and feasibility of the research process a pilot study was conducted on 10% of mothers (30 mothers). No modifications were required to be done in study tools, so the participants were involved in the entire sample. Pilot Study: A Pilot study was done to purposive sample of 21 visually impaired students were selected for the study. To test the objectivity and applicability of the research tools and the feasibility of the research process; Participant students in the pilot study were included from the research study. The pilot study revealed the feasibility, effectiveness and appropriateness of the study instruments.

Fieldwork:

The program was developed through four phases as follow:

The preparatory and assessment

phase: At the beginning of the webinar, the researchers were introducing themselves and gave a brief idea about the nature of the study and purpose. Each mother was assessed (pretest) using the study tools before the webinar presentation to gather the basic data. The zoom link was shared with the mothers for a limited period from 30 November 2020 to 10 December 2020. This link was represented to invite participating mothers on Facebook and WhatsApp groups. On the first page of the online

questionnaire, the mothers were informed about the aim and expected outcomes of the research study. The webinar session time was identified by asking the mothers about the proper time to be done and near all of them choose the time to be early at night from 7 to 9 pm. The average period spent for mothers' completion of the online questionnaire was about 20 minutes as they have reported. Each mother involved in the study was informed about the aim of the study, tools contents, and how to answer the questionnaire online.

Planning phase:

Designing the teaching program by the researchers based on the results of the pre-test and identified needs. The program developed to improve the knowledge and practices of the mothers regarding Vit DD among their children. By using a variety of teaching methods as; online lectures, PowerPoint presentation, group discussion and brain storming. Also, different audiovisual aids such as; sharing pictures, posters, and videos.

Implementation phase:

The study was conducted along three months from 30 November 2020 to 30 February 2021. It was carried out through 2 sessions Each session last for one hour it conducted from 7 to 8 pm two days/ week. These sessions were conducted for about 10 small groups; each group number ranged between (20 to 30 mothers).

The teaching program regarding vit DD in children has implemented for the study subjects into two session the 1st session were included theoretical part contained general

knowledge about Vit D (importance of Vit D for children, normal level of vit D, sources of vit.D, regulators in body, and food rich with vit D). General knowledge about Vit DD (definition, risk factors, causes, signs and symptoms, prevention, complications, and management and therapy of Vit DD). Sun exposure (importance, right time for sun exposure, and body parts should be exposed).

2nd session was included the practical part, contained mother's practice regarding nutritional habits (how to introduce foods rich in Vit D, type of foods rich in Vit D, frequency of intake). Use Vit D supplementation (regular/ irregular, at what age start) exposure to sun at selected time (daily exposure, time of exposure, duration, parts of body exposed, use of sun screen) and follow up for Vit DD (routine checkup, and how to monitoring and observing signs and symptoms of Vit DD).

During the webinar presentation, the host presenter chose to do one-way video broadcasting, to enable learners sense the researcher's presence. All mothers were allowed two-ways voice note recording, so they be able freely to ask the needed questions or clarify any details at any time with both audio notes or text chatting. There was repetition for a certain group if they asked to do so, through taking feedback in order to deliver all the needed knowledge for all mothers.

Evaluation phase:

The online questionnaire was used twice. First time was used as a pretest for the assessment of mothers'

knowledge about Vit DD and their reported practice regarding their children. The second, the same tool was used immediately after the end of webinar presentation as a posttest to measure the effect of webinar presentation on mothers' knowledge and practices regarding Vit DD among their children and to gain an immediate feedback about using webinar to reinforce what they knew and correct mistakes if any.

Statistical analysis:

Data analysis was performed using SPSS version 20. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables and mean and SDs for quantitative variables and mean values were compared using an independent t-test. Differences were considered significant at p-values of less than 0.05. Chi-square (χ^2) test was used to compare qualitative parameters' proportions.

Results

Table (1): Represents 75% of mothers' age was (18 -29 years) with a mean age (25.2 ± 4.3). 38% of mothers had bachelor's degrees, 83% were living in urban areas, 53% of them were working and 50% of them had at least one child.

Table (2): Reveals highly significant differences between mothers' knowledge regarding Vit DD pre and post webinar at (<0.001).

Figure (1): Shows 8% of mothers had good level of knowledge pre-webinar regarding Vit DD which improved to 75% post-webinar.

Table (3): Reveals highly significant differences between mothers' reported practices regarding Vit DD pre and post-webinar at (<0.001).

Figure (2): Portrays 17% of mothers had a satisfactory level of reported practice pre-webinar regarding Vit DD while 90% of them could exhibit this satisfactory level post webinar.

Table (4): Shows 96% of mothers reported that webinar's content was sufficient, 87% said that it was perfect that webinar lasted not more than 45 minutes, and 94% of them said they were satisfied with webinar as a method of learning. 100% of mothers reported that the webinar improved their practices and knowledge. 80% of

mothers said that it was the best time to watch a webinar. 97% of Mothers appreciated their ability to attend from any location as one of webinar benefits and 95% highlighted that the only disadvantage was the interrupted internet.

Table (5): Demonstrates significant differences which reflected the improvement in mothers levels of knowledge and reported practices pre and post-webinar implementation at ($p \leq 0.001$).

Figure (3): Portrays a positive correlation between mothers' knowledge and reported practices regarding Vit DD post webinar program.

Table (1): Mothers' demographic data (n=300)

Demographic data	No	%
Age(years):		
- 18 - 29	225	75
- 29 \geq 40	75	25
Mean and SD (25.2\pm4.3)		
Educational level:		
- Secondary school diploma	78	26
- Technical Institute	93	31
- Bachelor's degree	114	38
- Postgraduate	15	5
Residence		
- Urban	249	83
- Rural	51	17
Occupation		
- Working	159	53
- Housewives	141	47
Number of children		
- 1	150	50
- 2-3	80	27
- > 3	70	23

Table (2): Mean difference in mothers' knowledge regarding Vit DD pre and post webinar application (n=300).

Variable	Pre webinar application	Post webinar application	t-test	P-value
General knowledge about Vit D				
Importance of Vit D	0.26 ±0.11	1.35 ±0.23	74.050	<0.001**
Sources of Vit D	0.35 ±0.15	1.42 ±0.25	63.567	<0.001**
Food rich in Vit D	0.42 ±0.18	1.48 ±0.35	46.648	<0.001**
Normal level if Vit D	0.27 ±0.12	1.37 ±0.33	54.259	<0.001**
Level if Vit D differ from adults to children?	1.07 ±0.24	2.12 ±0.17	61.836	<0.001**
Regulators of Vit D in our body	0.38 ±0.14	1.42 ±0.13	94.286	<0.001**
General knowledge about Vit DD				
Definition of Vit DD	0.47 ±0.18	1.21 ±0.27	39.498	<0.001**
Risk factors for Vit DD	0.56 ±0.24	1.43 ±0.34	36.208	<0.001**
Signs and symptoms of Vit DD	0.56 ±0.27	1.22 ±0.35	25.860	<0.001**
Causes of Vit DD	0.45 ±0.19	1.33 ±0.46	30.625	<0.001**
Prevention of Vit DD	1.08 ±0.26	2.10 ±0.29	45.359	<0.001**
Management and therapy of Vit DD	0.37 ±0.15	1.34 ±0.22	63.097	<0.001**
Complications of vit DD	1.08 ±0.47	2.13 ±0.22	35.045	<0.001**
Suns exposure				
Importance of exposure (activation / source)	1.09 ±0.12	2.15 ±0.28	60.268	<0.001**
The right time for exposure	0.39 ±0.13	1.23 ±0.45	31.061	<0.001**
Body parts that should exposed to sun	0.37 ±0.14	1.32 ±0.41	37.979	<0.001**
Your Source of knowledge	0.35 ±0.17	1.45 ±0.13	89.026	<0.001**

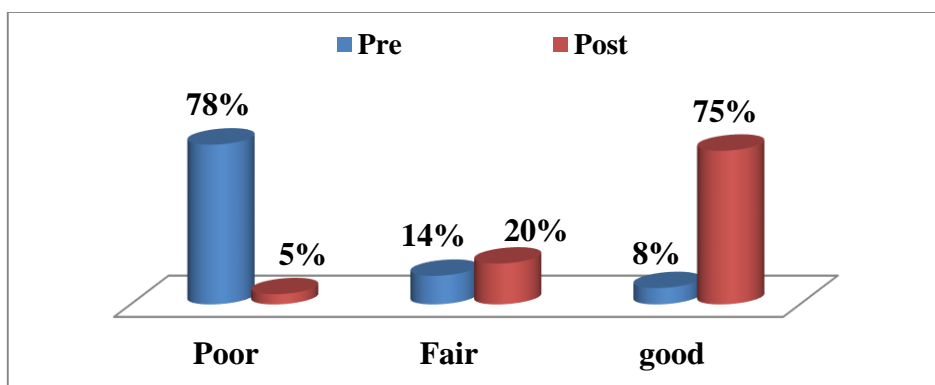


Figure (1): Mothers' levels of knowledge about Vit DD pre and post webinar application (n=300).

Table (3): Mothers reported practices about Vit DD pre and post-webinar application (n=300).

Variable	Pre webinar	Post webinar	t-test	P-value
Nutritional habits				
Foods rich in vitamin D intake	0.58 ±0.26	1.24 ±0.36	25.742	<0.001**
Types of food	0.49 ±0.18	1.23 ±0.37	31.150	<0.001**
Frequency of intake	0.59 ±0.23	1.32 ±0.43	25.928	<0.001**
Vitamin D supplementation				
Use of Vit D supplementation	0.57 ±0.19	1.44 ±0.35	37.838	<0.001**
Use of Vit D drops regularly (Every day, 400IU to 600IU)	0.56 ±0.22	1.29 ±0.56	21.015	<0.001**
Start of Vit D supplement in which age	0.58 ±0.20	1.25 ±0.41	25.439	<0.001**
Sun exposure				
Best time for exposure	0.47 ±0.22	1.34 ±0.47	29.037	<0.001**
Duration of exposure	0.46 ±0.23	1.23 ±0.55	22.371	<0.001**
Parts of body exposed to sun	0.49 ±0.23	1.43 ±0.66	23.294	<0.001**
Daily (regular / irregular)	0.54 ±0.26	1.29 ±0.43	25.851	<0.001**
Use of sun screen	0.53 ±0.22	1.28 ±0.33	32.753	<0.001**
Follow up				
Do you make routine investigation for vit D/ depend on complains	0.58 ±0.26	1.42 ±0.36	32.763	<0.001**
Observe the abnormalities on child muscles or bone shape	0.54 ±0.16	1.33 ±0.43	29.823	<0.001**

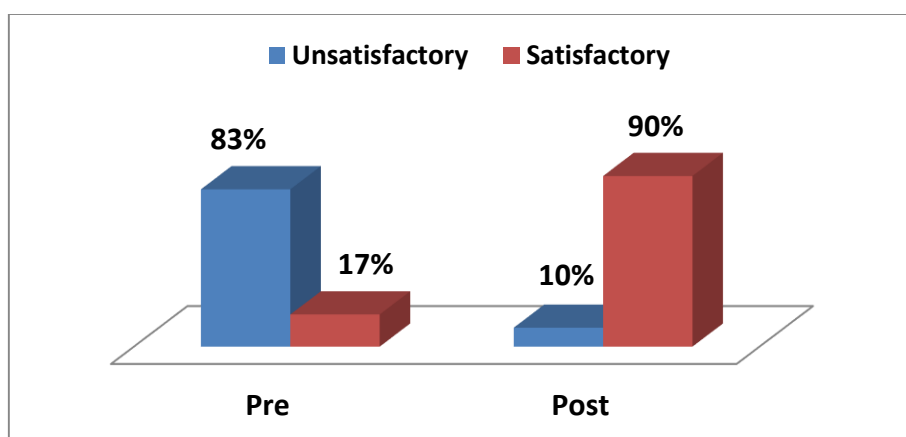


Figure (2): Mothers reported practices about Vit DD pre and post webinar (n=300).

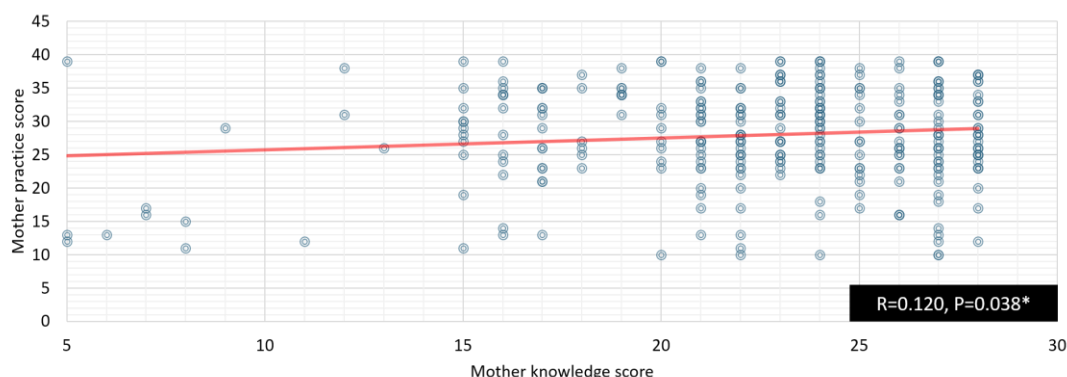
Table (4): Mothers' feedback regarding using webinar (n=300)

Webinar characteristics	No	%
Attendance of webinar courses before time of study		
- Yes	0	0
- No	300	100
Contents were enough for you?		
- Yes	288	96
- No	12	4
Webinar was not more than 45 minutes it is satisfactory?		
- Yes	261	87
- No	39	13
Satisfaction toward webinar program as a method of learning		
- Yes	282	94
- No	18	6
Webinar improved knowledge and practices		
- Yes	300	100
Webinar was in the suitable time:		
- Yes	240	80
- No	60	20
Agree with webinar advantages:		
- Active participation	276	92
- Attendance at any place.	291	97
- Share the screen among participants.	288	96
Disadvantages of webinar		
- Internet interruption	285	95
- A large number of attendees affect the ability of participants to share in webinar	15	5

Table (5): Relation between mothers' levels of knowledge and reported practices regarding Vit DD pre and post webinar application (n=300).

Item	Pre webinar		Post webinar		t-test P
	No	%	No	%	
Knowledge levels					
Poor	234	78	15	5	28.56 (0.001)*
Fair	42	14	60	20	
Good	24	8	225	75	
Practice levels					
Satisfactory	30	10	270	90	27.45 (0.001)*
Unsatisfactory	249	83	51	17	

(*) Statistically Significant at $p \leq 0.001$

**Figure (3): Correlation between mothers' knowledge and reported practices post webinar application.**

Discussion

Vit. D plays a physiological role in maintaining the extracellular calcium ion levels in the body by controlling its absorption from the intestine. Vit. D plays an essential role in various metabolic processes and neuromuscular activities such as cell differentiation, and growth, preventing cancer cells from dividing, preventing cardiovascular disease, has anti-inflammatory properties, and regulates insulin formation (Malaeb et al., 2017). Vit DD is a major cause of rickets in children. More recently, the

link between Vit DD and impaired immunity, inflammatory response, types of cancer, diabetes, cardiovascular diseases, respiratory diseases, and hypertension has been emphasized (Zhang et al., 2016). Hence, the researchers aimed to evaluate the effect of the webinar teaching program on mothers' knowledge and practices regarding Vit DD among their children.

The findings of the current study indicated that all the studied mothers didn't attend any courses about Vit DD before the time of study. From the researchers' point of view, this reflected the mothers' need to improve

their information and reflected also the importance of the present study which allowed them to be engaged in such webinars to improve knowledge and practices about Vit DD.

Concerning the mothers' knowledge regarding Vit DD, the study findings highlighted a highly significant difference between mothers' knowledge regarding Vit DD pre and post webinar implementation. The lack of knowledge pre-program implementation might be due to; mothers didn't visit the doctors only if there was a problem with their children and most doctors did not have the time to discuss the needed information with them. The apparent improvement post application of program in mothers' knowledge regarding Vit DD confirmed the positive and success indicator of the current study using webinar implementation teaching method in increasing knowledge.

Concerning the mothers' knowledge categories regarding Vit DD, the present study result showed; one quarter of mothers had a good level of knowledge pre-webinar implementation which improved post program to three quarters. From the researchers' point of view, the findings reflected the acceptance of the research hypothesis that indicated the effectiveness of webinar implementation in improving mothers' knowledge level.

These results were in the same line with **Kotta et al., (2015)**, who studied attitudes to Vit DD and supplementation: "Test me and treat me", a qualitative study, and found a limited knowledge among all the

interviewed groups. However, this finding was incongruent with **Çiçek et al., (2019)**, who studied "Determination of the level of knowledge and attitudes of mothers regarding vitamin d use in Konya" and found majority of mothers had adequate knowledge regarding Vit DD.

Concerning the mothers' reported practice scores related to Vit DD, the study result showed a significant differences between pre and post scores positively toward the post. This finding could be clarified that poor practices might be due to poor knowledge. This finding was in agreement with **Kavitha et al., (2015)**, who studied "knowledge, attitude, and practice regarding Vit DD among antenatal mothers in Tamilnadu: a phenomenological study in India", and found the majority of participants had poor practices for prevention of Vit DD.

Regarding the mothers' practicing attitude related to the importance of Vit D and its supplementation, the current study revealed a significant improvement post program implementation. This result was in the same line with **Çataklı et al., (2018)**, who studied "The knowledge and practice of mothers regarding Vit DD admitted to a hospital, in Ankara, Turkey", and reported that the practice of two-thirds of mothers regarding Vit D importance was favorable post the period of admission and teaching.

The present study findings highlighted; the majority of mothers had satisfactory level of reported practices post-implementation. This

confirmed the importance of program implementation through a webinar about the current topic.

The majority of the studied mothers reported their satisfaction with the webinar length to be not more than 45 minutes. This could be explained that attending webinars for a long time may cause loss of concentration. These results are matched with **Gegenfurtner et al., (2020)** who stated in the study "Evaluating webinar-based training: a mixed-methods study of trainee reactions toward digital web conferencing" that; trainers preferred webinars that are not long in time.

The present study results showed; a statistically significant correlation between the total knowledge and total practice scores about Vit DD. This was in agreement with **Habib et al., (2014)**, who studied "Vit DD: knowledge and practice among adult Saudi females", and found a positive association between total knowledge and the total practice scores. This might be due to the important role of learning which start with cognitive abilities then psychomotor skills or practices leading to the behavior change which is accurately defines the learning process. The increase in total knowledge was associated with an increase in the total practice score.

The current study results revealed that webinars implementation had a positive, significant effect on improving both mothers' knowledge and reported practices. This might be explained by the beneficial effects of current educational program. These

results were congruent with a study conducted by **Al-Daghri et al., (2017)** in the study "Vit. D status correction in Saudi Arabia: an experts' consensus under the auspices of the European Society" as pointed out; the nutritional knowledge score (NKS) was relatively low and a significant difference and improvement after nutritional education was observed. Also, **Hassen et al., (2020)** in the study entitled "National incidence, prevalence and disability-adjusted life years (DALYs) of common micronutrient deficiencies in Ethiopia from 1990 to 2017: estimates from the global burden of diseases study" in which reported similar findings. This highlights the need to educate mothers about Vit DD.

The current study results supported the research hypothesis and the study aim that implementing the educational program through webinars will effectively improve knowledge and reported practices regarding Vit DD among the studied mothers. **Bhaumik & Priyadarshini, (2020)** reported that webinars are very important for people because they can develop and share knowledge, and practices.

These results agreed with **Gegenfurtner, et al., (2020)** who stated "webinars were more effective in promoting achievement than traditional face-to-face seminars". In contrast, these results were disagreed with **Ebner and Gegenfurtner (2019)** study in which reported that webinars are not always successful in promoting learning outcomes in comparison to face-to-face classrooms.

Conclusion

Depending on the present study results, the mothers' knowledge levels have been improved, and satisfactory reported practices were noticed among the majority of the mothers post implementation of the webinar program, which support the research hypothesis.

Recommendations

- Using webinar as new educational method for mothers regarding other diseases among children.
- Future researches to study the impact of webinar on improving children's health related issues.
- Replication of the current study on larger sample in different settings for generalization of the results.
- Using the study findings as a basis for further training efforts based on the identified knowledge background and practice gaps to meet needs.

Limitations of the study:

There was sampling bias being educated mothers only were included because they can use or access the internet easily which did not represent the whole mothers.

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