Effect of Upgrading Mothers' Awareness Regarding Cardiovascular Diseases on their self- efficacy to promote their children life style

Samya Mohamed Ahmed Hegazy [(1)] & Basma Mahmoud Abd Elhamid Dawood [(2)]

(1-2) Lecturer of Pediatric Nursing, Faculty of Nursing, Tanta University

Abstract

Background: The progressive atherosclerotic process begins in childhood and develops gradually under the influence of conventional risk factors such as obesity and low levels of physical activity so continuous educational program for their caregivers is important. **Aim:** to evaluate the effect of upgrading mothers' awareness regarding cardiovascular diseases **on** their self- efficacy to promote their children life style. **Setting:** The study was conducted at the pediatric medical department and pediatric outpatient clinic affiliated to Tanta University Hospital, Tanta city, Egypt. **Sample:** a convenient sample of 60 mothers of school age children who attended the previously mentioned settings. **Tools:** two tools for data collection Were used: **Tool I** Structured interview questionnaire, it consisted of three parts. Socio-demographic data of the studied mothers, past and present family history for cardiovascular, diseases. The third part is mothers' knowledge about cardiovascular diseases. **Tool II**: Mothers' self-efficacy questionnaire. **Results**: the present study found that 91.67% of mothers had unsatisfactory practices level regarding their children life style before the educational intervention while 80% had satisfactory practices immediately after the educational intervention. **Conclusion:** there was a significant improvement in mothers' practices regarding their school age children life style **Recommendations:** educational programs for care giver should be conducted periodically and regularly regarding cardiovascular diseases risk factors among children.

Keywords: Mothers' awareness, cardiovascular diseases & Children.

Introduction

Cardiovascular diseases (CVDs) are a group of cardiac and blood vessel disorders. Atherosclerotic heart diseases are the first leading cause of deaths worldwide in addition the generator of a major morbidity burden. According to the World Health Organization (WHO) 17.9 millions of people die each year from CVDs **(WHO2020).**There are many risk factors for atherosclerotic cardiovascular diseases among children; like family history, obesity, unhealthy diet, sedentary activity, hypertension, dyslipidemia, diabetes mellitus, and cigarette smoking **(Mamedov 2018)**.

Risk factors for CVDs when develop at an early age, they are likely to track over time and maintaining a high-risk status. This tracking is reinforced by ongoing and new adverse health behaviors. This means that the preventive measures for their development have to be directed at the developing child and the family's environment. **(Vomen et al 2019, Kachur et al 2017, Gallyis 2020).** Risk factors for CVDs are mainly related to genetics and poor life style. Life style practices are rooted in early childhood and continue to adulthood life. The risk factors that can be tracked from childhood in to adulthood induce the possibility of adverse health outcomes. The primary life style components are diet and physical activity **(Mennsh et al 2019, Deferranti et al 2019, Saeedi et al 2019).**

Eating habits develop through childhood and can be a part of an effective primordial and primary prevention plan of care for reducing the incidence of CVDs. However, some eating behaviors are highly associated with increased risk for CVDs and obesity such habits include high intake of unsaturated fatty acids, sugar, salt and cholesterol **(Qin et al 2020, Vezina et al 2017, Pizarro 2013 Lanigan 2018).** Physical activity behavior is another important factor related to cardiovascular health status. It

should be practiced in combination with dietary modification program for reducing overweight or alone as part of daily habits such as walking to school daily which has a positive impact on reducing risk factors among school children. Also controlling of dietary fat intake with some forms of moderate to vigorous physical activity has a positive effect on reduction of waist circumference and lowering CVDs risk **(Pereira et al 21, Johnson et al 2012, Marques et al 2017, Christianson et al 2019).**

Mothers play a vital role in the development of their children's behaviors as a role model for them **(Hossain et al 2017, Arunachalam et al 2019).** Weight reduction interventions in children indicate significant weight loss in the groups of children when parents were involved in the intervention plan rather than groups focus on children only **(Candle and Jiménezb 2021, Martinez et al 2019).** Thus, it can be cleared that parents especially the mothers should be involved and empowered to upgrade their self-confidence and efficacy in promoting healthy life style practices among their children **(Zhao et al 2018).** Targeting mothers of school age children is important as preadolescent children are more reliant upon their parents for food choices available at home and when dining out. In addition, early consolidation and tracking of physical activity and dietary habits should begin as early as before adolescence where behavioral pattern resistant to change begin to develop**. (Thaker et al 2020, Sundstrand et al 2019)**

Promoting the health and wellbeing of children is a vital part of every pediatric nurse's role. Pediatric nurses' intervention is one of the methods for prevention and reducing CVDs risk related factors among children. The nurse is also responsible for empowering children, their families and supporting their adoption of healthy life style practices **(Mageloff 2019) .**

Significance of the study:

The acceleration of cardiovascular diseases (CVD) has become an alarming health problem across the globe. The Global Burden of diseases study has reported that by the year 2025, CVDs would be the major causes of death all over the world including the developing countries. The progressive atherosclerotic process begins in childhood and develops gradually under the influence of conventional risk factors including obesity, hypertension, dyslipidemia, cigarette smoking, family history of premature coronary artery disease, stress, and low levels of physical activity. As mothers are the main responsible for the house hold environment including eating practices and physical activity of the child so they have to be provided with information that enhance their self-competencies and efficacy to assist their children in adoption of healthy practices as early in their life as possible **(Hujova et al 2011, Morgan and Young 2017)**. When mothers are informed from trusted sources about the cardiovascular diseases, it is expected that they will be more efficient in promoting healthy practices related to their children's life style. For these reasons the present study aimed to explore the effect of upgrading mothers' awareness regarding CVDs on their practices regarding their children life style. **(American heart association 2016)**

Aim of the Study

The study was conducted to evaluate the effect of upgrading mothers' awareness regarding cardiovascular diseases on their self- efficacy to promote their children life style.

Subjects and Method:

Research Hypotheses:

- The mothers' knowledge regarding cardiovascular diseases is expected to be improved after the implementation of an educational intervention.
- The mothers' self-efficiency to develop healthy life style practices among their children is expected to increase after the implementation of an educational intervention.

Research Design

A quasi-experimental research design using one group (before, immediate and follow up after one month) was used.

Setting

This study was conducted at pediatric medical department and Pediatric Outpatient Clinic affiliated to Tanta Main University Hospital, Tanta city, Egypt. The Pediatric

Outpatient Clinics consists of Ear, Nose, and Throat clinic (ENT), Chest, clinic, Endocrine clinic, Neurology clinic, and Nutrition clinic.

Subjects:

A convenient sample of 60 mothers who attend with their children to the previously mentioned settings for medical checkup or for follow-up of their children. Mothers who were included in the study are those who met the inclusion criteria which include: acceptance to participate in the study and have at least one preschool or school age child.

The sample size identified based on the flow rate to the previously mentioned settings at the time of data collection. The sample size was based on the following parameters: confidence level error level 5% type I error 0.05 and power of test 95%.

Steven thimpson equation: the sample size was calculated using

$$n = \frac{N \times P(1-P)}{(N-1 \times (d^2/z^2)) + P(1-P)}$$

N= total society size (200)

D= error percentage (0.05)

Z= The correspond stander class of significant 95% (1.69)

P= Percentage of availability of the objectivity = (0.1)

n= sample size (60)

3.5 Tools of Data Collection:

Two tools for data collection were used:

Tool I: Structured interview questionnaire. The researchers developed it after review of the related literatures. It consisted of three parts:

Part 1: a-Socio-demographic characteristics of the studied mothers, which include their age, educational level, marital status, occupation, residence, and family income.

Part 2: families' medical history: mothers were asked questions related to

a- The presence of family member who have cardiovascular diseases.

b- The presence of any of their children who have cardiovascular diseases, obesity, hypertension, and diabetes mellitus.

Part 3: Mothers' knowledge about cardiovascular diseases among children. It included; questions related to the possibility of occurrence of cardiovascular disease among children, the possible predisposing factors for cardiovascular disease, the definition and causes of hypertension, the definition of cholesterol and whether it can affect children or not, the causes for elevated cholesterol in case of elevation, the methods for reducing cholesterol level, in addition questions related to smoking, obesity, and questions related to the eating habits and physical exercises and its effects on the child's health.

Scoring system for mothers' knowledge:

This part contained 13 questions. Each question was scored from 0-2 grades. The correct and complete answers were scored 2, correct and incomplete answers were scored 1 and wrong answers or didn't answered questions were scored zero. The sum of all questions was 26.

The total scores of mothers' knowledge were calculated and classified as follows:

- < 50 %was considered poor knowledge.
- 50-75 % was considered fair knowledge.
- > 75 %was considered good knowledge.

Tool II: Mothers' self-efficacy questionnaire developed by **(Decker 2010)** : it was consisted of a list of behaviors and practices that mothers might use while trying to get their children to adopt healthy diet or physical activity behaviors. It assesses to which degree mothers' are confident that they can change eating habits and physical activity of their school age children to a healthy style. It was consisted of 35 items. Each item is scored from 0 to 10. Then the sum total of the items is divided by the number. Mothers' self-efficacy is scored as:

- Not at all confident was scored 0 to less than 5.
- Moderately confident was scored from 5 to 6
- Totally confident was scored from more than 6 to 10

The total scores of mothers' self-efficacy: were calculated and classified as:

- < 60% was considered satisfactory self-efficacy.
- > 60% was considered unsatisfactory self-efficacy.

Method

The study was carried out after getting an official permission from the responsible authorities, participants' oral consent was obtained, their privacy was considered, every mother was assured that all information gathered will be confidential and she was free to withdraw from the study at any time, the developed tools were validated by five experts in the medical and nursing fields and content validity index was 96%, reliability of the developed tools was tested through the internal consistency and the value of Cronbach's alpha coefficient was 0.960. The pilot study was conducted on 6 mothers to test the clarity and applicability of the study tools, the necessary modification was done in the form of questions rearrangement, and restatement for some items, the data was collected over a period of three months from July to October 2020, and data collection procedure was compromised through three phases:

1- Assessment Phase:

It was carried out by the researcher for all study subjects to collect baseline data. The researcher was available 3 days per week from 9 am-12pm to assess mothers' knowledge about cardiovascular diseases among children before, immediate and after one month of intervention implementation Tool I (Part 3).

- Mothers' self-efficacy was assessed before, immediate and after one month of intervention implementation by using Tool II.
- Mothers were interviewed individually or in the group to fill the questionnaire sheet.
- The average time needed for each mother ranged from 20- 30 minutes
- The researcher ensured that all questions were answered and asked the mothers to fill any missed questions.

2- Implementation Phase was included preparatory and intervention phase**:**

- **Preparatory (program development) phase:**

The educational program was developed on the basis of the review of related research studies and review of the literature **(Voerman et al 2019 , American Heart Association 2016).** It was tailored to the identified needs and demands of mothers in Arabic language and developed according to the following objectives;

1. General objectives:

- By the end of this program mothers will acquire knowledge and self-efficacy for the development of healthy life style among their children which prevent or minimizing the risk factors for cardiovascular diseases among their children.

2. Specific objectives:

At the end of the educational sessions, the mothers and their children will be able to:

1. Define cardiovascular diseases
2. List predisposing factors for cardiovascular diseases
3. Identify healthy patterns of eating habits and physical activity

- The program was constructed according to the mothers' needs.
- The program was designed by the researchers, after review of the related literatures to meet mothers' knowledge and self-efficacy deficits.
- The content was prepared according to the mothers' level of understanding.
- Preparation of the content which was covered the reasons behind the application of the session.

- **Intervention phase:**

The educational intervention program was conducted in pediatric medical department and pediatric outpatient clinic through four sessions.

- Two sessions were conducted daily for 2 days per week.
- Time of each session was ranged from 30-45 minutes.
- At the beginning of the first session, mothers were oriented about the educational intervention content, purpose, and its effect on their children health status.
- Each session was started by a summary about what has been discussed in the previous session and the objectives of the current session, using simple Arabic language and different teaching media (lectures, demonstration, group discussion and audiovisual materials) were used relevant to program contents to facilitate mothers' understanding.
- -The sessions covered the following topics

The first session: related to the possibility of occurrence of cardiovascular disease among children, the predisposing factors for cardiovascular disease among children.

The second session: focused on the definition, causes of hypertension, definition of cholesterol, the causes for its elevation, and the methods for reducing it.

The third session: related to smoking effects on children's cardiovascular health, its dangers prevention, and obesity in children.

The fourth session: consisted of the healthy eating habits and benefits of physical exercises for children's health.

- Each session ended by a summary of its content and feedback from the mothers was obtained to ensure that mothers got the maximum benefit.

3- Evaluation phase:

The Effects of the educational intervention program on mothers' knowledge and self-efficacy were done through comparing the before and after test. This phase was done three times before, immediately after finishing the implementation phase, and then after one month.

Part I: Sociodemographic characteristics of mothers

Table (1) Percentage distribution of the mothers' sociodemographic characteristics (n=60)

Sociodemographic characteristics of mothers	The studied mothers	
	N	%
Age (years)		
20 to less than 30	24	40.0
30 to less than 40	25	41. 7
40 and More	11	18.3
Educational level		
Can't read and write	5	8.3
Read and write	7	11. 7
Preparatory school	6	10.0
Intermediate education	28	46. 7
University education	14	23.3
Marital Status		
Married	50	83.3
A widow	6	10.0
Divorced	4	6.67
Occupation		
Working	33	55.0
Not working	27	45.0
Residence		
Rural	39	65.0
Urban	21	35.0
Income (pounds)		
Less than 1000	3	5.0
1000to less than 3000	38	63.3
3000 ≤	19	31.7

Table (1) shows the mothers' sociodemographic characteristics. 41.7% of mothers had 30 to less than 40 years old. Regarding their education, 46.7% of mothers had intermediate education while 23.33% of them had completed their university education. Regarding their marital status, 83.33% of them were married .The table also shows that 55% were working. As regards the residence and the income 65% and 63.3% of mothers were from rural areas and had income from 1000 to less than 3000 pounds respectively.

Part II: families' medical history

Table (2) Percentage distribution of families' medical history (n=60)

Family medical history	The studied mothers	
	N	%
Past history of cardiovascular diseases		
Yes	17	28.3
No	43	71.7
Have a child with cardiovascular disease.		100.0
No	60	
Have a diabetic child.		
Yes	1	1.7
No	59	98.3
Have an obese child.		
Yes	9	15.0
No	51	85.0
Have a hypertensive child.		100.0
No	60	

Table (2) shows Percentage distribution of families" medical history. It was observed that 28.3% of the mothers have positive family history for cardiovascular disease. In relation to the presence of a child with cardiovascular disease and with high blood pressure, it was found that 100% of mothers didn't have any affected child. This table also shows that 98.33% of them didn't have any diabetic children. Regarding have a child with obesity, it was observed that 85% of the mothers didn't have any affected child.

Part III: Mothers' knowledge about cardiovascular diseases among children

Table (3): Percent distribution of mothers' total knowledge score regarding cardiovascular disease among children

Total Mothers' Knowledge score	Time						Chi-Square	B&I	B&A	I&A
	Before		Immediate		After one month					
	N	%	N	%	N	%				
Poor	41	68.33	0	0.00	0	0.00	X^2	66.563	62.278	17.143
Fair	19	31.67	45	75.00	60	100.00	P-value	<0.001*	<0.001*	<0.001*
Good	0	0.00	15	25.00	0	0.00				

Table (3) illustrates that mothers total knowledge score was 68% poor and 31.7% fair before program implementation compared to 75% fair and 25% good immediately after and 100% after one month

Table (4): Percent distribution of the total means scores of the mothers' knowledge about cardiovascular disease among children

Time	Mothers' Knowledge		COMP.	Differences		Paired Test	
	Range	Mean ± SD		Mean	SD	t	P-value
Before	0 - 21	10.400 ± 4.975	B&I	-12.783	4.812	-20.577	<0.001*
Immediate	13 - 26	23.183 ± 4.828	B&A	-10.800	5.148	-16.250	<0.001*
After one month	10 - 26	21.200 ± 6.612	I&A	1.983	3.671	4.185	<0.001*

***Statistically significant difference at (P<0. 05)**

Table (4) illustrates the total means scores of the mothers' knowledge regarding cardiovascular disease among children. It was observed that they had the highest mean scores immediately after the educational intervention (23.183±4.828) than before and one month later. There were statistically significant differences regarding the total means scores of the mothers' knowledge between before , immediate and one month after the educational intervention ($p<0.001$).

Table (5): Percent distribution of the total means scores of the mothers' self efficacy regarding changing their children's eating habits and physical activities.

Time	Total Mothers' Efficacy			COMP.	Differences		Paired Test	
	Range	Mean ± SD			Mean	SD	t	P-value
Before	119 - 249	168.550 ± 28.733		**B&I**	-66.617	31.129	-16.576	<0.001*
Immediate	181 - 292	235.167 ± 29.656		**B&A**	-31.983	19.999	-12.388	<0.001*
After one month	175 - 251	200.533 ± 16.438		**I&A**	34.633	28.089	9.551	<0.001*

***Statistically significant difference at (P<0. 05)**

Table (5) shows that the mothers had elevated self efficacy mean scores immediately after the educational intervention (235.167±29.656) compared to before and one month later. There were statistically significant differences regarding the total means scores of the mothers' self efficacy before , immediately after and one month after application of the educational intervention (p<0.001).

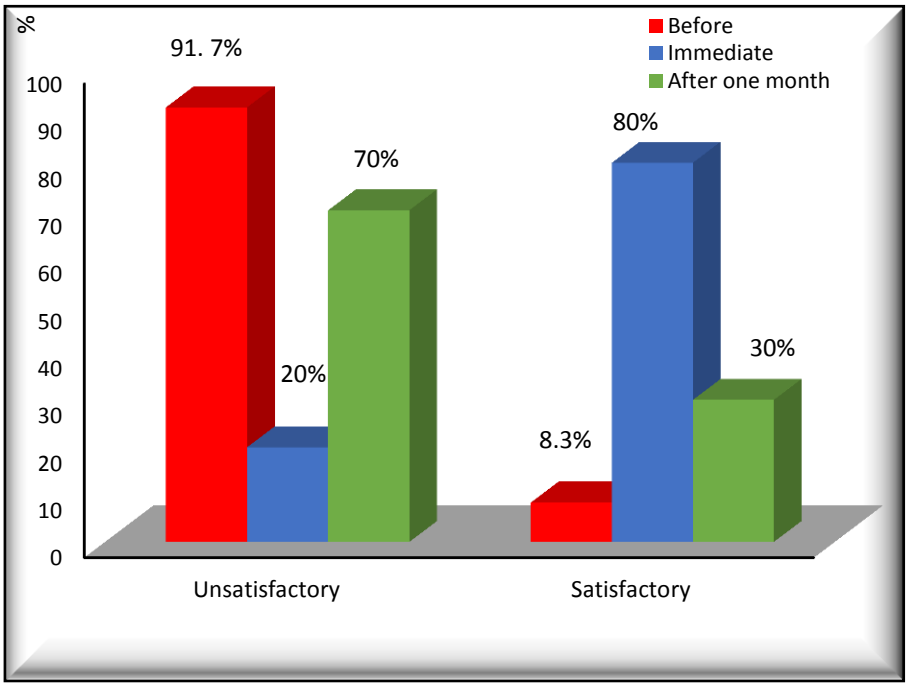

Figure (1): Percentage distribution of the mothers' self efficacy total scores in changing their children's eating habits and physical activities.

Figure (1) illustrates that 8.3% of mothers had satisfactory self-efficacy before the educational intervention compared to 80% and 30% of them had satisfactory self-efficacy immediately and after one month from the educational intervention implementation respectively.

Table (6) Relation between the mothers' total means scores of knowledge and their sociodemographic characteristics

Mothers' Knowledge		N	Before			ANOVA or T-Test	Immediate			ANOVA or T-Test	After one month			ANOVA or T-Test
			Mean	±	SD		Mean	±	SD		Mean	±	SD	
Mother's age (years)	20 to less than 30	24	11.292	±	3.940	0.101	24.375	±	3.820	0.054*	22.875	±	5.327	0.154
	30 to less than 40	25	10.800	±	5.635		23.360	±	4.889		20.880	±	7.061	
	40 and More	11	7.545	±	4.783		20.182	±	5.759		18.273	±	7.525	
Educational level	Illiterate	5	2.400	±	3.130	<0.001*	13.600	±	0.894	<0.001*	10.200	±	0.447	<0.001*
	Read and write	7	8.143	±	4.018		16.286	±	2.289		13.429	±	2.370	
	Preparatory school	6	6.833	±	3.601		19.500	±	5.167		12.333	±	2.338	
	Intermediate education	28	10.964	±	3.249		26.000	±	0.000		24.607	±	3.705	
	University education	14	14.786	±	4.509		26.000	±	0.000		26.000	±	0.000	
Marital Status	Married	50	10.820	±	5.165	0.252	23.980	±	4.424	0.005*	22.620	±	5.989	<0.001*
	A widow	6	9.333	±	2.066		17.500	±	4.680		15.333	±	5.989	
	Divorced	4	6.750	±	4.573		21.750	±	4.924		12.250	±	2.217	
Occupation	Working	33	8.148	±	4.605	<0.001*	21.815	±	5.664	0.095	19.296	±	7.221	0.001*
	Not working	27	12.964	±	4.123		24.607	±	3.573		24.143	±	4.411	

***Statistically significant difference at (P<0. 05)**

Table (6) shows that, there was statistically significant relation between total means scores of mothers' knowledge and their age immediately after educational intervention (p<0.001). As regards relation between total means scores of mothers' knowledge and their educational level, it was observed that there was statistically significant difference before, immediately after the educational intervention (p<0.001). The table also reflects that, there was statistically significant difference between total mean scores of mothers' knowledge and their marital status immediately and one month after the educational intervention (p= 0.005, <0.001) respectively There was statistically significant difference between total mean scores of mothers' knowledge and their occupation before and one month after the educational intervention (p<0.001)

Table (7) Relation between the mothers' total means scores of self-efficacy and their sociodemographic characteristics

Total Mothers' efficacy		N	Before			ANOVA or T-Test	Immediate			ANOVA or T-Test	After one month			ANOVA or T-Test
			Mean	±	SD		Mean	±	SD		Mean	±	SD	
Mother's age (years)	20 to less than 30	24	175.542	±	20.479	0.193	242.667	±	26.286	0.241	201.708	±	13.454	0.848
	30 to less than 40	25	160.800	±	32.173		232.000	±	31.126		199.080	±	17.545	
	40 and More	11	170.909	±	33.889		226.000	±	31.972		201.273	±	20.737	
Educational level	Illiterate	5	148.000	±	0.000	<0.001*	217.000	±	35.672	0.007*	187.600	±	14.843	0.014*
	Read and write	7	144.857	±	2.268		223.571	±	26.165		191.286	±	8.321	
	Preparatory school	6	147.833	±	9.390		210.000	±	27.137		190.000	±	6.419	
	Intermediate education	28	172.286	±	27.622		237.250	±	28.768		203.571	±	13.593	
	University education	14	189.143	±	31.248		254.071	±	19.902		208.214	±	21.955	
Marital Status	Married	50	173.480	±	28.997	0.010*	240.380	±	27.833	0.005*	203.080	±	16.685	0.024*
	A widow	6	143.833	±	6.585		216.333	±	25.089		188.000	±	7.403	
	Divorced	4	144.000	±	0.000		198.250	±	24.798		187.500	±	5.196	
Occupation	Working	33	158.259	±	22.757	0.002*	232.000	±	28.261	0.080	196.889	±	13.583	0.011*
	Not working	27	181.893	±	30.418		242.357	±	27.953		206.536	±	17.962	
	1000 to less than 3000	38	166.500	±	30.221		240.421	±	28.109		200.868	±	16.379	
	3 to 6000 and more	19	174.556	±	28.264		225.889	±	29.988		201.722	±	17.421	

***Statistically significant difference at (P<0. 05)**

Table (7) represents that, there was statistically significant relation regarding mothers' educational level, and their total self- efficacy score before, immediately and after one month from the educational intervention (p<0.001, p=0.007 and p=0.014) respectively. Also, there was statistically significant relation between total mean scores of mothers' self-efficacy and their marital status before, immediately and one month after the educational intervention (p= 0.010, p=0.005 and p=0.024) respectively There was statistically significant difference between total mean scores of mothers' self-efficacy and their occupation before and one month after the educational intervention (p=0.002 and 0.011) respectively .

Table (8): Correlation between mothers' knowledge and their self-efficacy

Correlation						
Knowledge	**Total Mothers' efficacy**					
	Before		**Immediate**		**After one month**	
	r	**P-value**	**r**	**P-value**	**r**	**P-value**
Self-efficacy	0.269	0.037*	0.356	0.005*	0.352	0.006*

***Statistically significant difference at (P<0. 05)**

Table (8) reflects the correlation between mothers' knowledge and their self-efficacy. Positive correlation was detected between mothers' knowledge and their self-efficacy before, immediately and one month after educational intervention. Mothers displaying more knowledge had a satisfactory self-efficacy before, immediately and one month after educational intervention (P = 0.037. P=0.005 and P=0.006) respectively.

Discussion

The acceleration of cardiovascular diseases (CVDs) has become an alarming health problem across the globe. The Global Burden of Diseases study has reported that by the year 2025, CVDs would be the major cause of death all over the world including the developing countries. The progressive atherosclerotic process begins in childhood and develops gradually under the influence of conventional risk factors including obesity, hypertension, dyslipidemia, cigarette smoking, family history of premature coronary artery disease, stress, and low levels of physical activity **(Hujova and Lesniakova 2011, Wafa et al 2020).**

The atherosclerotic processes are initiated early in childhood and are modified over the life course by both genetic and environmental interactions **(Prasad et al 2011).** Studies reported that primary prevention of CVDs risk factors include treating these risk factors while primordial prevention of CVDs include avoiding the development of the risk factors in the early stages of life **(Gillman 2015).** In addition other literature suggesting that starting preventive interventions very early—as early as infancy and perhaps before—may be an especially effective approach to prevent chronic disease over the life course. Prevention interventions during early stages of childhood may set individuals on the best possible trajectories of lifelong cardiovascular health, while later interventions, especially during the adolescence, may be stymied by inadequate physiological responses **(Gillman et al 2013, Jolicoeur et al 2017)**. for these reasons the identification and prevention of CVDs risk factors development as early during childhood as possible become an increasing health issue for promoting and maintaining cardiovascular health through life. Parents strongly influence their children's life-styles, the health status of the parent is intricately linked to the health status of their children. many studies revealed that parents' obesity is positively correlated to their children obesity **(Karki et al 2019, Hughes et al 2021, Ochoa and Berge 2017).** Mothers are the closest family member to the child and the principal care giver for their families. For these reasons the present study was conducted to empower mother's awareness regarding cardiovascular disease and evaluate the change in their self-efficacy to develop a healthy life style among their children in order to prevent or minimize the chance of developing the risk factors for cardiovascular disease among children.

The findings of the study revealed that, two thirds of mothers were from rural areas. This may be due to the location of Tanta University Hospital near rural areas.

Mothers' knowledge about cardiovascular diseases in children is an important step in the

modification of their children's lifestyle behaviors that conducive to their optimal cardiovascular health. The result of the present study revealed that, the total mean score of mothers' knowledge was poor before the educational intervention. Compared to fair and good immediately after program implementation and faire at follow up. This may be due to less than half of them had intermediate education, poor health facilities in rural areas, decrease health teaching programs that were provided to families. This finding was in agreement with **Oli et al., (2018)** who found that there were gaps and misconceptions in mothers' knowledge before the educational program in their study which was about knowledge, attitude and practice on diet and physical activity among mothers with young children in the Jhaukhel and Duwakot villages.

The current study revealed that, immediately and one month after educational intervention, there was an improvement in the total means scores of mothers' knowledge. This could be attributed to the content of program which was developed based on mothers' and children's needs, its clarity and simplicity, using of audiovisual aids, availability of the researcher in the field for more clarification and frequent repetition to fix the knowledge. All of these factors played an important role in enhancing and improving mothers' knowledge.

When parents take care of their children, they will develop beliefs about their own role. They judge if their educational efforts will have any chance of success in nurturing and comforting the child or in shaping child's socially desirable behaviors. A particular set of individual's beliefs about the role as parent is called parental self-efficacy which is defined as the conviction that one can successfully execute the behavior required to produce the outcomes that he or she wants to achieve **(Benedetto and Ingrassia 2018).**

It was observed that, immediately and one month after educational program, there was an improvement in the total means scores of mothers' self-efficacy regarding changing eating habits and physical activity of their school age children compared to their self-efficacy's total mean score before educational intervention. This may be due to the new knowledge and skills that mothers acquired from the educational intervention. This result was in line with **Oli et al., (2019)** who stated that, post-intervention, mothers' knowledge, practice and attitude regarding their children's heart-healthy diet and physical activity had improved that further improve their children's behaviors by targeting factors that affect their lifestyle outside the family environment.

Children's family status and socioeconomic environment has been found to promote beneficial or harmful habits in children, as family members act as role models for their children's behaviors for instance, maternal education level is associated with children's healthy eating behaviors **(Natale et al 2014, Philip et al 2014)**. It was observed that the total means scores of university education mothers' knowledge and self-efficacy were the highest. This result was in agreement with **(Arderius et al., 2015)** who stated that the level of mothers' education was strongly associated with higher diet quality in both parents and children, as well as with healthy oral habits. This result was incongruent with **(van Ansem et al., 2014)** who found that maternal education level did not have a direct effect on their children's dietary habits.

It was found that the total mean scores of working mothers' self-efficacy were lower than the total mean scores for not working mothers before, immediately and one month later. This may due to working mothers with children often have a stressed, overloaded life, combining work at home and professional involvement, so they may be more dependent on the unhealthy fast foods. The finding of this study was in line with many studies that had correlated in different ways child's nutritional status with mother's employment status, and found that children with full time working mothers being sometimes prone to have unhealthy dietary habits and to develop obesity or overweight **(US Department of Health and Human services 2011).**

Conclusion

Based on the results of the present study, it can be concluded that there was a positive significant improvement in mothers' knowledge regarding cardiovascular diseases

among their children. Mothers' knowledge had a positive significant effect on their self-efficacy to develop a healthy life style among their children.

Recommendations:

Based on the findings of the present study, the following recommendations are suggested:

- Empowerment programs should be directed to mothers concerned with prevention of chronic disease among their children.
- Education programs for caregivers should be conducted periodically and regularly regarding cardiovascular diseases risk factors among children.
- The media should be used as an important tool for promotion of children's knowledge about healthy life style.
- School based education program should be established to upgrade children and teachers' awareness regarding the risk factors for cardiovascular disease.
- This study should be replicated with more mothers at different geographical areas to generate larger statistical power with a diverse group of mothers and attain more generalization of results

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