

Dietary Counseling Program for Mothers of Children with Cerebral Palsy

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Abstract

Cerebral palsy (CP) is a group of disorders that affect a person's ability to move and maintain balance and posture. CP is the most common motor disability in childhood. *Cerebral* means having to do with the brain. *Palsy* means weakness or problems with using the muscles. **Aim:** This study aimed to evaluate dietary counseling program for mothers of children with cerebral palsy through, assess mothers' knowledge and practices regarding to cerebral palsy; and appraise dietary counseling program for mothers of children diagnosed with cerebral palsy. **Setting:** This study conducted at faculty of physical therapy of Cairo University and neuro outpatient clinic in Sayed Galal hospital at Bab-AL-Shareya Cairo, Egypt. **Design:** A quasi experimental design was used. **Subject:** This study included seventy mothers of children with cerebral palsy came to neuro outpatient clinic at faculty of physical therapy of Cairo university and fifty mothers of children with cerebral palsy from neuro outpatient clinic in Sayed Galal hospital at Bab-AL-Shareya Cairo, Egypt. **Tools:** An interview questionnaire tool used in this study pre and post dietary counseling program, include three parts, *I*) socio-demographic characteristics for mothers of children with cerebral palsy; *II*) Mothers' knowledge (pre and post) regarding to cerebral palsy; and *III*) Mothers' reported practices regarding dietary counseling program for their children with cerebral palsy. **Results:** an improvement of mothers' Knowledge and reported practice post dietary program than pre the program, the mothers' Knowledge mean and standard deviation pre-program is (53.0702 ± 29.77748) , while post-program is 89.3202 ± 11.68589 with highly statistically significant differences, also the mothers' reported practice mean and standard deviation pre-program is (42.6667 ± 27.76653) , and post-program is (75.0833 ± 20.29181) with highly statistically significant differences. **Conclusion** Mothers' knowledge and reported practices toward their children with cerebral palsy improved significantly post implementation of the dietary program. **Recommended:** Periodically dietary counseling program for mothers help to improve their practices for enhancement of dietary condition for their children with cerebral palsy and reduce the complications of cerebral palsy and malnutrition.

Key words: Cerebral Palsy, Dietary Counseling program, Mothers

Introduction

Cerebral palsy (CP) is essentially a permanent disorder affecting movement and posture, causing limitations in activity due to non-progressive disturbances that occur in the developing fetal or immature infant brain (**Park et al., 2018**). The average incidence rate is approximately 2 per 1,000 live births, making cerebral palsy one of the most common physical disabilities in children (**Parkes and Hill, 2018**).

Many children with cerebral palsy (CP) are at risk of poor dietary status, particularly those with severe gross motor impairment and oro-pharyngeal dysfunction (**Brooks et al., 2016**). These difficulties are due to problems with oro-pharyngeal control and esophageal motility, related gastroesophageal reflux, and the high risk of aspiration of food/fluid into the lungs among the consequent health problems of these feeding difficulties are under nutrition, esophagitis with bleeding and pain, recurrent chest infections, and progressive lung disease. In addition, most children at risk for these problems are those with spastic quadriplegic and dystonic CP. These categories account for one third of all cases of CP in developed countries (**Fung et al., 2017**).

The majority of children with cerebral palsy will experience feeding difficulties. Since Cerebral Palsy results in impairment of muscle groups, facial muscles can be affected. The facial muscles are one of the strongest muscle groups in the body. Impairment hampers a child's ability to chew, suck, or swallow, thereby creating a high risk for

undernourishment, failure to thrive, malnutrition, growth delay, and digestive difficulties. The children with cerebral palsy may take longer and experience discomfort when eating, so become sluggish from undernourishment, and dental problems may arise from excess drooling, longer meal times, or from stomach acids when aspiration occurs (**Stern, 2020**).

Feeding is a complex task requiring significant neuro-muscular coordination, and integration of motor and sensory pathways. Disorders of feeding and swallowing are common in children with CP. Feeding and swallowing disorders have significant implications for development, growth and nutrition, respiratory health, gastrointestinal function, parent-child interaction, and overall family life. Oral feeding interventions for children with CP may be effective in promoting oral motor function, but have not been shown to be effective in promoting feeding efficiency or weight gain (**Henderson et al., 2017**).

Young children often encounter feeding challenges, such as food refusal, an inability to meet dietary needs, and limited skills to self-feed. Further, overall development can be adversely affected when an infant or a toddler has difficulties with intake of fluid and solid foods. A variety of strategies are available to address these challenges and, collectively, inform a best practices model. Importantly, all require a team approach as well as use of individually and developmentally appropriate techniques. There is a concomitant need to provide strategies that match child and family preferences. Finally, all feeding experiences and interactions should be

pleasurable and should promote relationships between children and their parent(s) and caregiver(s). Implications for clinicians are also presented (**Bruns and Thompson, 2015**).

Depending on the severity level of the child with cerebral palsy, his or her digestive challenges and the ability to properly chew, swallow, and self-feed, effective dietary therapy can be devised to meet the children's unique needs. Feeding problems are prevalent many of these children, and can result in inadequate energy intake. Wasting of voluntary muscles, a common symptom of CP, contributes to reduce resting energy needs; nevertheless, the location of the central nervous system lesion may also influence energy requirements (**Eileen, 2014**).

Some of the more common dietary concerns for those with cerebral palsy include; ways to prepare food, the dietary practitioners can adjust textures and consistency of food by pureeing, chopping and grinding foods for a more palatable experience. Foods can be softened by adding broth, gravy, milk, or juices to accommodate constipation issues. Liquids can be thickened for ease in swallowing. Also look for ways a child with cerebral palsy can self-feed, a skill that greatly enhances quality of life, children with cerebral palsy must rely on a feeding tube for partial or total nutrition intake. Sufficient time is required between bites or drinks to allow for natural swallowing. Sometimes meals are scheduled around medication needs to avoid stomach upset, curb appetites, and address drowsiness (**Arvedson, 2019**).

Diets can be adjusted to provide more energy, balance metabolism, compensate for deficiencies, and enhance digestion. Vitamin, mineral and food supplements may assist those with mal absorption or who tire when eating. High fiber diets curb constipation. Prune and apricot juices may provide natural laxative qualities. Some foods enhance absorption of vitamins and calcium. That diet may include consuming specialized foods and liquids, or it may involve preparing foods in a specific way. All food decisions, however, are made taking into consideration a child's physical condition and dietary preferences (**Samson-Fang and Bell, 2019**).

Children with cerebral palsy suffering from drooling, aspiration, and long-term anti-seizure medication use can contribute to an increased risk of dental decay, cavities, gum disease, and bacterial infections. So encourage those children for proper dental hygiene, which may include regularly brushing, drinking fluorinated water, and scheduling dental check-ups (**Bell and Owens, 2018**).

Nurse will be responsible for providing information, options, assisting with choices, educating, training, and implementing the plan. These nurses work with mothers of children with cerebral palsy to commit to a plan, its time frame, and the demands. The nurse play an important role in administer dietetic counseling and meal-planning services are likely educated in food and nutrition sciences, culinary arts, and food service systems management. A successful plan requires focus on the goals, as well as an open communication process. It is always helpful to have

supportive family and friends. Measurable goals that can be benchmarked and reported to those in the interdisciplinary team for plan feedback are also helpful. These programs were developed to help families in need (Stern, 2020).

Significance of the study

Cerebral Palsy is considered a neurological disorder caused by a non-progressive brain injury or malformation that occurs while the child's brain is under development. Cerebral Palsy primarily affects body movement and muscle coordination.

Cerebral palsy is one of the most common causes of physical disability in childhood; with a reported prevalence of CP in children were 3.6 per 1,000, which are higher than that recorded in Egypt (El-Tallawy et al., 2017). 300 per 1,000 child complains from cerebral palsy complain from malnutrition because lake of their mothers and caregivers by important healthy diet program for the child with cerebral palsy Vincer et al., (2016).

The nurse play important role and provide diet counseling for mothers with children complain from CP to minimize complications of the disease (Stern, 2020).

Aim of the Study

This study aimed to evaluate dietary counseling program for mothers of children with cerebral palsy through the following objectives:

1- Assess mothers' knowledge and practices regarding to cerebral palsy.

2- Appraise dietary counseling program for mothers of children diagnosed with cerebral palsy.

Research hypothesis:

Developing dietary counseling program for mothers of children with cerebral palsy will improve mothers' knowledge, and reported practices after program implementation.

Subject and Methods

Research design

A quasi experimental design was used to conduct this study.

Setting

The study was conducted at the neurology out-patient clinic affiliated to Sayed Galal Hospital at Bab-AL-Shareya and faculty of Physical Therapy, Cairo University, Egypt.

Subjects

1- A purposive sample that included (120) mothers of children with cerebral palsy after excluded pilot study (12) mothers that represent ten percent from total mothers of children with cerebral palsy. Seventy mothers of children with cerebral palsy came to neuro outpatient clinic at faculty of physical therapy of Cairo university and fifty mothers of children with cerebral palsy at came to neuro outpatient clinic in Sayed Galal hospital at Bab-AL-Shareya Cairo, Egypt. With the following inclusion criteria mothers of children diagnosed with cerebral palsy, free from any psychological problems in the previously mentioned setting and the mothers of children with cerebral

palsy agree to participate in this study.

Yamane (1967) provides a simplified formula to calculate sample sizes. A 95 confidence level and $p = 0.5$ are assumed for:

$$n = \frac{N}{1 + N(e)^2}$$

n = Sample size N = Population size
e = Level of precision = 0.05

$$n = \frac{171}{1 + 171(0.05)^2}$$

$$n = \frac{171}{1.4275}$$

$$n = 119.78 \sim 120$$

2- One hundred and twenty children diagnosed with cerebral palsy in previous mention setting included in the study with the following inclusive criteria:

- Diagnosed with cerebral palsy
- Both gender and their age ranged from three to five years.
- Free from other metabolic and allergic diseases

Tools of data collection:

Tool 1: An interview Questionnaire tool used in this study pre and post the counseling program, in out-patient clinic affiliated to Sayed Galal Hospital at Bab-AL-Shareya and faculty of Physical Therapy, Cairo University, Egypt. It was designed by the researcher In a simple Arabic language after reviewing the current literatures. It comprised from three parts as following:

Part I: socio-demographic characteristics for mothers of children with cerebral palsy that include age, level of education, and occupation, residence ...etc.

Part II: Mothers' knowledge (pre and post) regarding to cerebral palsy divided to:

- Mothers' knowledge about cerebral palsy, such as: Meaning, causes, signs and symptoms, complications, home care, follow up...etc.
- Mothers' knowledge about nutrition of cerebral palsy, for example: Meaning of nutrition, importance of nutrition, causes of mal- nutrition, methods of feeding their children with cerebral palsy, equipment used and daily needs of nutrition and types of food needed for children with cerebral palsy.

Scoring system: According to the responses obtained from the studied mothers, a scoring system was followed to assess the mothers' knowledge, each question scored one (1) for correct answer and zero (0), for incorrect answer total score of the questionnaire equals (38) grads. Mothers' knowledge scores were categorized into; good knowledge for mothers who scored 75% and more, average knowledge for mothers who scored 50% to < 75% and poor knowledge for mothers scored less than 50% of total scores.

Tool 2: Mothers' reported practices regarding dietary counseling program for their children with cerebral palsy (**Wilson and Hockenberry, 2017**), this part include, hand washing, mouth care, introducing feeding, mashed feeding, ...etc.,

Scoring system: a scoring system was followed to assess the mothers' reported practices, each item scored two (2) for always answer, each sometimes answer scored one (1) and each never answer scored zero (0). The scoring systems of mothers' practices were classified into satisfactory when mothers' practices scored 60 % and more, while unsatisfactory mothers' practices scored less than 60% of total scores.

Ethical Considerations:

Certified agreements were attained from faculty of nursing then advanced to hospitals manager. Written informed consent was obtained from the mothers of children with cerebral palsy by the researcher. Anonymity and confidentiality of the study subject had been assured. They were be informed that all the gathered data were be used for research purpose only. They had the right to withdraw from the study at any time freely.

Validity:

Tools were established for content validity, by a Jury of 5 experts in the Community and pediatric Nursing field and neurology specialty, to check the consequence and inclusiveness of the tools. Face validity = 95.21%.

Reliability:

Reliability measurements were calculated for the study tools contain the following:

- Mother' knowledge about dietary counseling program for children with cerebral palsy, Cronbach's Alpha was 0.895.

- Mother' reported practice regarding dietary counseling program for children with cerebral palsy, Cronbach's Alpha was 0.848.

Pilot Study:

Pilot study was carried out on 10% of total subject size of mothers of children with cerebral palsy to test the applicability and to evaluate the content validity of the study tools. Results of the pilot study helped to make modifications on the tools; some items of questionnaire were modified and unnecessary questions were omitted. The mothers in the pilot study were excluded from the study sample.

Field Work:

- Before achieve the study the official agreement was taken from Sayed Galal Hospital at Bab-AL-Shareya and faculty of Physical Therapy, Cairo University, managers. The study was started from April 2019 until Jun 2019 for data collection and dietary counseling program implementation, the program consent the following phases:

Firstly phase: this phase ongoing with questioning with the mothers of children with cerebral palsy and the researcher announces herself to the mothers. At the beginning of implementation of dietary counseling program.; an orientation and explanation of it for the mothers, the aim and objective of the study were explained to gain their collaboration & to assure the mothers about the secrecy of their answers and that the information used for scientific research only and was be firmly confidential.

The data collected through interview questionnaire used to mothers identify background knowledge and practices reported by mothers, the check-lists which filled by the researcher. The collection of data was daily for two days per week using the Arabic questionnaire format.

Secondly phase: the dietary counseling program spent for 8 weeks, two days per week consumed in conducting the dietary counseling program. Consequently, the subject content has been sequenced through 16 sessions. The duration at each session ranged from 45 to 60 minutes including periods of discussion. At the beginning of first session, an introduction about the program was done. Each session started with feedback about the previous session, simple words and Arabic language were used to suit the mother's level of understanding. Different methods of education were used as lectures, demonstration and re-demonstration. Appropriate teaching aids were prepared and used during the implementation such as real equipment, posters and pictures to cover the content of the program and modify mothers' knowledge about cerebral as meaning, causes, and manifestation, also meaning of nutrition, importance of nutrition, causes of mal- nutrition, and methods of feeding their children with cerebral palsy, then provide session to improve mothers' practices as hand washing, mouth care, how to introduce feeding, mashed feeding, ...etc., all questions were designated in the form of open and closed ended questions.

Finally phase; evaluating the program was done two weeks later after

its implementation by using the same preprogramming tools.

Results

Table (1): As regards characteristics of the studied mothers, table (1) fined that the age of mothers of children with cerebral palsy ranged from 22 to 45 years with mean \pm S.D 33.8 ± 6.293 years. It was also found that, 73.3% of mothers were married. In relation to mothers' occupation, it was observed that, 70.0% of them were employer.

Figure (1): It is obvious from this figure that more than half of mothers of children with cerebral palsy (61.7%) were University education.

Table (2): As illustrated from this table that, 51.7% of children with cerebral palsy were in age group 4 ± 5 years with the mean age 4.08 ± 0.77 years. Regarding to gender of children it was found that 66.7% of them were males.

Table (3): This table clarifies that, as regards definition of cerebral palsy, common causes of cerebral palsy, complication, elements of food, importance of nutrition, sources of protein, ...etc. There is a statistical significant difference between pre and post of Dietary Counseling Program regarding to mothers' knowledge ($P < 0.000$).

Table (4): It was clear from this table that about 35% of studied mothers had good knowledge related to total knowledge of cerebral palsy at the pre implementation of Dietary Counseling Program. Meanwhile, the majority of them scored good knowledge at post dietary counseling program intervention.

Table (5): Showed mothers' practices toward hand washing introduce meal to their children; prepare soft diet, feeding their children, and mouth care throughout implementation of dietary counseling program, all previous mothers' practices improved after dietary counseling program with highly statistical significant differences ($P < 0.000$).

Table (6): Cleared pre implementation of dietary counseling program, 47.5% of studied mothers had satisfactory practices; meanwhile 90.8% of them improved post dietary counseling program intervention.

Table (7): Revealed that highly statistically significant differences between of mothers' total score reported practice and total scores knowledge post-dietary counseling program

Table (8): Showed that highly statistically significant differences between Mothers' Total Score Knowledge and their socio-demographic characteristics, P value < 0.05

Table (9): Displayed that highly statistically significant differences between Mothers' Total Score Reported Practice and their socio-demographic characteristics, P value < 0.05

Table (1): Distribution of Mothers Socio-Demographic characteristics, (N=120)

Items	No.	%
Age		
- ≤ 30 : < 40	44	36.7
- ≥ 40 : < 50	58	48.3
- ≥ 50 -	18	15.0
Mean \pm SD	33.8 \pm 6.293	
Range	22-45	
Marital status		
- Married	88	73.3
- Divorced / Widowed	32	26.7
Reside		
- Rural	88	73.3
- Urban	32	26.7
Mothers occupation		
- housewife	36	30
- Employee	84	70
Family No.		
- < 4 persons	28	23.3
- 5-7 persons	88	73.3
- > 7 persons	4	3.3
Mothers relatives with their husbands	30	50.0
Family history	28	23.3

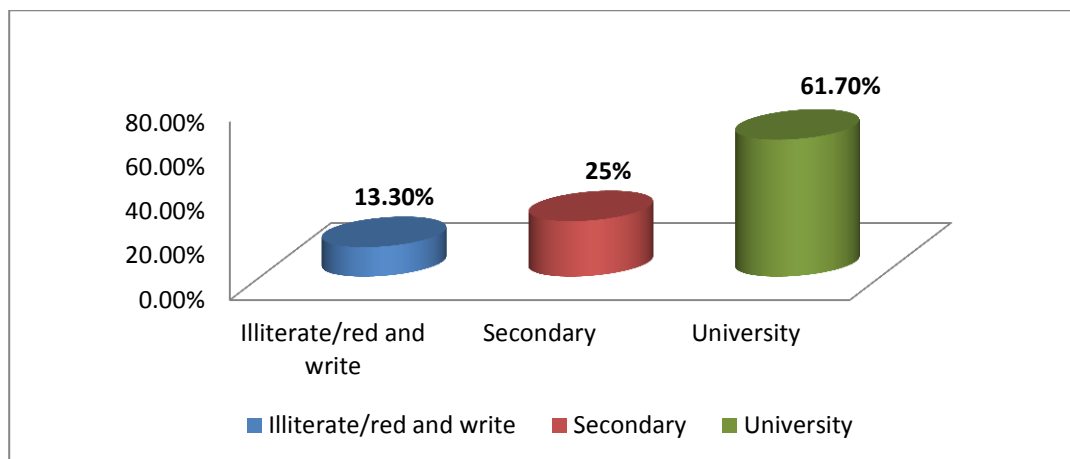


Figure (1): Distribution of the studied mothers according to level of education

Table (2): Distribution of Children Demographic Characteristics, (N=120)

Children' Characteristics	No.	%
Age in year		
- 3 : < 4	58	48.3
- ≥4 : 5	62	51.7
Mean ± SD	4.0833 ± 0.77115	
Range	2-3	
Gender		
- Male	80	66.7
- Female	40	33.3

Table (3): Frequency Distribution of Mothers' Knowledge regarding Dietary Counseling Program pre and post for Mothers of Children with Cerebral Palsy, (N=120)

Items	Mothers' knowledge				T-Test	P value
	Pre		Post			
	No.	%	No.	%		
Mothers' knowledge about cerebral palsy						
- Definition of cerebral palsy	42	35	104	86.7	10.15	0.000*
- Causes	40	33.3	97	80.8	9.50	0.000*
- Signs	43	35.8	88	73.3	7.88	0.000*
- Complication	37	30.8	86	71.7	7.867	0.000*
- Home Care	42	35	81	67.5	7.999	0.000*
- Follow up	35	29.2	92	76.7	4.740	0.000*
Mothers' knowledge about nutrition of cerebral palsy						
- Elements of food	66	55	89	74.2	8.510	0.000*
- Importance of food	42	35	102	85	7.786	0.000*
- Causes of mal nutrition	45	37.5	86	71.7	8.336	0.000*
- Methods of feeding	55	45.8	103	85.8	11.049	0.000*
- Equipment's used	36	30	92	76.7	9.347	0.000*
- Follow up to measure weight	40	33	78	65	6.831	0.000*
- Adherence to physiotherapy	45	37.5	77	64.2	6.176	0.000*
- Sources of protein	47	39.2	82	68.3	6.473	0.000*
- Sources of Carbohydrate	36	30	76	63.3	7.118	0.000*
- Sources of Iron	45	37.5	88	73.3	7.479	0.000*
- Sources of Calcium	51	42.5	88	73.3	7.955	0.000*
- Sources of Vitamins	44	36.7	86	71.7	7.527	0.000*
- Sources of Fats	44	36.7	90	75	7.984	0.000*

*Significant (P<0.05)

Table (4): Mothers' Total Score Knowledge regarding Dietary Counseling Program pre and post for their Children with Cerebral Palsy, (N=120)

Items	Total score knowledge				χ^2 test P - Value
	Pre		Post		
	No.	%	No.	%	
Poor: (< 50%) (0 :< 19)	60	50	0	0	664.270 0.0001*
Average (50- < 75 %) (19:< 29)	18	15	15	12.5	
Good (75 -100) (29: ≤ 38)	42	35	105	87	
Range (0-38) Mean ± SD	(25-30) 53.0702 ± 29.77748		(28-38) 89.3202 ± 11.68589		

*Significant (P<0.05)

Table (5): Frequency Distribution of Mothers' Reported Practices regarding Dietary Counseling Program for their Children with Cerebral Palsy, (N=120)

Items	Mothers' Reported Practices				T-Test	P value
	Pre		Post			
	No.	%	No.	%		
Hand washing						
- Not Done	47	39.2	18	15	0.408	0.000*
- Done incomplete	42	35	18	15		
- Done complete	31	25.8	84	70		
Introduce meal to their children						
- Not Done	51	42.5	25	20.8	0.491	0.000*
- Done incomplete	36	30	21	17.5		
- Done complete	33	27.5	74	61.7		
Prepare Soft Diet						
- Not Done	40	33.3	15	12.5	0.426	0.000*
- Done incomplete	43	35.8	20	16.7		
- Done complete	37	30.8	85	70.8		
Feeding their children						
- Not Done	40	33.3	18	15	0.497	0.000*
- Done incomplete	40	33.3	16	13.3		
- Done complete	40	33.3	86	71.7		
Mouth Care						
- Not Done	51	42.5	20	16.7	0.209	0.000*
- Done incomplete	69	57.5	32	26.7		
- Done complete	0	0	68	56.7		

*Significant (P<0.05)

Table (6): Mothers' Reported Total Score Practices regarding Dietary Counseling Program for their Children with Cerebral Palsy, (N=120)

Items	Total score mothers' reported practices				χ^2 test P - Value
	Pre		Post		
	No.	%	No.	%	
Inadequate (< 50%) (0 :< 5)	63	52.5	11	9.2	96.116
Adequate (50- 100 %) (>5:10)	57	47.5	109	90.8	0.030
Range (0-10) Mean ± SD	(0-5) 42.6667 ± 27.76653		(1-9) 75.0833 ± 20.29181		

*Significant (P<0.05)

Table (7): Correlation between Mothers' Total Score Practices and Total Score Knowledge through the Dietary Counseling Program (n=120)

Variables	Total score of Mothers' reported practices pre and post- program	
	Pre	Post
	r	r
Total knowledge scores	0.372	0.632
P - Value	0.003	0.0001*

*Significant (P<0.05)

Table (8): Relation between Mothers' Total Score Knowledge and their socio-demographic characteristics, (N=120)

Items	Total score knowledge					
	Pre			Post		
	Poor %	Average %	Good %	Poor %	Average %	Good %
Age						
- ≤30 : <40	18.3	7.5	10.8	0	3.3	33.3
- ≥ 40 : < 50	24.2	6.7	17.5	0	6.7	41.7
- ≥ 50 -	7.5	0.8	6.7	0	2.5	12.5
T-test	18.883			82.507		
P	0.000			0.000		
Marital status						
- Married	36.7	10	26.7	0	8.3	65
- Divorced / Widowed	13.3	5	8.3	0	4.2	22.5
T-test	19.057			82.481		
P	0.000			0.000		
Reside						
- Rural	36.7	5.8	27.5	0	9.2	64.2
- Urban	13.3	5.8	7.5	0	3.3	23.3
T-test	19.038			82.044		
P	0.000			0.000		
Level of education						
- Illiterate/red and write	13.3	0	0	0	0.8	12.5
- Secondary	25	0	0	0	8.3	16.7
- University	11.7	15	35	0	3.3	58.3
T-test	19.092			83.25		
P	0.000			0.000		
Mothers occupation						
- housewife	30	0	0	0	4.2	25.8
- Employee	20	15	35	0	8.3	61.7
T-test	19.314			82.891		
P	0.000			0.000		
Family No.						
- < 4 persons	11.7	5.8	5.8	0	3.3	20
- 5-7 persons	36.7	9.2	27.5	0	8.3	65
- > 7 persons	1.7	0	1.7	0	0.8	2.5
T-test	19.260			82.135		
P	0.000			0.000		
- Mothers relatives with their husbands	25	6.7	18.3	0	5.8	44.2
T-test	18.984			81.629		
P	0.000			0.000		
- Family history	11.7	4.2	7.5	0	2.5	20.8
T-test	18.881			81.764		
P	0.000			0.000		

*Significant (P<0.05)

Table (9): Relation between Mothers' Total Score Reported Practices and their socio-demographic characteristics, (N=120)

Items	Mothers' Total Score Reported Practice			
	Pre		Post	
	Adequate %	Inadequate %	Adequate %	Inadequate %
Age				
- ≤30 : <40	17.5	19.2	32.5	4.2
- ≥ 40 : < 50	21.7	26.7	45.8	2.5
- ≥ 50 -	8.3	6.7	12.5	2.5
T-test	16.152		39.453	
P	0.000		0.000	
Marital status				
- Married	34.2	39.2	66.7	6.7
- Divorced / Widowed	13.3	13.3	24.2	2.5
T-test	16.344		39.854	
P	0.000		0.000	
Reside				
- Rural	35	38.3	67.5	5.8
- Urban	12.5	14.2	23.3	3.3
T-test	16.330		39.879	
P	0.000		0.000	
Level of education				
- Illiterate/red and write	0	13.3	12.5	0.8
- Secondary	0.8	24.2	18.3	6.7
- University	46.7	15	60	1.7
T-test	16.316		39.811	
P	0.000		0.000	
Mothers occupation				
- housewife	0.8	29.2	25	5
- Employee	46.7	23.3	65.8	4.2
χ²	16.523		40.065	
P	0.000		0.000	
Family No.				
- < 4 persons	11.7	11.7	21.7	1.7
- 5-7 persons	34.2	39.2	65.8	7.5
- > 7 persons	1.7	1.7	3.3	0
T-test	16.519		40.035	
P	0.000		0.000	
Mothers relatives with their husbands				
	22.5	27.5	45.8	4.2
T-test	16.263		39.667	
P	0.000		0.000	
- Family history	11.7	11.7	19.2	4.2
T-test	16.142		39.735	
P	0.000		0.000	

*Significant (P<0.05)

Discussion

Cerebral palsy (CP) has been described as a group of disorders of the development of movement and posture that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of cerebral palsy are often accompanied by disturbances of sensation, cognition, communication, perception, behavior and/or a seizure disorder. Diseases specific the peripheral nerves of the spinal cord such as: spinal muscular atrophy, and myelomeningocele; or muscles (e.g. muscular dystrophies), although causing early motor abnormalities, it isn't considered cerebral palsy (**Bax et al., 2019**).

The nurses provide fetal role in provide dietary counseling for mothers had children with cerebral palsy to elevate mothers' awareness, which helps them implement the child's dietary needs and avoid several complications caused by malnutrition for children suffer from cerebral plasy (**Renee Warmbrodt, 2019**).

This study aimed to evaluate dietary counseling program for mothers of children with cerebral palsy through the following objectives: Assess mothers' knowledge and practices regarding to cerebral palsy; and appraise dietary counseling program for mothers

of children diagnosed with cerebral palsy.

Part (I):

Socio-demographic characteristics for mothers of children with cerebral palsy

Regarding the socio-demographic characteristics of mothers of children with cerebral palsy, it was observed that, the mean age of the studied mothers was 33.8 ± 6.293 years. This result was similar to the results of a study by **Renee Warmbrodt, (2019)**, who studied burden of caregivers having children with cerebral palsy in Egypt.

According to mothers' educational level, the current study finding displayed that, nearly more than half of mothers have university education, and more than two thirds were worker, while more than three quarter of them not working, these findings disagree with **Renee Warmbrodt, (2019)**, who studied "assesse knowledge about child nutrition with cerebral palsy" in England, reported that nearly the majority (90%) of caregivers were University education and 65% of studied sample workers.

Related to the mothers' residence, more than three quarters of them were from rural areas, these finding supported by **Yusuf, (2018)** who studied "Nutrition Interventions for children

with special health care needs" in Washington, cleared the most studied sample residence in rural areas

The present study revealed that, more than half of children with cerebral palsy were males. This finding is in agreement with **Renee Warmbrodt, (2019)**, mentioned that, cerebral palsy is more frequently seen in boys than girls. Moreover, the result of current study was in agreement with **El tallawy (2017)**, who studied "Epidemiology of cerebral palsy in El-Kharga District-New Valley in Egypt" reported that, the majority (92%) of children with cerebral palsy were males

The study finding showed the mean and standard deviation of children age was 4.0 ± 0.77 , this result was similar to the result reported by **Zuurmond et al., (2018)** who studied "Evaluating the impact of a community-based parent training programme for children with cerebral palsy in Ghana", reported that, the mean age of cerebral palsy children was 7.9 ± 5.1 .

Part (II):

Mothers' knowledge (pre and post) regarding to cerebral palsy

Regarding to mothers' knowledge about cerebral palsy, the present study mentioned an improvement in mothers knowledge about definition and causes, signs, complications, home care and follow up of cerebral palsy post

implementation of dietary program, these results agreement with **Garip et al., (2017)**, who studied "Fatigue in the mothers of children with cerebral palsy" in San Francisco city in in western California, revealed that, 82% of studied sample improved their knowledge after program with highly statistical significant differences. The present study also showed majority of mothers had knowledge about nutrition of cerebral palsy post the dietary counseling program with highly statistical significant differences, these finding agree with **Ohata et al., (2017)**, who studied "Impact of nutrition with children complain with cerebral palsy", in China, revealed that an improvement in the studied sample knowledge related important nutrition with children complain with cerebral palsy post program with highly statistical significant differences.

Regarding total score knowledge of mothers the current study displayed half of studied sample had poor total score knowledge level, while absent poor post the dietary counseling program, with highly statistically significant differences, these result compatible with **Donkor et al., (2018)** who studied "Improving nutritional status of children with Cerebral palsy: a qualitative study of caregiver experiences and community based training in Ghana" explained an improvement in the total score level of

studied sample knowledge post the program than before with highly statistically differences. From the researchers' opinion, it means that mothers didn't know about important of diet for reduction CP complications.

Part (III):

Mothers' reported practices regarding dietary counseling program for their children with cerebral palsy.

Concerning mothers' reported total score practices the current study showed that, less than half of mothers had adequate total score practices before programs reported by them, while majority of them had adequate practices post the dietary counseling program. These findings may be related to insufficient knowledge regarding dietary counseling program for their children with cerebral palsy

These previous results agree with **Samson-Fang and Bell, (2019)**, who carried out a study in Thailand, entitled "Identification of malnutrition in children with cerebral palsy: poor performance of weight-for height centiles" and reported that more than half (51%) of the patients had poor knowledge about the pathophysiology, mode of transmission, clinical manifestation, prognosis, and treatment.

In this respect, **Kuperminc et al., 2019**, who studied "Anthropometric measures: poor predictors of body fat in

children with moderate to severe cerebral palsy" revealed that the participants had improvement in their Total Score Practices regarding dietary counseling program for their Children with Cerebral Palsy

Regarding to correlation between total scores of knowledge and total score practices of the studied sample regarding dietary counseling program for their children with cerebral palsy, the present study showed that positive correlation were detected between total score knowledge and practices pre/post program and this result was corresponding with those of **Dhananjoy, (2018)**, who studied "Outcomes of Feeding Training to Mothers Having Child with Cerebral Palsy Admitted at A Tertiary Level Hospital in Bangladesh " who reported that if the total scores of knowledge improved, the total score practice going in the same direction of improvement. From the researchers' point of view, it means that mothers should be oriented by the dietary counseling program for their children with cerebral palsy to improve their practices to avoid malnutrition.

These previous results agree with **Vernon-Roberts et al., (2016)**, who carried out a study in Bangladesh, entitled "Gastrostomy feeding in cerebral palsy: enough and no more" and reported that more than three quarter of the mothers' had poor knowledge about the

gastrostomy feeding in cerebral palsy before the program while there knowledge improved after the program

The present study was corresponding with those of **Fung et al., (2017)**, who studied " Feeding dysfunction is associated with poor growth and health status in children with cerebral palsy" who reported that if the total scores of knowledge improved, the total score practice going in the same direction of improvement. From the researchers' point of view, it means that the studied sample should be oriented by important the nutrition for children with cerebral palsy to improve their practices to prevent malnutrition.

Concerning relation between mothers' total score knowledge and their socio-demographic characteristics, the present study cleared that less than half of mothers aged ≥ 40 : < 50 and two thirds of married mothers had good total score knowledge post of dietary counseling program for their children with cerebral palsy, also slightly less than two thirds of mothers reside in rural area, had good total score knowledge post of dietary counseling program for their children with cerebral palsy, with highly statistical significance differences.

These previous results agree with **Veugeliers et al., (2017)**, who carried out a study in Thailand, entitled "Prevalence and clinical presentation of constipation in children with severe generalized

cerebral palsy" and reported that two thirds (65%) of studied sample aged from 35: 45 had good total score knowledge post program, also **Cohen et al., (2017)**, who studied "Evidence-based review of bone strength in children and youth with cerebral palsy" and reported that less than two thirds (63%) of studied sample had adequate total score knowledge after dietary counseling program.

El-Sayed et al., (2014), who carried out a study in Egypt, entitled "Prevention of Hemolytic Crisis among G6PD Children: Effect of Educational Program Intervention", mentioned that 63.5% study sample live in the rural area had good total score knowledge post Educational program, with highly statistical significance differences, and **Cohen et al., (2017)**, showed that highly statistically significance between studied total score knowledge and their socio-demographic characteristics in all items.

Concerning relation between mothers' total score reported practice and their socio-demographic characteristics, the present study showed that highly statistical significance differences between all socio-demographic items and mothers' total score reported practice, this result agree with **Hosini et al., (2018)** who studied "Disease- based versus patient- based approach in epilepsy management from the patients" in Egypt, showed that statistical

significance differences in the relation between studied sample total score practice and their socio-demographic characteristics.

Conclusion

Based on results of the present study, the following conclusion can be reached after the application of the dietary counseling plan:

Mothers' knowledge and reported practices toward their children with cerebral palsy improved significantly post implementation of the dietary program.

Recommendations

In the light of the study findings, the following recommendations are suggested:

- Periodically dietary counseling program for mothers help to improve their practices for enhancement of dietary condition for their children with cerebral palsy and reduce the complications of cerebral palsy and malnutrition
- Emphasize the importance of establishing unit for public health awareness in hospitals outpatient to elevate mothers' knowledge and practices regarding cerebral palsy.

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