

## Effect of Educational Package for Mothers regarding Stunting among Children under Five Years

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### Abstract

**Background:** Stunting is the most noticeable physical symptom of long-term malnutrition. It is largely an irreversible result of poor nutrition and repeated infections in the first five years of a child's life. **Aim:** This study aimed to evaluate the effect of educational package for mothers regarding stunting among children under five years. **Design.** Quasi- experimental design was utilized. **Setting:** The study was conducted at Maternal and Child Health Center at Benha City in Egypt. **Sampling:** Simple random sample of 378 mothers were included. **Tools:** Two tools were used for data collection; tool I: An interviewing questionnaire consisted of four parts to assess mothers' socio-demographic characteristics, child personal data, mothers' knowledge about stunting and growth charts and maternal and child reported nutritional practices. Tool II; An Observational checklist to observe mothers' practices regarding measuring anthropometric measurements of children under five years. **Results:** The mean age of the studied mothers was 26.33±5.39 years. There were statistically significant improvements ( $P<0.05$ ) regarding to mothers' knowledge and practices post the educational package implementation. **Conclusion:** Educational package was effective in improving mothers' knowledge and practices regarding stunting. **Recommendations:** Maternal and Child Health Centers should plan and implement continuous workshops for mothers as an effective method for improving mothers' knowledge and practices regarding stunting among children under five years.

**Key words:** Children under Five, Educational Package, Mothers, Stunting.

### Introduction

Stunting is referred to as having a height that is more than two standard deviations below the median of the World Health Organization (WHO) child growth standard. When stunting affects more than 40% of children worldwide, it is deemed a serious public health issue. It is a largely irreversible outcome of inadequate nutrition and repeated bouts of infection during the first 1000 days of the child's life (Kahssay et al., 2020).

Stunting affects over 162 million children under the age of five worldwide. In communities where being short-statured is so common that it is regarded as normal, stunting frequently goes unnoticed. Recognizing the magnitude of this hidden disease takes longer than it should because it is difficult to detect stunted children and primary healthcare facilities do not routinely monitor linear growth (Garenne et al., 2019 & Faye et al., 2019).

Stunting is an indication of inability to reach ideal linear growth due to chronic or recurrent illnesses and/or inadequate nutrition. One of the main causes of illness and mortality in children under the age of five is stunting, which, is an indicator of enduring malnutrition, and a hallmark of poverty. Stunting is characterized globally by a Height-for-Age Z-score (HAZ) of less than -2 (Islam et al., 2018).

The distribution of the HAZ and the stunting rates in Egypt have significantly changed during the past 20 years. Children's height is standardized using the HAZ. If a child's HAZ is less than two standard deviations below the WHO median, they are considered stunted. The WHO median height for children is indicated by a HAZ of 0. The rate of stunting peaked in 1995 at 35.6%. The stunting rate dropped by almost half by 2003, reaching 16.7%. Unexpectedly, that drop did not last, and the stunting rate rose to 20.5% in 2014 (Herbst et al., 2019).

Low birth weight and size are significantly connected with mothers low Body Mass Index (BMI), which contributes to the fetus poor development and intrauterine growth retardation. The intergenerational transmission of stunting is sustained when pregnant women are underweight or anemic during pregnancy leading to more children who are stunted. Low birth weight babies are more likely to experience stunting (**Heslehurst et al., 2019**).

Practices of child feeding greatly affect a child's health. These practices comprise micronutrient consumption, solid and semi-solid feeding to breast-fed and non-breastfed children, and breastfeeding procedures. Poor growth and development of the child can be the result of negligence at any of these practices. The child's health and growth status might be negatively impacted by inadequate breastfeeding and not breastfeeding (**Roche et al., 2017**).

Anthropometric indices are created by combining variables such as weight, height (or length), sex, and age in the assessment of children's nutritional status. Currently, these are given as percentiles or z-score units (**DaSilva, 2020**). It is important to determine whether anthropometric measurements that deviate from the median value of the reference data are caused by dietary issues or genetic factors. However, the interpretation at the epidemiological level (population-based assessments) is based on the anticipated frequency of measurements in accordance with the statistical distribution in the data of the anthropometric standard (**Svefors et al., 2019**).

Long-term nutritional deficiency causes stunting, which frequently leads to delayed brain development, poor school achievement, decreased intellectual capacity, a weakening of the immune system, and short stature. (**Soliman et al., 2021**). Infections, such as pneumonia and diarrhea, but also sepsis, meningitis, tuberculosis, and hepatitis, are all associated with increased morbidity and mortality in children who are severely stunted, suggesting a systemic immunological dysfunction. (**De Vita et al., 2019**).

Community health nurse and pediatric nurse has a crucial role in prevention of stunting by providing nutrition education to mothers of children under five, which is one of UNICEF's recommendations to alleviate stunting problems and promoting all types of health services to the mothers and children, starting from taking care of the pregnant mothers to ensuring the immunization of the newborn. Community health

nurse and pediatric nurse organize regular sessions on pregnant mother and childcare, post-natal care, nutrition, food diversity and food safety, hygiene and sanitation, family planning and immunization (**World Health Organization (WHO), 2018; Permatasari et al., 2020**).

### Significance of the Study

Globally, 151 million under-five children were stunted; of which Africa and Asia account for 39.1% and 57.6%, respectively. Significant rate of stunting among Egyptian children; 29 % of children under 5 years of age were stunted and 14 % were severely stunted (the largest number of stunted children in the Middle East and North Africa (MENA) region). National incidence of Stunting is: Menya 26.2 %, Assiut 32.6% and Sohag 25.8% (**United Nations Children's Fund (UNICEF), 2019; Egyptian Demographic and Health Survey (EDHS), 2019**)

The first five years of a child's life are extremely important for their future growth, development, and health. Micronutrient deficits are, unfortunately common during this time. A major indicator of chronic undernutrition is stunting. The growth and health of the infant are intimately related to the health and well-being of the pregnant and lactating mother. During this period, the mother's and the child's nutrition can significantly affect the child's growth and development to lower the risk of disease. (**Soliman et al., 2021**). The nurse should focus a specific intervention or activity on a child's first 1000 days of life. So that this study aimed to evaluate the effect of educational package for mothers regarding stunting among children under five years.

### Aim of the study:

This study was carried out to evaluate the effect of educational package for mothers regarding stunting among children under five years through:

- Assessing mothers' knowledge regarding stunting and growth charts.
- Assessing mothers' practices regarding stunting.
- Designing and implementing the educational package for mothers regarding stunting among children under five years.
- Evaluating the effect of the educational package on mothers' knowledge and practices regarding stunting.

### Research hypothesis

The mothers' knowledge and practices regarding stunting will be improved after implementation of the educational package.

**Operational definition**

**Educational package** is referred to as a combination of educational materials, resources, and assessment tools that are developed to promote teaching and learning in a particular subject. It is known as a comprehensive toolset that aids educators in providing high-quality instruction and allows learners to obtain knowledge, develop skills, and achieve educational goals effectively.

**Subjects and method:****Research design:**

A Quasi- experimental design was utilized in this study (pre/post test/ one group).

**Setting:**

The study was conducted at Maternal and Child Health Center at Benha City in Egypt for mothers who were attending for child immunization. The researchers had chosen this setting because of the high flow rate of mothers and children. This setting serves many populations as it is composed of different medical specialties beside immunization. This setting consisted of two floors; the first one for immunization, breast feeding, and pregnancy follow up. The second floor is for lab investigation, dental clinic, and internal medicine clinic.

**Sample type:**

A simple random sample was used in this study.

**2.4 Sample size:**

The total number of mothers attending for child immunization during the year 2020 was 7200. The sample was calculated according to this formula (Yamene, 1967):

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

Where **n** is sample size = 378 mothers, **N** is the total number of mothers=7200 and **e** is coefficient factor=0.05. **Sample size**= 378 mothers have children < 5 years, and accept to participate and coordinate to achieve the study.

**Tools of Data Collection:** Two tools were used for data collection.

**Tool I: An interviewing questionnaire:** It was developed by the researchers, based on reviewing related literatures, and consisted of four parts to assess the following:

**Part I:** Mothers socio-demographic characteristics as age, educational level, marital status, occupation, residence, and income.

**Part II:** Child personal data as age, child ranking among siblings, gender, and number of children less than 5 years.

**Part III: A-** mothers knowledge about stunting, composed of thirteen items (multiple choice type) such as meaning of stunting, risk factors related to mothers, risk factors related to children, causes of stunting related to mothers, causes related to nutritional practices, causes related to health status, causes related to socioeconomic conditions, symptoms of stunting, effects, diagnosis, treatment, complications, and prevention of stunting.

**B-** Mothers knowledge about growth charts, which included five items (multiple choice type) covering areas such as meaning of growth measurement, aim of growth charts, importance of growth measurement, beginning of growth measurement.

**Scoring system:**

All responses received a knowledge score, which varied from "2" for a correct and complete answer to "1" for a correct incomplete answer to "0" for don't know. The overall score was divided into the following three levels: Good knowledge score is  $\geq 75\%$  ( $\geq 19$  score), average knowledge score is  $50 < 75\%$  ( $13 < 19$  score), and poor knowledge score is less than  $50\%$  ( $< 13$  score).

**Part IV: Reported nutritional practices:** It was adopted from (Ashwill et al., 2013) and modified by researchers to assess maternal and child reported nutritional practices. It included 28 items such as nutrition during pregnancy (5) items, nutrition during lactation (6) items, breastfeeding (9) items, complementary feeding of children (8) items. used pre and post implementing educational package.

**Scoring system:**

A score of "1" was given for each "done", and a score of "0" was given for "not done". The overall score was divided into the following two levels: Satisfactory practices level score  $\geq 60\%$  of total reported practices, while unsatisfactory practices level score is less than  $60\%$  of total reported practices score.

**Tool II:** An observational checklist adopted from (Fleming & Martin, 2018; DaSilva, 2020) and modified by researchers to observe mothers' practices regarding child anthropometric measurements, which included 31 items as infant weight (8 items), child

weight (8 items), infant length (8 items) and child height (7 items) used pre and post educational package.

**Scoring system:** Each done practice was assigned a score of „1“, and a score of „0“ was assigned for not done practice. The total score was categorized into two levels as follows: Unsatisfactory practice level < 60% of total practice score and Satisfactory level  $\geq$  60% of total practices score.

### Tools validity

A group of 5 experts, three in the field of community health nursing and two in the field of pediatric nursing revised the tools to ensure the validity of the content and to ensure their relevance, application, and accuracy.

### Tools reliability:

The tools involved homogenous items, as evidenced by the moderate to high reliability of each tool, according to the reliability test using Cronbach's Alpha coefficient (knowledge reliability was 0.761, and practices" reliability was 0.892)

### Ethical Considerations

Mothers were informed about the study's aim prior to data collection. They have a choice of rejecting or participating in the study. They were also told that the study would use the personal data they provided and that it would remain confidential. They also have the right to leave the study at any time.

### Pilot Study

37 mothers, who made up 10% of the sample, were included in the pilot study without being omitted from the total sample. The main goal is to evaluate the tools' objectivity and clarity, as well as to calculate the time needed to complete the data collection tools and identify problems that can hinder the data collection process.

### Field work:

After specifying the study objectives, the director of Maternal and Child Health Center and Undersecretary of the Ministry of Health gave their permission for the study conduction. Four main phases; assessment, planning, implementation, and evaluation were used to carry out the study. These phases took place over an 8-month period, from the beginning of March 2021 to the end of October 2021. The researchers visited the prior setting twice a week (on Sunday and Wednesday) from 9 a.m. to 1 p.m.

### Assessment phase:

Mothers were interviewed at the previous setting by researchers after taking their consent to participate in the study. The researchers obtained data regarding sociodemographic characteristics, knowledge of stunting and growth charts, and mothers' practices toward stunting. Data collected during this phase served as a basis for subsequent comparisons to assess the effectiveness of the educational package. Depending on the mothers' understanding, the interview questionnaire took an average of 20 to 30 minutes to be completed.

### Planning phase:

Based on the needs identified in the assessment phase from the mothers, and in view of the related literature, the educational package was designed by the researchers in the form of printed Arabic booklet to satisfy the mothers' deficit knowledge, and practices regarding stunting and according to the goal of the educational package. Colored posters and pictures about stunting were prepared. The general objective of the educational package was to improve mothers' knowledge and practices regarding stunting. Specific objectives: By completion of the educational package, each mother will be able to:

- (1) Define stunting.
- (2) List common risk factors and causes of stunting.
- (3) Enumerate symptoms and effects of stunting.
- (4) Identify diagnosis of stunting.
- (5) Demonstrate treatment of stunting
- (6) Discuss the complications of stunting.
- (7) Mention prevention of stunting.
- (8) Define growth measurement.
- (9) Mention the aim and benefits of growth measurement.
- (10) Identify when to begin growth measurement.
- (11) State the steps necessary for mother and child nutritional practices.
- (12) Demonstrate anthropometric measurements.

### Implementation phase

The educational package was implemented during this phase. According to the days of immunization, the researchers visited the specified setting twice a week. The educational package consisted of (7) planned sessions.

**First session:** The researchers provide explanations about stunting included meaning of stunting, risk factor, causes and symptoms.

**Second session:** included effects of stunting, diagnosis, treatment, importance of healthy nutrition and prevention.

**Third session:** Description was given to mothers about meaning of growth measurement, aim of growth charts, benefits and beginning of growth measurement.

**Fourth session:** mothers' nutritional practices during pregnancy and lactation were explained.

**Fifth session:** Practices of breast feeding, and complementary feeding were described for mothers.

**Sixth session:** demonstration of measuring infant and child weight was done.

**Seventh session:** measuring infant height and child length were demonstrated. Each group of mothers (8–10) received these sessions.

Each session lasted from 30 minutes to an hour and involved discussion periods based on mothers' accomplishments, progress, and feedback. An introduction to the educational package and its objectives was given at the start of the first session. Each session started with a brief review of the prior one. Discussion, demonstration, and re-demonstration, posters, and group discussions were the teaching methods used. On the first day of the educational package, an educational booklet was given to every mother. Additionally, during practical sessions about anthropometric measurements, real supplies such as scales, sliding board, and measuring tab were used.

#### Evaluation phase:

The educational package's efficacy was evaluated after its implementation using the same tools as the pretest. So, the study aim and hypothesis were accomplished.

#### Statistical analysis

The collected data were organized, tabulated, and statistically analyzed using the Statistical Package for Social Science (SPSS) version 21. Using descriptive statistics like frequency, percentages, averages, and standard deviation. Tests of significance include the Chi-square test ( $X^2$ ), which is used to measure significant of qualitative variables and correlation coefficient ( $r$ ) used for quantitative variables that were normally distributed or when one of the variables is qualitative. When the  $p$  value is less than 0.001, it is regarded as highly significant, and when it is less than 0.05, it is regarded as significant. When  $p > 0.05$ , no statistically significant difference was present.

#### Results:

**Table (1):** Demonstrates socio-demographic characteristics of the studied mothers. It was clear that 55% of studied mothers aged 20 < 30 years with mean age  $26.33 \pm 5.39$  years, 60.1% of them had university education, 74.9% were married, 59.3% were not working, 54.8% were from rural areas and 65.1% had adequate income.

**Table (2):** Shows that 50.3% of children aged from 1 to less than two years old with mean age  $1.90 \pm 0.69$ . Also 45% of the children were the first in ranking among siblings, 55% were males and 45% of families had two children less than 5 years.

**Table (3):** Clarifies that 62.2 % of studied mothers had poor level of total knowledge and Only 20.9% had good level of total knowledge regarding stunting pre- educational package. While 61.6% of the mothers had a good level of total knowledge and only 4.8% had poor level of total knowledge regarding stunting post educational package. There were a highly statistically significant differences were present ( $p < 0.001$ ) pre and post educational package in relation to mothers' knowledge about stunting and growth charts.

**Figure (1):** Portrays that 19.3% of the studied mothers had good total knowledge level pre-educational package, however post educational package implementation increased to 67.5%. Meanwhile 12.4% had an average total knowledge level pre-educational package compared by 26.7% post educational package implementation. Moreover, 68.3% of them had poor total knowledge level pre-educational package and post educational package reached to 5.8%.

**Table (4):** Declares that pre-educational package implementation 29.9%, 20.1% and 20.1% of studied mothers had satisfactory reported practices about complementary feeding of children, nutrition during pregnancy and breastfeeding respectively and post educational package implementation improved to 84.9%, 85.2 % and 89.9% respectively. Also, there were a highly statistically significant differences were present ( $p < 0.001$ ) pre and post educational package in relation to mothers' total reported nutritional practices.

**Table (5):** Declares that pre-educational package implementation (15.1% and 20.1%) of studied

mothers had satisfactory total practices about infant weight and child height respectively. Meanwhile post educational package implementation improved to 85.2% and 74.9% respectively. Also, there were a highly statistically significant differences were present ( $p < 0.001$ ) pre and post educational package in relation to mothers' total practices of child anthropometric measurements.

**Figure (2):** Clarifies that 20.1% of the studied mothers had satisfactory total practices level pre-educational package, however post educational package implementation increased to 78.6%. Moreover, 79.9% of them had unsatisfactory total practices level pre-educational package and post educational package decreased to 21.4%.

**Table (6):** Presents that there was a statistically significant correlation between studied mothers total knowledge level, and total practices level pre-educational package ( $P \leq 0.05$ ) and a highly statistically significant correlation between studied mothers total knowledge level, and total practices level regarding stunting post educational package implementation ( $p < 0.001$ ).

**Table (7):** Clarifies that there was a statistically significant relation between total mean of mothers' knowledge and educational level pre-educational package ( $P \leq 0.05$ ), meanwhile post educational package implementation a highly statistically significant relation between total mean of knowledge and sociodemographic characteristics was present ( $p < 0.001$ ).

**Table (8):** Clarifies that there were a highly statistically significant relation between total mean of mothers' practices and educational level, marital status, residence and income pre and post educational package implementation ( $p < 0.001$ ), moreover preprogram a statistically significant relation between total mean of mothers practices and age was present ( $P \leq 0.05$ ).

Table (1): Frequency distribution of studied mothers' regarding their socio-demographic characteristics (n=378).

socio-demographic characteristics	No	%
<b>Age</b>		
<20	75	19.8
20 < 30	208	55.0
30<40	95	25.1
<b>Min- Max 18-37</b>		
<b>Mean <math>\pm</math>SD 26.33<math>\pm</math>5.39</b>		
<b>Educational level</b>		
Basic	75	19.8
Secondary	76	20.1
University	227	60.1
<b>Marital status</b>		
Married	283	74.9
Widowed	19	5.0
Divorced	76	20.1
<b>Occupation</b>		
Working	154	40.7
Not working	224	59.3
<b>Residence</b>		
Rural	207	54.8
Urban	171	45.2
<b>Income</b>		
Inadequate	19	5.0
Adequate	246	65.1
adequate and save	113	29.9

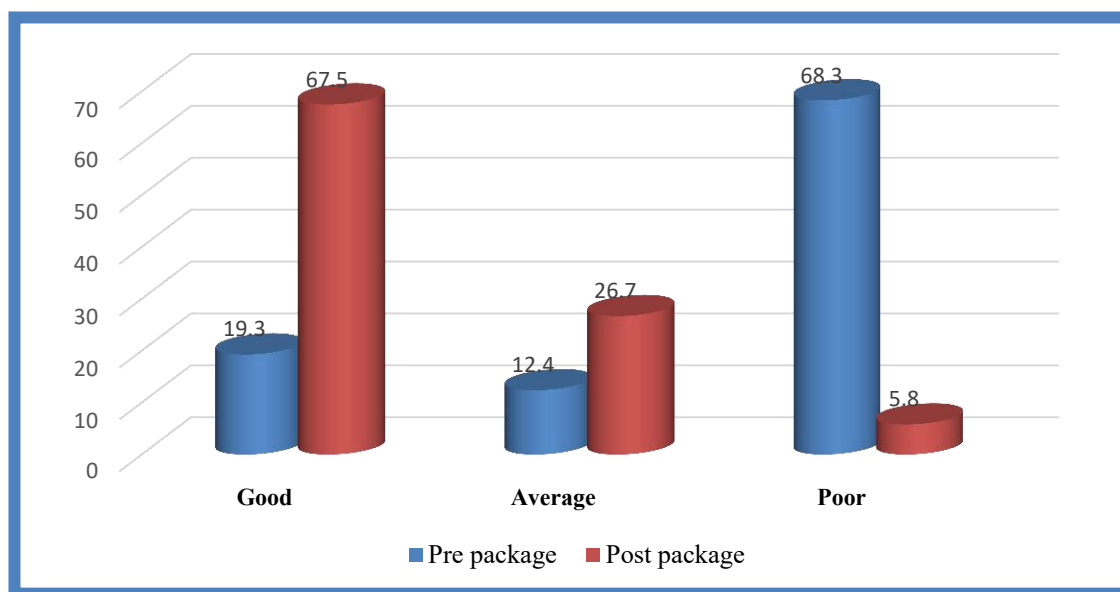
Table (2): Frequency distribution of studied children regarding their personal characteristics (n=378)

Personal data	No	%
<b>Age</b>		
<1	113	29.9
1 < 2	190	50.3
2 < 3	75	19.8
<b>Mean <math>\pm</math>SD 1.90<math>\pm</math>0.69</b>		
<b>Child ranking among siblings</b>		
First	170	45.0
Second	132	34.9
Third	76	20.1
<b>Gender</b>		
Male	208	55.0
Female	170	45.0
<b>Number of children less than 5 years in the family</b>		
One	170	45.0
Two	208	55.0

**Table (3): Frequency distribution of studied mothers regarding total knowledge about stunting and growth charts pre and post educational package (n=378)**

Mothers' knowledge	Pre educational package		Post educational package		X <sup>2</sup>	p-value
	No	%	No	%		
<b>knowledge about stunting</b>						
Good	79	20.9	233	61.6	282.91	0.000**
Average	64	16.9	127	33.6		
Poor	235	62.2	18	4.8		
<b>knowledge about growth charts</b>						
Good	26	6.9	267	70.6	415.46	0.000**
Average	74	19.6	88	23.3		
Poor	278	73.5	23	6.1		

\*\* Highly statistically significant difference p<0.001



**Figure (1): Percentage distribution of studied mothers regarding their total knowledge level about stunting pre and post educational package (n=378)**

**Table (4): Frequency distribution of studied mothers regarding total reported nutritional practices pre and post educational package (n=378)**

Items	Total reported nutritional practices								X <sup>2</sup>	p-value
	Pre educational package				Post educational package					
	Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory			
	No	%	No	%	No	%	No	%		
Nutrition during pregnancy	79	20.1	299	79.9	322	85.2	56	14.8	316.28	0.000**
Nutrition during lactation	75	19.8	303	80.2	284	75.1	94	24.9	231.70	0.000**
Breastfeeding	79	20.1	299	79.9	340	89.9	38	10.1	367.56	0.000**
Complementary feeding of children	113	29.9	265	70.1	321	84.9	57	15.1	234.04	0.000**

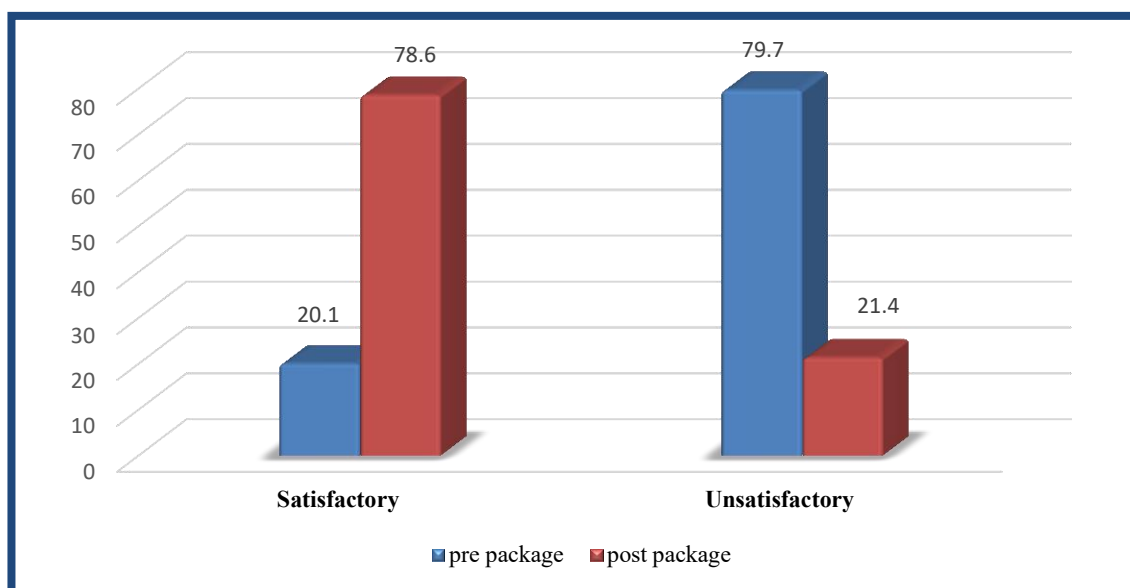
\*\* Highly statistically significant difference p<0.001



**Table (5): Frequency distribution of studied mothers regarding total practices of child anthropometric measurements pre and post educational package (n=378)**

Items	Total practices of child anthropometric measurements								X <sup>2</sup>	p-value
	Pre educational package				Post educational package					
	Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory			
	NO	%	NO	%	NO	%	NO	%		
Infant weight	57	15.1	321	84.9	322	85.2	56	14.8	371.65	0.000**
Child weight	38	10.1	340	89.9	256	70.1	113	29.9	275.32	0.000**
Infant length	56	14.8	322	85.2	245	64.8	133	35.2	197.18	0.000**
Child Hight	76	20.1	302	79.9	283	74.9	95	25.1	227.28	0.000**

\*\* Highly statistically significant difference p<0.001



**Figure (2): Percentage distribution of studied mothers regarding their total practices level about stunting pre and post educational package (n=378)**

**Table (6): Correlation between studied mothers total knowledge level, and total practices level regarding stunting pre and post educational package.**

Items	Total knowledge level			
	Pre educational package		Post educational package	
	r	p-value	r	p-value
Total practices level	.124	.016*	.581	.000**

\*Statistically significance P ≤ 0.05

\*\* Highly statistically significance p<0.001

**Table (7): Statistically relation between studied mothers total mean of knowledge and socio-demographic characteristics pre and post educational package.**

Socio-demographic characteristics	Total knowledge							
	Pre educational package		Test of significance	p-value	Post educational package		Test of significance	p-value
	Mean	±SD			Mean	±SD		
<b>Age</b>								
<20	6.9867	9.38874	F=1.433	.240	21.0400	6.12138	F=42.869	.000**
20 < 30	9.0913	9.68770			28.2212	6.28311		
30<40	9.1263	9.93515			28.7789	5.98967		
<b>Education al level</b>								
Basic	6.7632	10.87121	F=4.268	.015*	20.2800	5.91736	F=93.137	.000**
Secondary	7.0667	9.57662			24.5000	5.14717		
University	9.8590	9.18287			29.9515	5.63431		
<b>Marital status</b>								
Married	8.6325	9.75221	F=0.513	.599	25.9011	7.01448	F=15.080	.000**
Widow	6.8421	9.22113			27.9474	3.73383		
Divorced	9.3289	9.69589			30.5395	5.36020		
<b>Occupation</b>								
Working	8.9740	8.80949	t=0.498	.619	28.9545	6.15841	t=5.015	.000**
Not working	8.4821	10.28777			25.5491	6.93644		
<b>Residence</b>								
Rural	8.2512	9.88009	t=0.951-	.342	24.8647	7.03397	t=6.874	.000**
Urban	9.2047	9.48802			29.4444	5.65385		
<b>Income</b>								
Inadequate	8.5325	9.86919	F=0.499	.607	25.1667	6.92472	F=27.075	.000**
Adequate	8.6460	9.72930			30.1062	5.51032		
Adequate and save	10.8421	7.22083			31.0000	3.51188		

\*Statistically significance  $P \leq 0.05$

\*\* Highly statistically significance  $p < 0.001$

t: independent t test

F : ANOVA test

**Table (8): Statistically relation between studied mothers total mean of practices and their demographic characteristics pre and post educational package.**

Socio-demographic characteristics	Total Practices							
	Pre educational package		Test of significance	p-value	Post educational package		Test of significance	p-value
	Mean	±SD			Mean	±SD		
<b>Age</b>								
<20	11.1467	7.22924	F= 4.342	.014*	44.5867	4.49653	F=91.545	.000**
20 < 30	9.0433	8.98593			54.0673	6.11684		
30<40	11.6000	4.86717			52.4000	3.27921		
<b>Education al level</b>								
Basic	6.0000	4.77493	F=16.728	.000**	44.3333	4.37849	F=290.32	.000**
Secondary	9.3733	8.32900			47.2500	6.42106		
University	11.7181	8.03255			55.7357	2.55570		
<b>Marital status</b>								
Married	8.8622	8.65649	F=15.775	.000**	51.0177	7.04064	F=9.389	.000**
Widow	12.0000	.00000			56.0000	.00000		
Divorced	14.2500	2.29274			53.5000	2.71047		
<b>Occupation</b>								
Working	10.5909	7.44093	t=0.999	.318	54.0844	4.10635	t=6.752	.000**
not working	9.7679	8.14772			50.1741	7.11287		
<b>Residence</b>								
Rural	8.8116	7.62331	t=3.554	.000**	49.5556	7.16759	t=8.485	.000**
Urban	11.6667	7.89713			54.4444	3.78559		
<b>Income</b>								
Inadequate	8.8821	7.05361	15.216	.000**	49.1220	6.35300	89.777	.000**
Adequate	11.4336	9.15918			56.0000	.00000		
Adequate and save	18.0000	.00000			56.8142	1.95735		

\*Statistically significance  $P \leq 0.05$ \*\* Highly statistically significance  $p < 0.001$ 

t: independent t test

F : ANOVA test

## Discussion

Stunting in children is one of the most prevalent nutritional issues in the world and is a severe public health concern. It affects all aspects of a child's life, including their mental, social, and spiritual wellbeing in addition to their physical health **Metwally et al., (2020)**. Therefore, this study aimed to evaluate the effect of educational package for mothers about stunting among children under five years.

Concerning age of studied mothers the current study showed that more than half of studied mothers aged 20 < 30 years with Mean  $\pm$ SD 26.33 $\pm$ 5.39. This result was inconsistent with research by **Sari et al. (2021)**, who performed a study on mothers in Indonesia about the effects of early stunting detection education on mothers' awareness of stunting prevention. They showed that (65%) of the responders were in the 20 to 35 age range.

Regarding level of education, the present study denoted that nearly three fifths of studied mothers had university education. This finding disagreed with **Yunitasari (2020)**, who performed a study in Surabaya, Indonesia on mothers regarding prevention of stunting about effects of lecture, brainstorming and demonstration on mothers' knowledge, attitudes, and behavior and found that more than two fifths (42.9%) of mothers had middle education,

The present study revealed that more than half of studied mothers from rural areas. This result supported by **Rakotomanana et al., (2017)** in the study regarding stunting in children under 5 years in Madagascar who showed that the great majority (>81%) of the households lived in rural areas.

Concerning personal data of the studied children the present study showed that more

than half of children aged from 1 < 2 years old with mean age 1.90 $\pm$ 0.69. The researchers chose the age group under five years as this age group high risk for stunting. This supported by **Kofi (2018)**, in his study in Ghana about predictors of childhood stunting who revealed that children 24-35 months had higher odds of stunting. These results supported by **Rakotomanana et al., (2017)**, who revealed that the characteristics of the children in the two age groups (0–23 months and 24–59 months) were very similarly.

As regards mothers' knowledge regarding stunting pre/post educational package. The current study revealed that more than half of studied mothers had poor level of knowledge and only one fifth had good level of knowledge regarding stunting pre-educational package. While more than half of the mothers had a good level of knowledge and a minority of them had poor level of knowledge regarding stunting post educational package. This might be due to the positive effect of the educational package which upgraded the mothers' knowledge about stunting. These findings were in the same line with **Yunitasari, (2020)** and discovered that the level of knowledge of the respondents improved to a good level and there was a statistically significant difference regarding mothers knowledge level ( $p < 0.05$ ).

In relation to mothers' knowledge regarding growth chart it was observed that there were a highly statistically significant differences were present ( $p < 0.001$ ) pre and post educational package. This might be relevant to effective teaching of mothers that result in raising mothers' awareness to monitor growth of their children. This result was supported by **Herliani et al., (2018)** who stated that mother class training can improve knowledge of competency-based growth and

development monitoring. These results disagreed with **Nyavani et al., (2016)** Who conducted a study in Tzaneen Municipality, South Africa on care givers with their children under 5 years and concluded in his study that there was a need to improve educational content on growth monitoring for the caregivers.

Regarding the total level of mothers' knowledge, this study showed that nearly one fifth of the studied mothers had good total knowledge level pre-educational package, however post educational package increased to more than two thirds. This could be attributed to that the researchers were keen to identify mothers needs and gave them the opportunity to ask questions and used effective teaching methods during implementing educational package. This outcome was supported by **Sari (2021)**, who proved that providing education on early detection of stunting could significantly increase mothers' knowledge regarding the prevention of stunting in children.

As regard of mothers reported nutritional practices pre and post educational package, the existing study declared that pre-educational package implementation less than one third and one fifth of studied mothers had satisfactory reported practices about complementary feeding of children, nutrition during pregnancy and breastfeeding respectively, while post educational package implementation the majority of them had satisfactory reported practices respectively. Also, there were a highly statistically significant differences were present ( $p < 0.001$ ) pre and post educational package implementation in relation to mothers' total reported nutritional practices. In the researchers' opinion, this might be attributable to an efficient educational package that used simple Arabic language, visuals, and straightforward communication

strategies as well as the design of educational package materials based on mothers' needs. These results agreed with **Muluye et al., (2020)** who study effects of nutrition education on improving of complementary feeding of mothers with 6- to 23-month-old children in Hawassa town and found that nutrition education can increase knowledge and practice of complementary feeding for mothers with children aged 6 to 23 months.

These results were supported by **Setia et al., (2020)** who conducted a study in Indonesia to evaluate effect of family-based nutrition education on knowledge, attitude, behavior of pregnant women and mothers with toddlers in preventing stunting and illustrated that nutrition education affects maternal behavior by providing a balanced menu, increasing knowledge and attitudes, and providing a balanced menu for toddlers. This also agreed with **Effendy et al., (2020)** in their study regarding nutrition education in Southeast Sulawesi Province, Indonesia that demonstrated that mothers' capacity to select nourishing foods for their children and manage the limited resources to supply food depends on their knowledge. It has been shown that educating mothers on nutrition can help improve their children's poor eating practices.

According to the mothers' practices regarding child anthropometric measurements, there were a highly statistically significant differences were present ( $p < 0.001$ ) pre and post educational package in relation to mothers' total practices of child anthropometric measurements. This might be due to effective using of real supplies which motivate mothers to take growth measurements and increased mothers' awareness about growth monitoring of their children, all that reflected on improving mothers' practices regarding anthropometric measurements. These results

were in the same line with **Golshiri (2018)**, who found a significant difference in mothers' practice mean scores before and after educational intervention ( $P < 0.001$ ).

Concerning mothers' total practices level about stunting pre and post educational package implementation, this study clarified that one fifth of the studied mothers had satisfactory total practices level pre-educational package compared to more than three quarters post educational package implementation. Moreover, more than three quarters of them had unsatisfactory total practices level pre-educational package and post educational package decreased to one fifth. This could be relevant to the effect of educational package and also the fears of mothers about their children growth and development and their need to identify if their children were stunted or not and how to prevent their children from stunting. These findings were in accordance with **Zuraida et al., (2017)**, who evaluated the effect of MCH handbooks in the context of stunting prevention and reported that MCH books providing proper nutrition, children consuming various foods, training children to eat alone, and monitoring children's growth and development.

The present study showed that there was a statistically significant correlation between studied mothers total knowledge level, and total practices level pre-educational package implementation and a highly statistically significant correlation between studied mothers total knowledge level, and total practices level regarding stunting post educational package implementation. These findings indicated that the improvement in mothers' practices have been achieved due to an increase of level of maternal knowledge after implementation of educational package. This was in contrast with **Manzour (2019)**, who discovered that the knowledge and

practices score of mothers had improved. Also, **Berisha et al., (2017)** who assessed knowledge and practices of mothers in Kosova about complementary feeding for infant and reported that maternal knowledge on child feeding is positively correlated with the child feeding practices and improved nutritional status among young children,

As regard statistically relation between studied mothers total mean of knowledge and socio-demographic characteristics pre and post educational package, this result clarified that there was a statistically significant relation between total mean of mothers' knowledge and educational level pre-educational package ( $P \leq 0.05$ ). One reason could be that education increases awareness about dietary intake, adequate childcare, and use of healthcare facilities, as well as improved practice. It agreed with **Shourov & Sandberg (2018)**, who studied the impact of maternal education on childhood stunting in Bangladesh and observed that maternal education was one of the strongest determinants of childhood stunting besides other socioeconomic factors.

This study showed that post educational package a highly statistically significant relation between total mean of knowledge and socio demographic characteristics was present ( $p < 0.001$ ). The researchers' interpretation, that mothers age, education, income and residence influence mothers' knowledge and were strong factors in identifying childhood stunting. This was in line with **Shaban et al. (2017)**, who discovered a significant difference between the amount of knowledge of nutritional stunting and all mothers' characteristics ( $p = 0.001$ ) in their study prevalence of nutritional stunting and associated risk factors among under five children in Suhag Governorate.

The present study illustrated that there was a highly statistically significant relation between total mean of mothers' practices and educational level, marital status, residence and income pre and post educational package ( $p < 0.001$ ), moreover preprogram a statistically significant relation between total mean of mothers practices and age was present ( $P \leq 0.05$ ). This could be explained that mothers demographic characteristics especially age, education, residence and income influence mothers' health behavior toward their families and children. This finding was supported by **Sari et al (2021)**, who reported that the education level of the mothers may have an impact on the children nutrition and households. Malnourished children are typically the result of parents not paying enough attention to their children's nutrition, which in some cases was impacted by the mother's level of knowledge on nutrition.

This results also agreed with **Prendergast & Humphrey (2014)**, who has study regarding stunting syndrome in developing countries reported that income greatly affected the ability to choose the quality and quantity of food. As well as this result supported by **United Nations System (UNS) & Standing Committee on Nutrition (SCN) (2013)**, in the sixth report on the world nutrition situation. which reported that a family's low socioeconomic level may have an adverse effect on the children's growth, increasing the risk that the child would grow up thin and short.

### Conclusion

The educational package was effective in improving mothers' knowledge and practices regarding stunting. So, the aim and hypothesis of the research was accomplished.

### Recommendations

**In the light of the result of the present study, the following recommendations are suggested:**

- Maternal and Child Health Center should plan and implement continuous workshops for mothers as an effective method for improving mothers' knowledge and practices regarding stunting among children under five years.
- An educational booklet must be present in all MCH centers to be available for all pregnant women and mothers of children under five years.
- Further studies regarding factors leading to stunting should be carried out on a larger sample and in different settings.

### Limitations

Children crying and loud voices sometimes leads to repetition of session content several times resulting in increasing time of some sessions.

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