

Applying Health Education Learning Package for Mothers Regarding Nocturnal Enuresis

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Abstract Introduction: Nocturnal enuresis is a common distressing disorder that carries a significant burden. This disorder has psychological, social and financial implications for the families and their children. **Aim:** This study aimed to assess the effect of applying health education learning package (HELP) on mothers having children with nocturnal enuresis. **Method:** A quasi-experimental research design with repeated measures was utilized. A convenient sample of (88) mothers and their children (88) was recruited from the urinary incontinence out-patient clinic that affiliated to Mansoura University Children's Hospital (MUCH), Egypt. Seven structured tools were used for data collection. **Results:** There were statistically significant differences in mothers' knowledge, practices and attitude post-application of the HELP regarding nocturnal enuresis compared to pre-application ($P=0.000$). Additionally, the frequency of bedwetting and urination problems as polyurea and urinary tract infection among the affected children were decreased. **Conclusion:** Applying of health education learning package regarding nocturnal enuresis showed a significant improvement in mothers' knowledge, practices and attitude. As well, the associated clinical manifestations among the affected children were decreased post-application of the HELP. Overall, the studied mother found the HELP is useful and effective in solving problems of the mothers and children related to nocturnal enuresis.

Keywords: health education, learning package, mothers, nocturnal enuresis, nursing

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1. Introduction

Nocturnal enuresis (bedwetting or urinary incontinence during sleep) has a view of an iceberg as a public health problem which can lead to profound loss of self-esteem, self-perception and poor inter-personal relationship to the affected children. It occurs especially with low income, smaller age, family history of enuresis and history of urinary tract infection [1,2]. It is classified into primary enuresis (75%) when nocturnal urinary continence has not been achieved since birth, and secondary enuresis (25%) when bed-wetting occurs in a child with at least 6 months of nighttime dryness. Furthermore, it can be classified into non-monosymptomatic (accompanied by daytime urinary symptoms) and monosymptomatic (without daytime urinary symptoms) [3,4]. The etiology is not completely understood. However, multi-factorial indications have been responsible for it including genetic causes, disrupted anti-diuretic hormones secretion, impaired bladder function, sleep troubles, delays in the maturation of central nervous system, and psychological and behavioral problems [5].

Around 10% of 6-7 year-olds children suffers from enuresis worldwide [6]. In Egypt, there is no existing document regarding the real incidence of enuresis among children. Though, according to a study done by Rady, et al., [7] the prevalence of nocturnal enuresis in Egyptian children (6-12-year olds) was estimated to range between 10.4% and 15.7%. What is more, another Egyptian study showed that the prevalence rate was 14.5% with a higher frequency for boys than girls (16.5% versus 12.6% correspondingly) [8] while, primary enuresis has a prevalence of 11.5% and 3.2% for secondary enuresis [9].

Parents and families face considerable burdens associated with time, effort, and finance when dealing with their child's incontinence [10]. Hence, management of nocturnal enuresis should be designed around the needs of the children and the resources of the family. Moreover, it should involve actively both parents and children [8]. The mothers of enuretic children as the main caregivers for their children should have adequate knowledge and should be responsible for helping the child to learn the skill of being dry [11,12]. As well as, the child should be included in the treatment plan; this helps to increase the child's motivation to become dry and to cope with the stressors [13]. A strong supportive community-based

program can make the management less difficult for child and family [14] and was associated with lower levels of parental dysfunction, greater parental self-efficacy, less parental distress, and relationship conflict [11].

The package is one of the effective health educational interventions which are defined as a bundle of two or more interventions [15]. It improves care-related outcomes predominantly in low and middle-income countries. For that reason, health educator will be able to adopt a variety of teaching strategies that efficiently meet each individual learning needs and preferences [16]. However, the development of effective health education interventions for clients is considered a challenge for healthcare professionals [17].

Nurses as providers of primary healthcare play a major role in improving the knowledge, attitude, and practice of mothers regarding nocturnal enuresis. They have access to homes, community resources, and developed relationships with possible referral sources for instance schools and the families themselves [11]. As well, they are perfectly located to offer support and to push families to come forward to discuss the problem for achieving and maintaining an optimal level of functioning and reducing the complications [17].

There is little research addressing the effect of educational interventions targeted to the mothers in relation to nocturnal enuresis in Egypt. What's more, much of the available researches evaluating the effects of interventions are of poor quality. As a result, it is essential to identify mothers' knowledge, practices, and their attitude as well as to design and implement valid and effective educational interventions for helping the mothers to adhere to management plan according to the recommended treatment guidelines.

1.1. Aim

This study aimed to assess the effect of applying health education learning package on mothers having children with nocturnal enuresis.

1.2. Research Hypotheses

1. The application of health education learning package related to nocturnal enuresis will improve mothers' knowledge, practices, and attitude.
2. Frequency of associated clinical manifestations among the affected children will be decreased post-application of the HELP.

2. Subjects and Method

Research design: The study adopted the quasi-experimental research design with repeated measures.

Setting: This study was carried out at the urinary incontinence out-patient clinic that affiliated to the Mansoura University Children's Hospital (MUCH) from December 2017 to January 2019.

Subjects and sampling: This research design required sample size of (88) mothers and their children (88 children).

Inclusion criteria: Mothers aged 25-55 years and having (children diagnosed with non-organic nocturnal

enuresis and their age ranged 5-15 years). As well as, they are willing to participate in the study.

Exclusion criteria: Mothers having (children who had a co-morbid disease, neurologic or structural forms of incontinence and aged less than 5 years) or they are unwilling to participate in the study.

Sampling technique: A convenient sampling technique was used.

Data collection tools: Seven tools were designed and used in this study after reviewing the relevant preceding studies [9,18,19].

A. Preliminary Assessment of the Studied Mothers and their Children

1. Assessment of mothers' knowledge, reported practices and attitude regarding nocturnal enuresis

Tool (I): Socio-demographic assessment sheet. It was used to gather information as regards mothers' age, marital status, background education, occupation, residency, and monthly income.

Tool (II): Mothers' knowledge regarding nocturnal enuresis structured interview sheet. It was used to determine the mothers' knowledge related to nocturnal enuresis pre, post three months and post six months of HELP application. It was classified into seven categories covering (50) questions related to the definition of enuresis, types, risk factors, associated manifestations, diagnostic measures, complications, and management measures. One mark was awarded for each correct response. The total scores were computed for each item by adding the items scores (possible range 0–50 marks). The system for calculating the scores will be the frequency each answer was chosen and percentages. The mean score was also calculated. The knowledge score level was categorized into three categories: Poor= scores were <50% of total scores (0 - <25 marks), Fair= scores were 50% to 65% of total scores (25 - <32.5 marks), and Good= scores were >65% of total scores (>32.5 marks) according to the researchers' cutoff point.

Tool (III): Mothers' reported practices regarding nocturnal enuresis structured interview sheet. It was used to identify mothers' practices regarding nocturnal enuresis pre, post three months and post six months of HELP application. This interview sheet was classified into four categories; dietary intake and fluid restriction, reward systems, awakening program, and bladder training. All of these categories were composed of (15) questions. One mark was awarded for each item. The total scores were computed for each item by adding the items scores (possible range was 0–15 marks). The reported practices level was categorized into satisfactory level $\geq 65\%$ and unsatisfactory level <65% of the total score according to researchers' cutoff point.

Tool (IV): Mothers' attitude regarding nocturnal enuresis structured interview sheet. It was used to identify mothers' attitude regarding nocturnal enuresis pre, post three months and post six months of HELP application. The mothers were asked to spell out their level of agreement with given (26) statements by way of an ordinal scale (3-point Likert summative scale: strongly agree, neither agree nor disagree (neutral) and strongly disagree. A scoring system was used to measure the mothers' attitude; two marks were allocated to agree response, one mark was allocated to disagree response and

zero mark was allocated to neutral response. If the statements were negative, the scoring system was inverted in SPSS as two marks were given to disagree, zero mark was given to neutral, and one mark was given to agree.

2. Assessment of children' demographic data and health history

Tool (V): Children' demographic data and health assessment sheet. It included children' age, sex, academic class, and childbirth order. Moreover, relevant health history was included as urination history and problem, type of enuresis, frequency of bedwetting, daytime urination, and somatic and behavioral symptoms.

B. Health Education Learning Package Development

Based on preliminary data assessment of the mothers' knowledge, practices and attitude as well as the professional experts' evaluation, the researchers designed the HELP after reviewing the latest advances and recommended treatment guideline in caring of children with nocturnal enuresis.

C. Health Education Learning Package Evaluation

Tool (VI): Professional experts' evaluation related to the construction of HELP structured questionnaire: It was used to explore the professional experts' opinion in relation to the printed materials, teaching and learning strategies, quality of media, criteria of health educator, and physical criteria of the environment [20,21]. This checklist sheet was composed of 86 questions. Questions from 1 to 85 are likert scale ranged from 0 to 2 degrees and the question number 86 was open-ended question about any comments or suggestions from the experts.

Tool (VII): Mothers' feedback related to HELP structured interview sheet: It was used to illicit the mothers' feedback concerning HELP after its application. This interview sheet was classified into five categories covering (23 questions) as time (2 items), content and its presentation (6 items), training physical environment (3 items), training activities (2 items) and feedback (10 items).

2.1. Method

Official permission was obtained from the hospital manager to carry out the study after clearing up the aim of the study as well as gaining his assistance and support throughout data collection. The researchers arranged a meeting to have each mother informed about the aim of the study. Prior to enrolment, informed verbal consents were obtained from the mothers to join the study.

Diverse aspects of nocturnal enuresis using scientific published papers, internet search (scientific databases), and textbooks were carried out through a review of local and international literature. Development of the study tools was done after reviewing the allied literature. Face and content validity to identify the degree to which the tools measure what was supposed to measure were done by submitting the tools to a jury of five experts in "community health nursing, pediatric nursing, and statistics". Their suggested modifications had been done. Internal consistency was measured to identify the extent to which the items of the tools measure the same concepts and the extent to which the items are correlated with each other. Internal consistency estimated reliability by Cronbach's Alpha coefficient test was (0.85) and (0.78) for the knowledge

interview sheet and attitude scale correspondingly.

A pilot study was conducted on 10% of mothers (9 mothers) who had children with nocturnal enuresis. They were selected from the same setting to evaluate the clarity and applicability of the study tools, to compute approximately the time required for data collection, and to identify the obstacles or problems that may obstruct data collection, and possible actions to overcome them. In the light of the collected data; the needed modifications were done, some questions were supplemented and others were clarified or omitted.

The aim of the study was explained to the head of the department and to the mothers to gain their cooperation. Clarification to any point of the study was provided to the mothers if needed. The mothers (n=88) were face-to-face interviewed by using structured interview sheets for exploration of their knowledge, reported practices, and attitude in relation to nocturnal enuresis. In addition, the associated clinical manifestations among the affected children as bedwetting, and urination problem were assessed. Each interview consumed from 25-30 minutes to be finished, about 5-6 mothers were interviewed/day. For precision, after each day the sheets were checked for completeness by the researchers. The preliminary data collection covered a period of four months.

Drafts of the designed HELP was circulated to the group of experts (n=10) for revision to evaluate the content validity, applicability and format pre-application of HELP using structured questionnaire (tool VI) regarding health education topic and teaching methods as presented in (Table 1). Any specific instructions and comments from experts' evaluation were documented and considered in the formulation of the present package.

According to the preliminary data assessment of the mothers' knowledge, reported practices, attitude as well as professional experts' evaluation, the HELP was designed by following health education principles. The package delivered to the mothers was intended to improve their knowledge and practices thereby enhancing positive attitude toward nocturnal enuresis. As well as to help mothers dealing with difficulties and promoting the health and most favorable development of their children.

The package included a guide with health education message in the Arabic language which is the mother tongue of the study participants with colored pictures to boost the learning process concerning nocturnal enuresis. The guide was a simplified handout started with a brief introduction about nocturnal enuresis and their effects on children' health. Moreover, it aims at providing the mothers with adequate knowledge and skills that ensure control of nocturnal enuresis. The knowledge and skills were intended to be acquired by using different educational strategies and learning activities that encourage experience exchange. The content was written in shortlists and with a tone that encourages mothers to adhere with instructions. The content was arranged at three modules in nine messages. These messages were supported by pictures and focused on what the mothers need to know and do. Each message was explained in details. Words are consistent all over the guide with a single definition and with no use of unnecessary abbreviations. Description of the package message and their intended outcomes were presented in Box 1.

Table 1. Distribution of the professional experts' evaluation regarding the printed materials, educational strategies, and construction of the developed HELP before the application

Items	N =(10)	$\bar{X}\pm S.D$
General structure (topic, author and target group: 6 items = 12 marks)		
The topic of the educational package was important and significant	10	9.6 ± 0.31
Package developers were adequately mentioned	10	
Numbers and target group education are adequately described	9	
Work nature of the target group was adequately described	10	
Objectives (7 items = 14 marks)		
Objectives were SMART	8	13.5 ± 0.87
Objectives were written according to Bloom's Taxonomy	10	
Contents (8 items = 16 marks)		
The content was sufficient and updated to achieve the objectives	9	15.8 ± 0.85
The content was appropriate to the level of understanding	10	
The content was integrated into the local culture	9	
Literary presentation (13 items = 26 marks)		
The language was neutral and composed of simple words	10	24.9 ± 0.96
The language was explanatory and conversational	9	
Identification of headings and subheadings help in the learning process	10	
Ideas were concisely expressed	10	
Illustrations (10 items = 20 marks)		
Illustrations are simple and outlines were consequently presented	10	19.6 ± 0.94
Lists and tables were self-explanatory	9	
Legibility and printing characteristics (11 items = 22 marks)		
Size and style of the letters were suitable	10	21.6 ± 1.28
Spacing and length of the lines were suitable	10	
Using bold characters and bullet points that draw attention to key content	10	
Material was reader-friendly	10	
Educational strategies and quality of media (30 items = 60 marks)		
Objectives of the sessions were integrated	10	39.2 ± 1.57
Session' time was appropriate	10	
Teaching methods were appropriate to the number of audience /session	10	
Teaching methods facilitate experience exchange and discussion	10	
Teaching methods facilitate the delivery of material	10	
Different teaching methods were used	10	
Activities of session facilitate the participation of learners	10	
Objectives of each session were achieved by teaching and learning activities	10	
The used media was clear, attractive, facilitate information transformation, and was culturally appropriate	10	
The intended objectives of the package were achieved by the used media	9	
Construction of developed HELP		
Professional experts' opinion related to teaching strategies		
Group education	10	
Using audiovisual media, printed pictures, and discussion	10	
Using role play	4	
Professional experts' opinion related to educator criteria		
Have effective teaching skills	10	
Knowledgeable regarding nocturnal enuresis	10	

Box 1. Description of the designed health education learning package regarding nocturnal enuresis

Module	Message	Intended outcomes
I	<ul style="list-style-type: none"> • Definition of nocturnal enuresis • Types of nocturnal enuresis • Incidence and prevalence of nocturnal enuresis 	<ul style="list-style-type: none"> ▪ Define nocturnal enuresis. ▪ Differentiate between the organic and non-organic type of nocturnal enuresis. ▪ State incidence and prevalence of nocturnal enuresis.
II	<ul style="list-style-type: none"> • Risk factors of nocturnal enuresis • Complications of nocturnal enuresis 	<ul style="list-style-type: none"> ▪ Illustrate the risk factors that aggravate the frequency of nocturnal enuresis. ▪ List the complications of nocturnal enuresis.
III	Nocturnal management plan: Best practices to decrease the frequency of nocturnal enuresis through: <ul style="list-style-type: none"> - Dietary intake and fluid restriction - Reward systems - Awakening program - Bladder training 	<ul style="list-style-type: none"> ▪ Identify the pest practice regarding the management of nocturnal enuresis.

The designed HELP was applied to the mothers via four (30 to 45 minutes) face-to-face group sessions per month in the health education room at the selected hospital. Teaching and learning methods that stimulate and encourage recall, understanding, and retention of the relevant information were utilized as interactive lecture, discussion, brainstorming, poster, and role play. An open conversation and feedback were made among the researchers and the mothers for ensuring that they understood, answering any query and verifying information and practices. The total time for applying the package was two months for all mothers.

An assessment was done by comparing mothers' knowledge, reported practices, and attitude pre, post three months and post six months of HELP application by using (tool II, III, IV, and V). In addition, the frequency of associated manifestation as bedwetting, and urination problems among the affected children were assessed. The mothers' feedback toward HELP sessions was assessed once after completing the sessions using (tool VII).

2.2. Ethical Consideration

To consider the ethical issues, ethical approval was granted from the Research Ethics Committee of Faculty of Nursing, Mansoura University prior to initiating the study. After providing general information on the aim and process of the study, informed verbal consents were obtained from all mothers. The mothers were assured that their identities and responses to the interview would be confidential; they were under no obligation to complete the study. The mothers had the right to withdraw from the study at any time. The data were collected confidentially. Code numbers were created instead of names and were kept by the researchers to keep the mothers' anonymity.

2.3. Statistical Analysis

The collected data were analyzed by Statistical Product and Service Solution (SPSS version 25). Descriptive statistical methods were used including absolute frequency distribution as Arithmetic mean \pm standard deviation for continuous variables and percentages for categorical variables. Analytic statistics as Chi-square test and Monte Carlo test were used to compare between the groups. In order to compare the mean of scores pre and post-application, F (repeated measures-ANOVA) was used for normally distributed variables. The p-value ≤ 0.05 was considered as significant.

3. Results

The results of this study are divided into three parts:

A. Mothers' demographic characteristics, knowledge level, reported practices, and attitude toward nocturnal enuresis.

B. Children' demographic characteristics, and their enuresis health history.

C. Mothers' feedback toward the designed HELP.

Part A: Mothers' demographic characteristics, knowledge level, reported practices, and attitude toward

nocturnal enuresis pre, post three months and post six months of HELP application.

Table 2 displays that the mean age of the studied mothers was 34.1 ± 4.82 years, (45.5%) of them completed a secondary degree of education, (64.7%) were living in rural areas and (78.4%) were housewives.

Table 2. Distribution of the studied mothers' demographic characteristics

Mothers' demographic characteristics	N=88	%
Age/years	$\bar{X} \pm SD: 34.1 \pm 4.82$	
25 \leq 35 years	52	59.1
35 \leq 45 years	33	37.5
45 years & more	3	3.4
Educational level		
Illiterate	9	10.2
Read and write	22	25
Secondary	40	45.5
University	16	18.2
Post grade	1	1.1
Work status		
Workers	19	21.6
Housewives	69	78.4
Marital status		
Married	83	94
Divorced	5	5.7
Residence		
Rural	57	64.7
Urban	31	35.2
Family income		
Enough	25	28.4
Not enough	63	71.6

It was obvious from Table 3 that (96.6%) of the mothers showed poor total score of knowledge with a mean of (12.5 ± 5.95) marks related to nocturnal enuresis pre-application of HELP. However, post three months and post six months of HELP application (90.9% and 85.2%) of them showed good total score of knowledge with a mean of (41.4 ± 4.64) marks and (39.5 ± 7.30) marks respectively. Significant differences were observed between pre, post three months and post six months of HELP application ($F = 626.8, P \leq 0.05$).

Table 4 reveals that (95.5%) of the mothers showed an unsatisfactory level of reported practices related to dietary intake/fluid restriction, scheduled awakening program, reward systems, bladder training, and follow up of nocturnal enuresis pre-application of the package with a mean of (3.12 ± 2.35) marks. However, post-three months of application (95.5%) of them showed a satisfactory level of practices with a mean of (13.7 ± 1.29) marks compared to (97.7%) with a mean of (14.1 ± 1.16) marks post six months of HELP application. There were statistically significant differences between pre, post three months and post six months of HELP application ($F = 1123.8, P \leq 0.05$).

Table 3. Distribution of the studied mothers' level of knowledge regarding nocturnal enuresis pre, post three months and post six months of HELP application

Knowledge items	Test time N = (88)						Significance	P*
	Pre		Post three months		Post six months			
	N	%	N	%	N	%		
Definition and types of nocturnal enuresis (3 marks)								
Good	3	3.4	81	92	75	85.2	$\chi^2 = 178.7$	0.000
Poor	85	96.6	7	8	13	14.8		
$\bar{X} \pm SD$	0.26±0.51		2.5±0.70		2.36±0.84		F= 286.5	0.000
High-risk groups for nocturnal enuresis (4 marks)								
Good	6	6.8	77	87.5	70	79.5	$\chi^2 = 142.7$	0.000
Poor	82	93.2	11	12.5	18	20.5		
$\bar{X} \pm SD$	1.26±0.78		3.34±0.89		3.1±1		F= 141.5	0.000
Risk factors for nocturnal enuresis (10 marks)								
Good	1	1.1	83	94.3	76	86.4	MC	0.000
Fair	2	2.3	3	3.4	3	3.4		
Poor	85	96.6	2	2.3	9	10.2		
$\bar{X} \pm SD$	2.05±1.5		8.81±1.48		8.18±2.16		F= 402.7	0.000
Clinical manifestations of nocturnal enuresis (7 marks)								
Good	2	2.3	81	92.1	75	85.2	$\chi^2 = 209.7$	0.000
Fair	9	10.2	6	6.8	9	10.2		
Poor	77	87.5	1	1.1	4	4.5		
$\bar{X} \pm SD$	1.5±1.36		5.87±0.94		5.6±1.27		F=349.4	0.000
Diagnosis of nocturnal enuresis (4 marks)								
Good	7	8	71	80.7	67	76.1	$\chi^2 = 117.9$	0.000
Poor	81	92	17	19.3	21	23.9		
$\bar{X} \pm SD$	1.35±0.71		3±0.89		3±0.94		F=108.2	0.000
Complications of nocturnal enuresis (5 marks)								
Good	2	2.3	82	93.2	75	85.2	$\chi^2 = 201.3$	0.000
Fair	9	10.2	5	5.7	6	6.8		
Poor	77	87.5	1	1.1	7	8		
$\bar{X} \pm SD$	1.09±1.15		4.5±0.66		4.35±0.95		F= 369.6	0.000
Management of nocturnal enuresis (17 marks)								
Good	4	4.5	71	80.7	65	73.9	$\chi^2 = 174.9$	0.000
Fair	5	5.7	12	13.6	14	15.9		
Poor	79	89.8	5	5.7	9	10.2		
$\bar{X} \pm SD$	4.9±3.5		13.4±2.9		12.9±3.36		F= 184.6	0.000
Total knowledge level (50 marks)								
Good	0	0	80	90.9	75	85.2	MC	0.000
Fair	3	3.4	6	6.81	2	2.3		
Poor	85	96.6	2	2.3	11	12.5		
Total score $\bar{X} \pm S.D$	12.5±5.95		41.4±4.64		39.5±7.30		F=626.8	0.000

MC: Monte Carlo test: 2 cells have expected cell count <5. χ^2 : Chi-square test. F: (repeated measures-ANOVA), **Good**= >65% of the total scores. **Fair**= 50% to 65% of the total scores. **Poor**= <50% of the total scores, P: Significance. * Significant (p≤ 0.05).

Table 4. Distribution of the studied mothers' reported practices regarding nocturnal enuresis pre, post three months and post six months of HELP application

Reported practices' items	Test time N = (88)						Significance	P*
	Pre		Post three months		Post six months			
	N	%	N	%	N	%		
Dietary intake and fluid restriction (6 marks)								
Satisfactory	5	5.7	87	98.9	88	100	$\chi^2 = 237.7$	0.000
Unsatisfactory	83	94.3	1	1.1	0	0		
$\bar{X} \pm SD$	1.28±1.34		5.4±0.67		5.53±0.67		F= 517.3	0.000
Scheduled waking program (3 marks)								
Satisfactory	11	12.5	88	100	88	100	$\chi^2 = 217.4$	0.000
Unsatisfactory	77	87.5	0	0	0	0		
$\bar{X} \pm SD$	0.55±0.70		2.9±0.28		2.94±0.23		F= 164.6	0.000
Reward system (2 marks)								
Satisfactory	1	1.1	82	93.2	77	87.5	$\chi^2 = 196.1$	0.000
Unsatisfactory	87	98.9	6	6.8	11	12.5		
$\bar{X} \pm SD$	0.42±0.51		1.8±0.41		1.89±0.40		F= 62.1	0.000
Bladder training and follow up (4 marks)								
Satisfactory	5	5.7	83	94.3	83	94.3	$\chi^2 = 201.9$	0.000
Unsatisfactory	83	94.3	5	5.7	5	5.7		
$\bar{X} \pm SD$	0.81±0.86		3.5±0.86		3.73±0.79		F= 234.7	0.000
Total mothers' reported practices (15 marks)								
Satisfactory	4	4.5	84	95.5	86	97.7	$\chi^2 = 221.3$	0.000
Unsatisfactory	84	95.5	4	4.5	2	2.3		
Total score $\bar{X} \pm S.D$	3.12±2.35		13.7±1.29		14.1±1.16		F=1123.8	0.000

χ^2 : Chi-square test. F: (repeated measures-ANOVA), P: Significance. * Significant ($p \leq 0.05$),

Satisfactory practice = >65% of total scores **Unsatisfactory practice** =<65% of total scores

Table 5. Distribution of the studied mothers' attitude regarding nocturnal enuresis pre, post three months and post six months of HELP application

Attitude items	Test time N= (88)																	
	Pre						Post three months						Post six months					
	Agree		Neutral		Disagree		Agree		Neutral		Disagree		Agree		Neutral		Disagree	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Mother's positive attitude toward nocturnal enuresis*	17.9±2.26 marks						30.6±1.57 marks						26.3±1.1 marks					
Nocturnal enuresis does not cause anxiety and/or fear	23	26.1	13	14.8	52	59.1	74	84.1	0	0	14	15.9	80	90.9	0	0	8	9.1
Nocturnal enuresis can be resolved by time	3	3.4	18	20.5	67	76.1	83	94.3	2	2.3	3	3.4	80	90.9	1	1.1	7	8
As a mother, you have an optimistic and satisfied view toward enuresis	8	9.1	11	12.5	69	78.4	81	92	0	0	7	8	82	93.2	0	0	6	6.8
I am able to control disease by adhering to recommended interventions	3	3.4	14	15.9	71	80.7	83	94.3	2	2.3	3	3.4	82	93.2	0	0	6	6.8
Diagnosis of nocturnal enuresis should not be delayed	13	14.8	9	10.2	66	75	84	95.5	0	0	4	4.5	81	92	0	0	7	8
Consequences from disease is dangerous	36	40.9	52	59.1	0	0	86	97.7	0	0	2	2.3	77	87.5	0	0	11	12.5
Behavioral treatment is as more effective as medications	11	12.5	20	22.7	57	64.8	87	98.9	0	0	1	1.1	85	96.5	0	0	3	3.4
Periodic follow up is very important for enuresis control	34	38.6	6	6.8	48	54.5	86	97.7	0	0	2	2.3	85	96.6	0	0	3	3.4
Giving the child a reward feel him love	52	59.1	5	5.7	31	35.2	82	93.2	0	0	6	6.8	84	95.5	0	0	4	4.5
Toilet training is necessary for enuresis control	52	59.1	2	2.3	34	38.6	86	97.7	0	0	2	2.3	87	98.9	0	0	1	1.1
Teaching the child to clean his clothes and bed is so important	10	11.4	5	5.7	73	83	83	94.3	0	0	5	5.7	85	96.6	1	1.1	2	2.3
Child encouragement can be helpful to decrease his anxiety	24	27.3	4	4.5	60	68.2	87	98.9	0	0	1	1.1	84	95.5	0	0	4	4.5
My family give me support and needed help	18	20.5	12	13.6	58	65.9	50	56.8	4	4.5	34	38.6	76	86.4	0	0	12	13.6
No need to exhibit anger in front of my child	15	17	3	3.4	70	79.5	81	92	2	2.3	5	5.7	49	55.7	5	5.7	34	38.6
There is no negative effect on my family	13	14.8	10	11.4	65	73.9	82	93.2	0	0	6	6.8	74	84.1	1	1.1	13	14.8

Attitude items	Test time N= (88)																	
	Pre						Post three months						Post six months					
	Agree		Neutral		Disagree		Agree		Neutral		Disagree		Agree		Neutral		Disagree	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Mother's negative attitude toward nocturnal enuresis*	10.9±2.23 marks						18.7±1.21 marks						17.6±2.7 marks					
Nocturnal enuresis is a lifelong disease	59	67	22	25	7	8	4	4.5	3	3.4	81	92	23	26.1	3	3.4	62	70.5
Nocturnal enuresis is an embarrassing and shameful disease	34	38.6	34	38.6	20	22.7	5	5.7	0	0	83	94.3	32	36.4	3	3.4	53	60.2
Nocturnal enuresis cannot be cured and/or controlled	57	64.8	25	28.4	6	6.8	5	5.7	1	1.1	82	93.2	26	29.5	4	4.5	57	64.8
Herbal treatment is more effective than medications	30	34.1	31	35.2	27	30.7	6	6.8	0	0	82	93.2	22	25	12	13.6	12	13.6
In case of incontinence, my child deserve punishment	51	58	4	4.5	33	37.5	3	3.4	0	0	85	96.6	25	28.4	3	3.4	60	68.2
Toilet training limit my sleep	47	53.4	7	8	34	38.6	10	11.4	0	0	78	88.6	32	36.4	1	1.1	55	62.5
Nocturnal enuresis can prevent me from social activities and visits	55	62.5	6	6.8	27	30.7	19	21.6	1	1.1	68	77.3	30	34.1	4	4.5	54	61.4
It is better not to talk about my child enuresis with others	66	75	7	8	15	17	11	12.5	1	1.1	76	86.4	29	33	4	4.5	55	62.5
I feel shy from my child enuresis	41	46.6	8	9.1	39	44.3	14	15.9	3	3.4	71	80.7	26	29.5	6	6.8	56	63.6
I feel anger and hopeless regarding nocturnal enuresis	51	58	8	9.1	29	33	12	13.6	1	1.1	75	85.2	30	34.1	3	3.4	55	62.5
Total attitude $\bar{X}\pm S.D$	28.8±3.61						49.3±1.84						44±2.9					
	F= 1179.9												P= 0.000					

* More than one answers given.

The mothers' total positive attitude score regarding nocturnal enuresis was (17.9±2.26 marks) pre-application of HELP. However, post three months of HELP application it reached to (30.6±1.57 marks) compared to (26.3±1.1 marks) post six months of HELP application. Additionally, the total negative attitude score was (10.9±2.23 marks) pre-application of HELP. However, post three months of application it reached to (18.7±1.21 marks) compared to (17.6±2.7 marks) post six months of HELP application as displayed in Table 5.

Part B: Children' demographic characteristics, and their enuresis health history.

Table 6, clarifies that more than three quadrants of the children (76.1%) aged from 5 to less than 10 years and (56.8%) of them are boys. Moreover, (57.9%) of the children attained bladder control between 3 to less than 4 years, and (76.1%) of them suffered from primary nocturnal enuresis.

It was illustrated in Table 7 that (42.04%) of the studied children suffered from bedwetting every night pre-application of HELP. However, the frequency was decreased to (32.95% and 20.45%) post three months and post six months of HELP application correspondingly. With respect to urination problems, (53.41%) of the studied children suffered from polyurea pre-application of HELP. However, post three months and post six months of HELP application the frequency was decreased to (27.27% and 22.73%) respectively. Regarding urinary tract infection (UTI), (25%) of the studied children suffered from UTI pre-application of HELP. However, the frequency was decreased to (6.82% and 5.68%) post three months and post six months of HELP application

correspondingly. There were statistically significant differences between pre, post three months and post six months of HELP application regarding the previously mentioned items ($P \leq 0.05$).

Part C: Mothers' feedback about the designed HELP regarding nocturnal enuresis after its application.

Table 8 portrays the mothers' feedback in relation to the designed HELP after its application. All the mothers reported that the content and health educational message of the package were related to their real problems of enuresis and assisted them in solving the associated complications. In relation to the presentation and used media, they were attractive. The language was suitable for their level of understanding. With respect to the teaching activities, all mothers stated that using different activities assisted them to understand nocturnal enuresis. Regarding the retained health educational messages at the end of sessions, all mothers were able to mention the information given as well as the session time was suitable for all mothers.

Additionally, (86.4% and 86.7%) of mothers preferred conducting the sessions individually and by using audiovisual aids respectively. Regarding the educator, (93.2%) of the mothers preferred the educational teaching to be conducted by healthcare professionals. All mothers stated that the educator should have sufficient knowledge and teaching skills concerning nocturnal enuresis. On the other hand, there was a negative point concerning the HELP reported by (7.95%) of the mothers as some parts were difficult to be understood attributable to excessive information. The mothers recommended increasing the number of sessions that could overcome this negative point.

Table 6. Distribution of the studied children' demographic characteristics and types of enuresis

Children' demographic characteristics	N=(88)	%
Age/years	$\bar{X} \pm SD: 7.61 \pm 2.69$	
5 -< 10 years	67	76.1
10 -15 years	21	23.9
Sex		
Boys	50	56.8
Girls	38	43.2
Academic class		
Kinder garden	16	18.2
First - third class	51	57.9
Fourth - six class	18	20.5
Preparatory	3	3.4
Childbirth order		
First	33	37.5
Second	32	36.4
Third	21	23.9
Fourth	2	2.3
Time of toilet training		
2 years - 3 years	73	83
3 years - 4 years	15	17
Age of bladder control		
From 2 to less 3 years	18	20.5
From 3 to less than 4 years	51	57.9
4 years and more	19	21.6
Type of nocturnal enuresis		
Primary	67	76.1
Secondary	21	23.9

Table 7. Distribution of the studied children according to their clinical manifestations regarding nocturnal enuresis pre, post three months and post six months of HELP application

Clinical manifestations	Test time N = (88)						Significance	P*
	Pre		Post three months		Post six months			
	N	%	N	%	N	%		
Frequency of bedwetting								
Every night	37	42.04	29	32.95	18	20.45	MC	.002
More than once a week	25	28.41	19	21.59	11	12.50	MC	.006
Once a week	21	23.86	11	12.50	7	7.95	MC	.002
Once a month	3	3.41	1	1.14	0	0	$\chi^2 = 3.55$.169
Every two months or more	2	2.27	1	1.14	0	0	$\chi^2 = 2.02$.364
Urination problems								
Polyuria	47	53.41	24	27.27	20	22.73	MC	.000
Urgency	21	23.86	12	13.64	6	6.82	MC	.001
Dysuria	13	14.77	4	4.55	2	2.27	MC	.001
Change in urine color	7	7.95	2	2.27	0	0	$\chi^2 = 8.97$.011
Daytime urination								
Frequency of daytime urination	28	31.82	17	19.32	10	11.36	MC	.001
Accompanying symptoms								
Sleep disturbance	32	36.36	17	19.32	20	22.73	MC	.024
Urinary tract infection	22	25	6	6.82	5	5.68	MC	.000
Constipation	18	20.45	7	7.95	6	6.82	MC	.003

MC: Monte Carlo test: 2 cells have expected cell count <5 χ^2 :Chi-square test. P: Significance. * Significant (p≤0.05).

Table 8. Distribution of the mothers' feedback about the designed HELP regarding nocturnal enuresis after its application

Items	N= (88)	%
Positive points of the health education learning package		
The content and its presentation		
The content and message were related to the real problems of enuresis and assist the mothers in solving enuresis problems	88	100
The educational message added information to mothers about nocturnal enuresis, health effects and treatment regimen	88	100
Presentation and used media were attractive	88	100
The language was suitable for the mothers' level of understanding	88	100
Session time		
Session time and duration was suitable	12	80
Teaching physical environment		
Adequate lighting and ventilation	88	100
A suitable place for education	88	100
Using various teaching activities to learn the mothers how to help their children in:		
Adopting a healthy lifestyle and adhering to recommended treatment measure.	83	94.3
Retained health education messages at the end of sessions		
Definition, types, high-risk groups, etiology, manifestations, diagnosis, complications, management, and follow-up of nocturnal enuresis	80	90.9
Preferences related to the construction of nocturnal enuresis health education learning package		
Time of health education sessions		
Morning	65	73.8
Afternoon and evening	23	26.2
Mothers' preferences about teaching methods to be conducted		
Individually	76	86.4
With group	12	13.6
Mothers' preferences about media		
Printed pictures	5	13.3
Audiovisual	83	86.7
Preferred educator		
Healthcare professionals as nurses and physician	88	100
Educator criteria		
Have effective teaching skills	88	100
Have adequate knowledge and skills about nocturnal enuresis	88	100
Negative points of the health education learning package		
Some parts are difficult to be understood by the mothers due to excessive information	7	7.95
Healthcare professionals' recommendations to overcome negative points		
Increasing the number of sessions	6	6.8
Using more simple language	7	7.9

4. Discussion

Nocturnal enuresis in children aged five to sixteen years is seen worldwide in all cultures and across all socioeconomic strata [22]. The resulting distress of nocturnal enuresis to children and their parents shows the public health importance of this problem [23]. It can have a dramatic psychological and emotional impact on young children and strictly affect their quality of life [24]. What's more, it is a frustrating problem for parents since they are classically the one responsible for the clean up after an accident and are typically charged with finding a cure for the problem. As well, parents often treat enuresis

as a psychological problem. For that reason, parental perception can often cause psychological damage to children suffering from nocturnal enuresis, through punishment, shaming, and lack of support. Parental concern is often not high and as a result, most children are not treated at all [25].

The study aim was to assess the effect of applying health education learning package on mothers having children with nocturnal enuresis. The study main results provide evidence that the HELP is useful and effective in improving mothers' knowledge, practices, and attitude regarding nocturnal enuresis as well as decreasing the frequency of children' clinical manifestation. These results

are remarkably in harmony with the study done by McKillop, et al., [26] & Osman, et al., [18].

With regard to the studied mothers' socio-demographic characteristics, more than three quadrants of them were housewives, and less than two-thirds of them are living in a rural area. Also, few of them were divorced. These results go in line with Salem, et al., [19] who reported that about two-thirds of mothers were housewives, resides in a rural area, and the minority of them was divorced. In addition, El bahnasawy and Elnagar [2] who proved that a higher relative risk of enuresis in children was observed in a mother with relatively lower education. This is in accordance with the current study results.

Based on the results of the present study, the studied mothers showed a poor level of knowledge regarding nocturnal enuresis pre-application of HELP. This may be attributed to the unavailability of health information delivered to them by qualified healthcare professionals. These results point to the great need for health information in structured interventions related to nocturnal enuresis. However, post-application of HELP, there was a significant improvement in mothers' level of knowledge. What's more, the provided guide with health education messages targeted to mothers helped in the mothers' acquisition and retention of knowledge. These results are in agreement with studies [27,28,29] which indicated that the educational program had a positive effect on the knowledge of mothers regarding nocturnal enuresis.

Talking about the mothers' reported practices regarding nocturnal enuresis, there were statistically significant differences between pre, post three months and post six months of HELP application in an area related to dietary intake and fluid restriction, scheduled awakening program, reward system, bladder training, and follow up. These results may be owing to mothers' motivation to adhere to the recommended treatment guidance delivered to them through the message of the designed package and their desire to manage enuresis by behavioral intervention measures at home. These results are consistent with other studies by Senbanjo, et al., [30]; Schlomer, et al., [31]; Fagundes, et al., [32] and Caldwell, et al., [33] who stated that most parents treat their children by home behavioral therapy including limited fluids intake prior to sleep, reward child for dry nights, and regularly wake the children to use the restroom during night. In addition, these results come in parallel with studies done by Mohammed, [8] and Osman, et al., [18].

Bring to light; the studied mothers' attitude toward nocturnal enuresis was improved post-application of HELP. The researchers attribute this result to the observed knowledge gain and practices improvement. The health education message about nocturnal enuresis provided the mothers with the needed help, confidence and motivation to gain more and drier nights. This, in turn, affects their attitude in a positive way. A similar study was done by Fagundes, et al., [32] showed that one-third of the parents had an encouraging attitude toward children with nocturnal enuresis; expressed words of comfort, and praised their children for being dry. As well a study by Osman, et al., [18] supports the results of the current study. Conversely, these study results are not consistent with Senbanjo, et al., [30].

Our study describes the socio-demographic characteristics of the studied children as; slightly more than three quadrants of them aged 5 to 10 years, and suffered from primary type of nocturnal enuresis. Regarding their birth order, more than one-third of them were the first or second child. These results were congruent with Salem, et al., [19] who studied nocturnal enuresis among primary school children in Zarka district, Damietta governorate, Egypt, and reported that sixty-eight percent of primary school students between 6 to 12 years had primary nocturnal enuresis and more than half of them were first and second birth order. A similar study result was also reported by Elsayed, et al., [34].

In this current study, more than half of the studied children were boys. This result may be attributed to the culture of the Egyptian mothers who are over concerned in seeking medical treatment for boys more than in girls. On the same line, a study by Gunes, et al., [1] who found that nocturnal enuresis is more prevalent and prolonged in boys than in girls.

It was remarkable an obvious decrease in the frequency of clinical manifestations as bedwetting, polyurea, and urinary tract infection post-application of HELP. These results actually could be explained by the improvement in mothers' knowledge, practice, and attitude post-application of HELP, in turn, resulted in positive health conditions among the studied children. Furthermore, the success of the package in helping the mothers to adhere to the recommended treatment measures through the provided health education message. Also, the persistence of the researchers to follow up the mothers' practices and to provide them with needed motivation and support to manage their children with nocturnal enuresis. These points of view agreed with Osman, et al., [18] who mentioned that there was a negative correlation between mothers' knowledge, attitude, and practices with the frequency of bedwetting per night. As when the mothers had satisfactory scores of knowledge, their children experienced less bedwetting per week. In this regards, a study was done by Senbanjo, et al., [30] supports the results of this current study.

If the information is of individuals relevance and relates to what they find significant, the information may be better recalled [35]. This is in accordance with the results of this study as all mothers mentioned the health educational messages at the end of package sessions. Furthermore, in the present study, the mothers mentioned that the health educator should have teaching skills and sufficient knowledge and skills as regards nocturnal enuresis. These results are consistent with Welber and Feinberg, [36] and [37].

On a global view, this designed package which can be integrated into the local health care system was attached with a guide filled with valid, precise, and up-to date health education message to facilitate the adherence of mothers and children to the treatment plan of nocturnal enuresis. The package is effective for assuring knowledge gain and probably enhancing retention and enforces correct practices and positive attitude. This finding is confirmed by Friedman [21]. Mothers declared that they would recommend others to participate in the HELP teaching sessions.

5. Conclusion

Applying the health education learning package for mothers showed a significant improvement of mothers' knowledge, practices, and attitude regarding nocturnal enuresis. Besides, children's clinical manifestations were decreased post-application of HELP. Overall, the studied mother found the HELP is useful and effective in solving problems of the mothers and children related to nocturnal enuresis.

6. Recommendations

Support and promotion of the use of HELP in various healthcare settings to enhance families' awareness level regarding nocturnal enuresis. As well in-services training programs should be conducted for healthcare professionals especially the nurses to apply HELP in caring families and children with nocturnal enuresis. Moreover, provision of counseling and supportive care for parents and children by qualified healthcare professionals at specialized clinics through health campaigns and mass media should be emphasized. Further studies are needed for replication of the study on a larger probability sample to achieve more generalizable results.

6.1. Strength of the Study

The researchers favor repeated measures design because they permit the detection of within-person change over time and typically have higher statistical power than other designs.

6.2. Limitations of the study

Designing and applying the health education learning package consumed time. Also, data collection consumed more time because of the limited working days of the selected hospital (one day/week).

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