

Research article

Effect of Mothers Coping Strategy Intervention on Metabolic Control of their Children with Type 1 Diabetes Mellitus: Integrated Care Pathway

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Abstract

Little is known about the use of coping skills interventions for mothers and their children with type 1 diabetes (T1D). Nurses are challenges to plan and provide care to promote the best clinical outcome utilizing novel care methods as integrated care pathway (ICP). Aim of this study was to assess the effect of designing nursing coping skills program guided by integrated care pathway in acquiring mothers of type 1 diabetic children effective coping strategies to promote metabolic control of their children. Design A quasi-experimental research was used. Methods A study group of mothers acquiring coping skills training compared to health education control group with the same-aged of children with T1D, n =25 were managed in an integrated care pathway (ICP). Tools. Data were collected by using; biosocial and health history questionnaire, Way of Coping Scale, Diabetic Self Care Activities Questionnaire, and Diabetic Family Behavior Checklist, administered for both groups, Results Glycated hemoglobin HbA1c recording post intervention for three times, reached to be completely controlled (100%) for study group and by 60% for control group of health education intervention only. Recommendations, coping skills program should be held for mothers of diabetic children based on integrated care pathway to collaborate efforts of health care team. Further replication of this study are recommended in different hospitals to promote metabolic control of children with type 1 diabetes.

Key words: Children with T1D, Metabolic Control, Mothers' Coping Strategies, Integrated Care Pathway, Nursing Intervention

Introduction

Type 1 diabetes (T1D) is the most common severe chronic disorder of childhood, affecting 1 in every 400 individuals under the age of 20. It is caused by insulin deficiency resulting from the destruction of insulin-producing pancreatic beta cells (*Levitsky & Misra, 2014*). Little data is available on the epidemiology of diabetes in Egypt. As T1D is a lifelong situation that invades the lives of children and their parents and its prevalence is increasing throughout the world, the management of which imposes a huge responsibility on children and their parents, especially in young children (*Marshall et al., 2009 and Nieuwesteeg et al., 2011*). However, the positive relationship between children' self-management with parental involvement in management of T1D and adherence to medical treatment improve metabolic control (*Sheppard, 2010*).

As care of diabetic children is complex it requires care from a physician-coordinated team. Such teams include, but are not limited to, physicians, nurses' practitioners, dietitians, pharmacists, and mental health professionals with expertise in diabetes. In this collaborative and integrated team approach, the individuals with diabetes must also assume an active role in their care (*American Diabetes Association, 2014*).

The key to improved outcome for diabetic children management isn't depends only in glycemic control but also their quality of life. Glycated hemoglobin (HbA1c) is considered the 'gold standard for monitoring metabolic control in diabetes. An International Expert Committee recently recommended HbA1c as a better method than measurement of glucose in urine to use in the diagnosis of diabetes (*Lapolla et al., 2011*). Besides, the *American Diabetes Association (ADA, 2010)* recommended that to manage diabetes, the first step is having a skilled diabetes team in the coping area for clear and positive communication with both the family and professionals training in clinical pathway from the time of diagnosis.

Considerable attention has focused on the relationship between family functioning and adjustment to T1D as it relates to cooperative family efforts. Good family communication and problem-solving skills are related to better metabolic control in children (*Lewin et al., 2006*). Caring for children with diabetes has unique challenges that differentiate pediatric from adult care. These include the obvious differences in the size of the child, developmental issues such as the unpredictability of dietary intake, activity level, and medical issues such as the increased risk of hypoglycemia. Because of these considerations, the management of a child with type 1 diabetes must take into account the age and developmental maturity of the child (*Levitsky & Misra, 2014*). This can be achieved by daily self-monitoring of blood glucose (SMBG), multiple daily insulin injections, regular HbA1c measurements, and attention to

physical activity. Also, exercise is an essential component in blood glucose regulation for T1D mellitus, along with insulin management (*Robertson et al., 2009*).

The integrated care pathways evolved as a means to standardize care for particular medical diagnoses. These pathways are multidisciplinary plans of care and can incorporate the possible nursing diagnoses that are most commonly found with a particular medical condition. When used appropriately, these pathways can drive the nursing process and contribute to the nursing care plan. In addition, care pathways provide a blueprint for multiple disciplines to coordinate care and achieve desired outcomes within a specified time frame. They include four main components: a timeline, a treatment plan of interventions, outcome criteria (measurable long-and short-term goals, and a variance record to allow for deviations to be recorded and analyzed (*Kathy, 2013*).

The essentials of administering diabetes management programs are addressed, with information on developing and implementing care pathways, measuring and managing outcomes, monitoring and improving patient satisfaction. The study is targeting healthcare providers with information about diabetes and its management in a concise, practical, and pertinent manner. It is pretty basic and would be easily understood by nurses and diabetic nursing specialists (*American Association of Diabetes Educators, 2010*).

Nurses play a critical role in the education of diabetic patients and their family, this role is well-known all around the world (*Peimani et al., 2010*). However, nurses who are aware of the psychosocial challenges families face caring for a child with diabetes can play a seminal role educating, advocating, and intervening to help children and families "live well" with this chronic condition (*Kelo et al., 2013*).

Theoretical framework

Coping skills training (CST) is based on social cognitive theory, which proposes that mothers can actively influence many areas of their children's lives, particularly coping and health behaviors. A major premise of this approach is that practicing and rehearsing a new healthy behavior, such as learning how to cope successfully with a problem situation, and promote positive behaviors. The goal of CST is to increase competence and mastery by retraining non-constructive coping styles and behaviors into more constructive behaviors. There is evidence supporting the potential efficacy of CST to promote positive health outcomes with and without a chronic illness. In this model, coping has both physiologic (metabolic control) and psychosocial component (coping) (*Margaret et al., 2010*). The concept of a care pathway is one of the concepts from the field of Health Operations Management (Health OM), described as the analysis, design, planning and control of all the steps necessary to provide a service to a client (*Bastable, 2008*).

Operational definitions

Type 1 diabetes can occur at any age, but it is most often diagnosed in children, teens, or young adults. In this disease, the body makes little or no insulin. Daily injections of insulin are needed. The exact cause is unknown (*David, 2011*).

Coping is expending conscious effort to solve personal and interpersonal problems, and seeking to master, minimize or tolerate stress and conflict (*Weiten and Lloyd 2008*).

Integrated Care Pathway (ICP); A care pathway is "anticipated care placed in an appropriate time frame, written and agreed by a multidisciplinary team. As it is a map of the process involved in managing a common clinical condition or situation, it has locally agreed standards based on evidence where available to help a patient with a specific condition or diagnosis move progressively through the clinical experience. It should also challenge the effectiveness of the conventional scheme of care and thereby improve the quality of the care given (*BNSSG, 2012*).

Metabolic control; The *American Diabetic Association (2011)* recommendation that the level of HbA1c for children from birth to age 6 years is between 7.5 – 8.5% and for children ages 6–12 years is <8% and the average HbA1c levels for populations without diabetes are <6%.

Aim

The aim of this study was to assess the effect of designing nursing coping skills program guided by integrated care pathway in acquiring mothers of type 1 diabetic children effective coping strategies to promote metabolic control for their diabetic children.

Hypothesis

Mothers whose receive designated guided care pathway coping skills program will have children with more stable metabolic control than those who will not exposed to this program.

Subjects and Methods

Research Design:

The study utilized a quasi-experimental research design to carry out the current study.

Setting:

The current study was conducted in the Follow-up Clinic for diabetic children- Department of Pediatric at Benha University Hospital.

Sample:

Total purposive sample of 50 mothers and their newly diagnosed children with type 1 diabetes mellitus were selected from Follow-up clinic for diabetic children at previously mentioned setting, were divided into two groups. The first was a control group received education for management of diabetes only and the other (25 mothers) assessed as a study group “before and after receiving of the designed education intervention coping skills program based on ICP.

Inclusion criteria:

1. Mothers with newly diagnosed T1D less than one year.
2. Children are from both sexes without concentration on their ages.

Tools for Data Collection:

The data collected by using four tools:

Tool one:

Semi-structured interview schedule, was developed by the researchers after extensive reviewing of the related literature. It was written in simple Arabic language and composed of two parts.

Part (1):

Socio-demographic data about the participated mothers and their children, it involved (16) items related to mothers’ and child’s age, sex, education and occupation as well as health history including, time of diagnosis, type of treatment given, health history and presence of complications.

Part (2):

Mothers’ knowledge Interview questionnaire about T1D, it was included (22) items such as definition, causes, signs and symptoms, complications, insulin types, metabolic control, hypo and hyperglycemia, treatment, diabetic diet and exercises etc. The questionnaire contains multiple choices and true, false question. The total answers of the questions were classified into. Poor 50-60%, average 61-80% and good knowledge 81-100% based on average percentage of their responses.

Tool two:

Way of Coping Scale originated from *Folkman & Lazarus, (1985)* to study coping processes by 66 items covers a wide variety of cognitive and behavioral strategies that mothers report to be use to deal with either internal or external demands in stressful situations. The procedure produced eight scales, including two problem-focused and six emotional focused scales. The Scale was a 4-point Likert-scale response by 0 = never used, some what used= 1 used sometimes= 2 and used usually, =3. The total score of problem solving coping was evaluated according to the average score then classified into three categories for simple interpretation of the scale as never used = 18-35, sometimes used 36- 35, and usually used 45-68. Also, the emotional coping scale scored for never used = 23- 44, sometimes used 45-

67, and usually used 68-88. Cronbach's alpha coefficient for measurement of coping process ranged from 71-94 with the mean of .83

Tool Three

Diabetic Self Care Activities questionnaire, derived from *Toobert et al., (2000)*. The questionnaire is a multiple choice questionnaire asking about how much often the child sticks to daily activities during the past seven days as diet which include 5 multiple choice questions, exercise include 3 multiple choice questions, glucose testing, and compliance to medication includes 5 questions. Items were constructed to cover all domains of self-care (e.g., following recommendations about food, exercise, foot care, insulin administration, and self-monitoring of blood glucose [SMBG] as well as self-regulation of blood glucose, e.g., adjusting insulin or detecting and treating high and low levels of blood glucose). Responses classified into never done 1-40%, sometimes done 41—70% and usually done 71-100%. The total score is calculated by summation of all item scores and then transformed to a 0–100% scale

Tool Four

Diabetes Family Behavior Checklist (DFBC), used to measure of perceived family support for children and adolescents with type 1 diabetes (*McKelvey et al., 1993*). This 60-item scale has three subscales (warmth/caring, guidance/control, and problem solving) that are used to determine the mother's overall perception toward children support. The mothers chose one choice from five categories including never applicable, sometimes applicable at least once a day, or usually applicable several times a week. Analyses indicate stronger reliability that have been attributed to developmental differences for children Cronbach's alpha in the subcategories was ≥ 0.93 , and the test-retest showed an intra class correlation coefficient of 0.89.

Validity:

Data collection by using four tools was revised by a panel of three experts in the field of pediatric and psychiatric nursing to test its content validity. Modifications of the tools were done according to the panel judgment on clarity of sentences, appropriateness of content and sequence of items.

Data Collection Procedure:

Ethical approval was obtained from the relevant research ethical committee in the Faculty of Nursing, Menofia-University, to approve the study. All participants were informed about the study in order to obtain their acceptance to participate in the study; the researchers explained the benefits of the current study and inform them that all data gathered during the study considered confidential. The mothers informed about their rights to withdraw from the study at any time without any effect on their children received care. An official permission to conduct the current study was obtained from the directors of Follow-up clinic for previously mentioned setting.

Planning for the intervention

The designed nursing coping skills program was implemented based on integrated care pathway design. The expected outcomes from this intervention program were: to increase mothers' knowledge and improve their skills toward using of coping skills for child with type I diabetes mellitus depends on consultation from pediatric nurse, pediatrician, psychiatric nurse and dietitian.

Coping skills were guided by 3 researchers in the same session and divided into three parts to facilitate integration in skills given according to their specialties. The three researchers were involving in giving mothers skills about diabetes care, monitoring of hypo or hyperglycemia skills and giving insulin injection, in addition to food choices for diabetic child for both groups (study and control group). Then coping skills session was taken about 90 minutes conducted separately for study group. The researchers gave each mother of diabetic child Arabic illustrated brochure to review the instructions. The time spent for data collection took six months from July 2013 to December 2013 to be completed.

Methods

1-mothers of children with T1D were classified in two equal groups control or coping skills training ($n = 25$) group. Mothers of both groups completed biosocial and health history of diabetes interview, the interview conducted for all mothers and their children to fill the socio-demographic sheet on individual bases. The time spent to fill the tools ranged between (30 to 45) minutes for each mother. Way of Coping Questionnaire including problem solving skills, and emotional focused, Diabetic Family Behavior Checklist and Diabetic Self Care Activities at baseline and, post intervention for study group. Clinical data (i.e., HbA1c) were collected from children's medical records monthly for 3 times pre- and post intervention. Sessions of the program beginning to ask mothers about ways to try to deal with stress attributed to have a diabetic child, which indicate what they generally do and feel, when experience stressful events with their diabetic children.

2- Control group was receiving methods of diabetic metabolic control, health education regarding, diet, exercise, medication, etc.....

3- Study group treated as control group plus training session for coping skills in combination with the use of integrated care pathway (ICP) to be taken for children according to their developmental age chart. It supports the translation of clinical guidelines into local protocols and their subsequent application to clinical practice. The coping intervention was the implementation of ICP aimed at guiding mothers to management for a specified health problem, which were guidelines by

1. A structure multidisciplinary plan of care consultation from specialist mentioned previously.
2. Used to channel the translation of guidelines into charged staff of nurses.

3. The intervention detailed the steps in a course of treatment or care in a plan, with written guideline, protocol or other inventory of actions.
4. The intervention aimed to standardize coping skills (problem solving and emotional) integrated care with standard care (Rotter *et al.*, 2010).

The Coping Skills Training program first is an a problem solving focused, which teaches mothers problem solving skills such as seeking information from health profession, life style modification, and using complementary medicine. The participants review difficult situations, including managing food choices with children, decision making about whom and how giving injection, resolving independence/dependence with mothers about self care skills, and blood glucose testing. In addition to social problem solving, these skills are taught and rehearsed in small groups of mothers (5 mothers).

The skills are designed to increase the ability of mothers to cope with problems they face on a day-to-day basis (rather than just learning to manage the medical condition. Second is an emotional focused, this skill is designed to help mothers how to handle children peer pressure and teacher reaction to children disease by focusing on the process of how to solve a problems at school. It includes support seeking, acceptance of diagnosis, faith, prayer, relaxation and destruction from the problems they faced. 5. The program was supported by printed handouts including general information on diabetes, medications, nutrition, exercise, blood sugar control, special considerations (such as travel,, school;), and complications of diabetes.

Pilot study:

The pilot study was carried out on 5 mothers of diabetic child and their children at Follow-up clinic for diabetic children in Pediatric Department at Benha University Hospital to test the applicability and clarity of the questions of the study tool, estimate the time needed to complete the questionnaire, and to add or omit questions. Some modifications for the questions were done. That sample was excluded from the total of study sample. During pilot study, the researchers found that mothers of old diagnosed cases were more adapted with their children disease than those of newly diagnosed. In addition, mothers of newly diagnosed child take their assurance from mothers of previously diagnosed diabetic child. So, the researchers were directed the study for mothers of newly diagnosed diabetic child and at the same time involve mothers of old diagnosed diabetic child in the study sessions and gave them the study brochure.

Statistical Analysis:

The collected data were categorized, tabulated and analyzed using the computer program (SPSS Version 11). Numerical data were expressed as mean and standard deviation. Qualitative data were expressed as frequency and

percentage. Correlations were done and comparison of means was performed using paired-sample f-test. Level of significance was set at ($P < 0.05$).

Results

Table (1):- represented distribution of biosocial characteristics of the studied mothers, there were insignificant differences ($P > 0.05$) regarding to their mean age, education, working status, and sources of information for both study and control group while, there were a statistical difference for their number of children within their families and there family history. ($P < 0.05$).

Table (2): represent distribution of socio-demographic characteristics of diabetic children among study and control group. There were insignificant differences ($P > 0.05$) regarding to their mean age, gender, and birth order for study and control group, while there was a statistical significant difference ($P < 0.05$) regarding to disturbance in their metabolic control.

Figure (1): showed that the glucose level was disturbed by 84% among children in study group and by 60% for children in control group, when recorded before the intervention of (CSP) After program intervention it was recorded for three times and diminished to be completely controlled (100%) for children in study group.

Table (3): reflected that there were insignificant differences ($P > 0.05$) regarding to children's time of diabetes detection, presence of diabetes complications and types of treatment for both study and control group.

Table (4): showed that there were a statistical significant differences ($P < 0.05$) between mothers' knowledge, problem solving coping, emotional coping and diabetes self care activities, mean while, there was insignificant difference ($P > 0.05$) regarding to their family behavior toward diabetes for study group in pre and post intervention of (CSP).

Table (5): proved that there was a statistical significant difference ($P < 0.05$) between control and study group of mothers during pre and post program intervention in relation to their coping skills variables.

Table (6): revealed that there were a statistical significant difference ($P < 0.05$) for children metabolic control recorded more than 1-3 post (CSP) for mothers of study group to their mothers problem solving coping, and coping of family behavior. While, there were insignificant difference ($P > 0.05$) for the total mothers' knowledge, emotional coping and self care activities.

Table (7): showed correlations between final recorded metabolic control and different variables of coping, there were a positive correlation between children final metabolic control and different variables of coping for changes of family behavior, self care activities, emotional and problem solving coping at (0.001) level of highly significance, as well, there were a significance correlation at (0.05) between changes of life style and trying to give insulin.

Discussion

Coping skills program (CSP) along with integrated care pathways (ICP) and mothers' education were an ideal reference for clinicians in developing and implementing a management program for their diabetes children. Integrated care pathways expert in management plan strategies, use an easy to read educational handouts, collected from consulting professionals at leading health care facilities to help children and their mothers to cope with diabetes management and problems when needed (*New Zealand Guidelines Group, 2012*).

Results indicated that the mean age of mothers were 31.89 ± 5.21 and 32.34 ± 5.29 while for children were 10.40 ± 2.9 and 9.29 ± 2.9 for study and control groups respectively. This is reflected that the children were in their school age. The major development is that the child's thinking is becoming more orderly, more structured, and more logical. Therefore, the school-age child is more socially involved with age-mates than ever before. Acceptance by one's peers is of great importance to children in this age group, skills and abilities that they can be proud of and reflected this need for industry. This means that children establish a sense of self or self-concept based on their abilities. This self-concept is influenced by how easily they learn new skills. Children use feedback from important adults, teachers, peers and their own self-evaluation to judge new skills which facilitate their coping and training skills (*Kenneth & Andrea, 2003 and Kelo, 2013*). This is reflection on how often those children can accept the disease process according to their developmental age. Also, parents may need to adjust their level of involvement. So that, children can exercise developmentally-appropriate gains in autonomy, while continuing to rely upon parents for support, guidance, and encouragement. However, more than one third of mothers in study group were graduated from university which reflected that they were able to learn coping problem solving skills more easily and efficiently.

Health history of diabetes revealed an insignificance difference between control and study group regarding their knowledge about presence of complications or type of treatment. *Bolyai et al., (2010)* stated that immediately after diagnosis (regardless whether the child is hospitalized or treated as an outpatient, parents must quickly learn how to apply complex disease-related knowledge (understanding and managing hypoglycemia and hyperglycemia, etc and perform invasive technical skills (blood glucose monitoring and injections of insulin) to adequately manage their children's disorder. In addition, *American Diabetes Association, (2007)* emphasized the importance of ongoing education in prevention of and screening for diabetes complications.

In relation to mothers' coping, the current study revealed statistical significant differences between study and control group regarding their coping either in their problem solving skills or emotional (psychosocial skills) coping. *Katz, (2002)* noted that parents experiencing stressful events such as a child's diabetes tended to use more coping behaviors than parents experiencing less stressful events. So, diabetes healthcare team should assess the impact of

anxieties/concerns about diagnosis and the future with the mother of diabetic child and identify immediate support (family, friends) and provide additional support as necessary. Moreover, problem-solving is seen as an active coping strategy, which is more effective than such avoidant strategies as denial or refusing to talk about problems to solve diseases conflict between children and their mothers. However *Jodie et al., (2010)* supported this result in the study done about developing of an internet coping program for children with type 1 diabetes mellitus and mentioned that parents reported more change regarding flexibility in family roles than in educational group only. As well, children reported gains in life satisfaction from coping skills training. This is can be interpreted in the form of care pathway which introduced by researcher coordinator which is should be as a part from nursing profession.

The present study results indicated that there were statistical significant differences for mothers' coping skills group in their behavior and self care activities for their diabetic children. In the same line *Toobert et al., (2000)* mentioned that self-care is the key to the development of a child's independence and self-esteem. So, mothers must get her child involved in self-care as soon as he is able to master self-management tasks and is emotionally ready and at the same time, supervision by caregivers must continue. In addition, current HbA1c measurements should be made available as a part from self care skills in home and outpatient clinics because their availability can lead to immediate changes in insulin therapy and/or diet and so reduce the need for follow-up appointments. Moreover *American Diabetic Association, (2011)* stated that diabetes self-care requires the patient make many dietary and lifestyle modifications supplemented with the supportive role of healthcare staff for maintaining a higher level of self-confidence leading to a successful behavior change.

This study result may indicate that rigorous evaluation of the effectiveness of integrated care pathways and improved understanding of the reasons behind their success or failure, were necessary for developing and implementing more ICP with diabetic nurse specialist

Clearly, the current study findings indicated a positive correlation between final recorded child's metabolic control and different variables of coping skills. *Ananya, (2014)* stated that regulation of metabolic pathways includes regulation of an enzyme in their pathway by increasing or decreasing its response to signals. Diabetic control involves monitoring of the effects that these changes in an enzyme's activity have on the overall rate of the normal pathway. This is will done through effective training in self monitoring of glucose, exercise and changing life style behavior. In addition, self-monitoring provides information about current glycemic status, allowing for assessment of therapy and guiding adjustments in diet, exercise and medication in order to achieve optimal glycemic control. So, one of the most important jobs for mothers of a child with T1D is to supervise, encourage, and foster the independence of her child to successfully manage T1D and try to avoid being overprotective. However, the previous study done by *Nordwall et al., (2009)* about glycemic control remains crucial in prevention of late diabetic complications indicated poor metabolic

control among children to their changing physiology as well as to behavioral and adherence issues. So, children with type 1 diabetes should be offered an ongoing integrated package of care by a multidisciplinary pediatric diabetes care team. To optimize the effectiveness of care and reduce the risk of complications, the diabetes care team should include members with appropriate training in clinical, educational, dietetic, lifestyle, psychology and foot care aspects of diabetes.

Moreover, monthly recording of HbA1 for assessment of diabetic control revealed stability in glucose level after recording three times and diminished to be approximately completely control compared to more than half controlled for children with health education group only. *Deeb et al., (2005)* in his study about an Internet coping skills training program, reported that diabetes educational programs have small to medium beneficial effects on metabolic control and somewhat greater effect on psychological outcomes. We describe the current level of metabolic control in children regarding to revealing children to coordinating efforts for ICP plans, and training coping skills. Moreover, in the study done by *Tonella et al., (2010)* about metabolic control of type 1 diabetic patients it revealed that ICP information is easy to understand and relevant to patient teaching and staff to be followed, in providing and guiding the clinician to provide child's care and education. So, if school-aged children and their mothers learn effective coping skills, a positive transition may occur, to maintain effective diabetes management. Similarly *Margaret et al., (2010)* added that the flexibility in using coping strategies is important. Like active, problem-focused coping strategies help to change the situation that is causing the problem. While, emotion-focused coping strategies manage or reduce emotional distress, which may be helpful for the immediate crisis, but should be used in combination with more active strategies for complete diabetic problem resolution.

Conclusion:

Coping skills training program and integrated care pathway can help to improve glycemic control through collaborative involvement in coping efforts which considered as an important resource for eliminate negative emotions and enhancing problem solving skills for both mothers and their children with type 1 diabetes mellitus.

Recommendations:

Coping skills programs should be held for mothers of diabetic children based on integrated care pathway to collaborate efforts of health care team. Further replication of this study are recommended in different hospitals to promote metabolic control of children with type 1 diabetes.

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Results

Table (1): Frequency distribution of biosocial characteristics of studied mothers (n=50)

Variables	Study group (n=25)		Control group (n=25)		X ²	P- Value
	No.	%	No.	%		
Mothers' age:						
Mean± SD	31.89 ± 5.21		32.34 ± 5.29			
Education:						
▪ Read & write	3	12.0	1	4.0	2.06	.559
▪ Preparatory	2	8.0	4	16.0		
▪ Secondary	9	36.0	11	44.0		
▪ High education	11	44.0	9	36.0		
Working status:						
▪ Work	3	12.0	9	36.0	3.94	.047
▪ House wife	22	88.0	16	64.0		
Number of children in family:						
▪ One	8	32.0	1	4.0	10.55	.005
▪ Two	0	0.0	5	20.0		
▪ Three & more	17	68.0	19	76.0		
Family history:						
▪ Yes	17	68.0	17	68.0	9.720	.002
▪ No	8	32.0	8	32.0		
Sources of mothers' information:						
▪ Physician & nurses	11	44.0	12	48.0	1.16	.763
▪ Mothers in the same situation	3	12.0	2	8.0		
▪ Books & media	2	8.0	4	16.0		
▪ All of them	9	36.0	7	28.0		

Table (2): Frequency distribution of diabetic children according to their socio-demographic characteristics (n= 50)

Variables	Control group (n=25)		Study group (n=25)		X ²	P. Value
	no.	%	no.	%		
Age:						
Mean± SD	9.29 ± 2.9		10.40 ± 2.9			
Gender:						
▪ Male	20	80	15	60	2.38	.123
▪ Female	5	20	10	40		
Birth order						

▪ 1 st child	11	44	8	32	1.67	.433
▪ 2 nd child	5	20	9	36		
▪ 3 rd and more	9	36	8	32		
Control in glucose level /month:						
▪ 1-3 times	10	40.0	4	16.0	14.52	.000
▪ > 3 times	15	60.0	21	84.0		

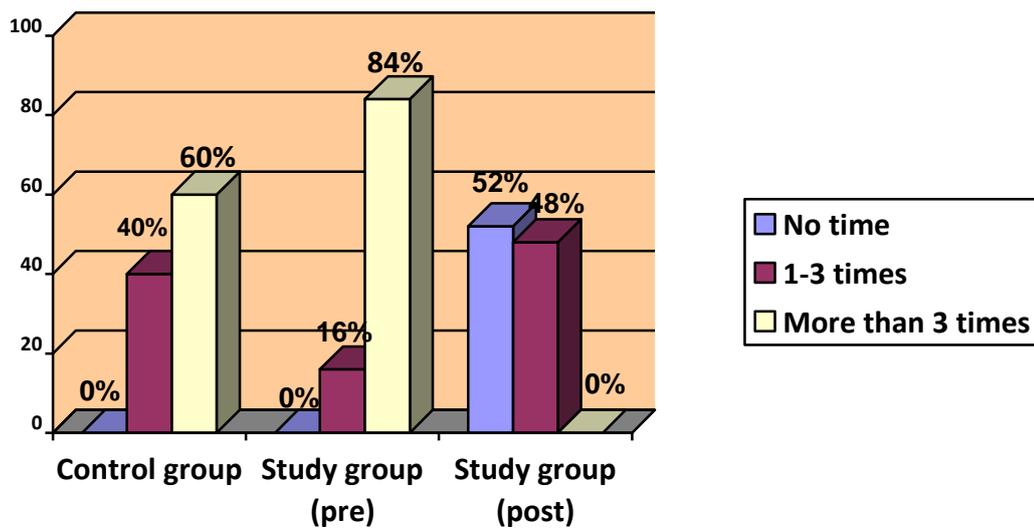


Fig. (1): Comparison between study and control group of children regarding to their metabolic control before and after intervention per month

Table (3): Comparison between study and control group of children regarding to their health history of diabetes

Health history of diabetes	Control group (n=25)		Study group (n=25)		X ²	P- Value
	no.	%	no.	%		
Time of diabetes detection:						
▪ Less than 6 months	17	68	14	56	.764	.382
▪ Since 6 months-one year	8	32	11	44		
Complications from DM:						
▪ Yes	17	68	14	56	.764	.382
▪ No	8	32	11	44		
If yes:						
▪ Hypoglycemia or hyperglycemia	17	68.0	21	84.0	4.63	.098
▪ Vision problems	8	32.0	4	16.0		
▪ Heart disease	0	0.0	0	0.0		
▪ Neurological disorders	0	0.0	0	0.0		
Type of treatment:						
▪ Long acting Insulin injection	17	68.0	19	76.0	7.27	.026
▪ Short acting Insulin injection	8	32.0	4	16.0		
▪ Both	0	0.0	2	8.0		

Table (4): Comparison between control and study group after implementation of coping skills and health education programs in relation to their knowledge, coping, diabetes self-care activities and family behavior toward diabetes

Items of coping	Control group (n=25)		Study pre-intervention (n=25)		Study post-intervention (n=25)		X ²	P-value
	No.	%	No.	%	No.	%		
Knowledge								
▪ Poor	9	36.0	9	36.0	0	0.0	4.76	.092
▪ Average	16	64.0	16	64.0	3	12.0		
▪ Good	0	0.0	0	0.0	22	88.0		
Problem solving Coping								
▪ Never	17	68.0	17	68.0	0	0.0	34.51	.000
▪ Sometimes	4	16.0	2	8.0	4	16.0		
▪ Usually	4	16.0	6	24.0	21	84.0		
Emotional Coping								
▪ Never	16	64.0	9	36.0	0	0.0	26.47	.000
▪ Sometimes	3	12.0	5	20.0	3	12.0		
▪ Usually	6	24.0	11	44.0	22	88.0		
Self-Care Activities								
▪ Never done	8	32.0	7	28.0	0	0.0	22.02	.000
▪ Sometimes done	8	32.0	7	28.0	1	4.0		
▪ Usually done	9	36.0	11	44.0	24	96.0		
Family Behavior								
▪ Never applicable	4	16.0	1	4.0	0	0.0	10.08	.039
▪ Sometimes applicable	6	24.0	9	36.0	3	12.0		
▪ Usually applicable	15	60.0	15	60.0	22	88.0		

Table (5): Comparison between the total mean scores of mothers' coping variables for study and control group pre and post program intervention

Coping variables	Control group	Study pre-intervention	Study post-intervention	F	p-value
	Mean ± SD	Mean ± SD	Mean ± SD		
Knowledge	21.16±8.33	19.84±8.74	28.20±7.91	7.27	.001
Focus on problem solving	18.56±14.52	19.96±15.13	51.80±14.37	40.97	.000
Emotional Focused	29.80±22.52	36.96±20.81	71.00±16.49	29.97	.000
Self-Care Activities	23.12±15.21	24.44±13.79	48.64±9.33	30.41	.000
Family Behavior Checklist	38.96±19.01	44.20±21.480	61.12±20.38	8.12	.001

Table (6): Relationship between mothers coping variables and child's metabolic control level/month recorded for one to three time and more than three times/ month

Coping Variable Metabolic control	Study pre-intervention Mean ± SD	Study post- intervention Mean ± SD	F Test	P. Value
Total knowledge-				
. No time			.232	.749
. 1-3 times	8.50±1.29	24.61±9.43		
. > 3 times	22.00±7.79	32.08±2.77		
Problem solving coping				
. No time		-	6.590	.002
. 1-3 times	13.75±2.06	43.07±14.59		
. More 3 times	21.14±16.28	61.25±5.61		
Emotional				
. No time		-	4.783	.011
. 1-3 times	20.75±2.75	64.15±19.97		
. More 3 times	40.04±21.36	78.41±6.54		
Self-Care Activities				
. No time			4.783	.011
. 1-3 times	46.50±4.79	45.53±11.22		
. More 3 times	20.23±10.44	52.00±5.37		
Family Behavior				
. No time		-	12.793	.000
. 1-3 times	71.25±4.99	60.00±22.06		
. More 3 times	39.04±19.38	62.33±19.29		

Table (7): Correlations between last times recorded metabolic control and different variables of coping

Coping Variables		Final metabolic control	Change life style	Try to give insulin injection	Total self care	Total family behavior	Total coping problem solving	Total emotional coping
Final Metabolic Control								
Final Metabolic Control	Pearson Correlation	1	.139	.102	-.646(**)	-.467(**)	-.390(**)	-.334(**)
	Sig. (2-tailed)		.508	.627	.000	.000	.001	.003
Change life style	Pearson Correlation	.139	1	.486(*)	.162	-.203	.104	.157
	Sig. (2-tailed)	.508		.014	.438	.330	.621	.454
Try to give insulin injection	Pearson Correlation	.102	.486(*)	1	.195	-.099	-.007	.073
	Sig. (2-tailed)	.627	.014		.351	.637	.973	.731
Total self care	Pearson Correlation	-.646(**)	.162	.195	1	.568(**)	.336(**)	.249(*)
	Sig. (2-tailed)	.000	.438	.351		.000	.003	.031
Total family behavior	Pearson Correlation	-.467(**)	-.203	-.099	.568(**)	1	-.026	-.094
	Sig. (2-tailed)	.000	.330	.637	.000		.826	.421
Total coping problem solving	Pearson Correlation	-.390(**)	.104	-.007	.336(**)	-.026	1	.912(**)
	Sig. (2-tailed)	.001	.621	.973	.003	.826		.000
Total emotional coping	Pearson Correlation	-.334(**)	.157	.073	.249(*)	-.094	.912(**)	1
	Sig. (2-tailed)	.003	.454	.731	.031	.421	.000	
Total		25	25	25	25	25	25	25

** Correlation is highly significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tail