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Effects of Massage Therapy and Muscle Relaxation on Glycosylated Hemoglobin in Diabetic Children.

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Abstract:

Introduction: From the time of recognition of diabetes mellitus to now, different management methods have been recommended. the major medical care are insulin together with diet and exercise. Despite this regular management, many complementary interventions had been used that could imply massage therapy and progressive muscle relaxation, both are the special nursing techniques.

The objective of this study is to determine the effects of massage therapy and progressive muscle relaxation therapy on the glycosylated hemoglobin level in diabetic children registered in Metabolism and Endocrinology Center of Isfahan University of Medical Sciences.

Material and methods: In a quasi experimental study 75 diabetic children participated in three groups (the massage group, the progressive muscle relaxation group and the control group). Glycosylated hemoglobin measured at the beginning of the study and also at the end of the study in all subjects. The groups were matched for gender and age. Other confounding factors such as educational level and job of the parents, insulin dosage and duration of diabetes were controlled during the process of data management.

Descriptive inferential statistic methods (mean, SD, paired T test and variance) were used for Data analysis by using SPSS package. P value < 0.05 was considered significant.

Results: Finding showed no significant difference for duration of diabetes. Also the average intake of insulin was not different between the groups. Massage therapy and progressive muscle relaxation were associated with significant decreases in HbA_1C compared with the control group.

The massage group demonstrated more decrease in HbA_1C level than the other.. In the intervention groups there was significant relationship between the decrease of HbA_1C level and the pre intervention HbA_1C level.

Discussions: Results showed that both techniques are effective to decrease blood glucose level in diabetic children. So these techniques could be recommended to diabetic children and their parents for optimal long term improvement in HbA_1C .Further research is necessary to determine the long term effects of these techniques.

Key Words: Diabetes Mellitus, Massage Therapy, Muscle Relaxation, HbA_1C.

Introduction:

Diabetes mellitus is the most common metabolic disease in childhood [1]. Approximately 5-10% of diabetic people suffer from type I diabetes mellitus [2]. The prevalence of anxiety disorders and stress events is higher in individuals with diabetes mellitus compare with the general population [3]. During the stress response activation of sympathetic nervous system could enhance cortisol release and insulin resistance [4]. As a result blood glucose will increase [5]. On the other hand stressful life events have been associated with poor self care in individuals with diabetes such as feeding, exercise and drug use, these could result in hyperglycemia or hypoglycemia (e.g. the patient injects insulin but refuses to eat) [6]. So, decreasing emotional stresses by appropriate intervention could normalize the blood glucose level and decrease the complications of diabetes subsequently [7].

Recently, in addition to usual management of diabetes mellitus such as insulin, diet, and exercise, alternative medicine are increasingly used world wide. Massage therapy and progressive muscle relaxation (PMR) are as special nursing techniques that recently are used in many chronic disorders.

PMR is a technique that every person is able to learn it and applied to relieve stress and anxiety. [8]. Surwit and et al found that muscle relaxation could decrease HbA1C [9]. Blood glucose lowering effect of Massage therapy in children with diabetes indicated in previous studies [10].

In Iran incidence of diabetes mellitus is high, and it is seemed that there is no evidence based study on alternative medicine for children with type 1 diabetes mellitus in our community. So this study conducted to examine and compare the effects of massage therapy and progressive muscle relaxation on Glycosylated Hemoglobin (HbA_1c) level in diabetic children.

Materials and Methods:

75 diabetic children were voluntarily recruited using simple convenient method to participate in a quasi experimental study.

Subjects were Included in the study if they have: age 7-15 years, to be no adopted child (having biologic parents), to be visited at 1-3 month interval at pediatric clinic of Endocrine and Metabolism Research Center affiliated to Isfahan University of Medial Sciences, to have no chronic disease other than diabetes mellitus, to take usual management (insulin, exercise and diet) for diabetes mellitus before and during the study.

They were excluded if having: any contraindication of massage therapy, mental retardation, blindness, deafness, ketoacidosis during previous month, newly diagnosed physical illness, major source of stress and intake of lowering blood glucose level medications except for insulin and not living with own parents.

During the intake session patients and/or their parents signed a consent form. A brief history was taken regarding length of illness, prior medical therapy of diabetes, history of recent hospitalization due to diabetes and its problems.

The patients' diabetes care providers were contacted for permission to participate their patients.

Subjects were randomly divided into three groups (the case group, the massage therapy group and the PMR group). All subjects in the massage therapy group and the PMR group had received usual diabetic care during the study.

The groups were matched for gender and age. The Other confounding factors such as educational level and job of the parents, insulin dosage and duration of diabetes were controlled during the process of data management.

In the massage group, the parents were truly educated technique of massage.

The parents were asked to do the procedure for their children for duration of 2 months. Hand and face, chest, abdomen, lower extremities and upper extremities were parts of the body that received massage 15 minute every night before the child goes to sleep.

In the PMR group children were taught to constrict every part of their extremity 2-10 minutes, and then relaxed them completely 8-10 minute.

An Audio tape was provided to the patients for a recommended once every night while supervised by their parents. This process continued during a period of 2 months before the child go to sleep. All subjects were followed by researchers via once a week telephone call.

A blood sample was drown for measurement of Hb A_1c, indicator of metabolic control for a previous 10-12 weeks, at the beginning of the study and another one at the end of the study .Reference range in our laboratory was 4-7%

Data were statistically analyzed by descriptive inferential methods (mean, SD, paired T test and variance) by SPSS package. P value < 0.05 was considered as significant.

Results:

The Findings revealed that the average age of subjects (n=75) was 10.5±2.3 years with the mean duration of diabetes 2.27±1.84 years. 49.3% of subjects were male and 50.7% of them were female. Finding should no significant differences for duration of diabetes, educational level of the mothers and of the fathers between the groups. Also the mean intake of insulin was not different between the groups.

Frequency distributions and the mean of HbA_1C level at the beginning of study had no significant differences in the three groups (table 1). The average HbA_1c level in the massage group decreased from pretest 10.14 ± 2.54 to posttest 9.96 ± 2.29 (p=0.026).

In the PMR group the average HbA1c level decreased from pretest 10.17±2.2 to posttest 10.13±2.1 (p=0.036).

In the control group the average level of HbA_1C was 10.24 ±2.56 at the beginning of the study and it was 10.34 ± 2.37after 2 months (p=0.46).

Table 2 illustrates how the HbA_1C levels in the three groups has been Changed during the study.

A significant difference was observed between the three groups for

changes in the HbA_1C levels (one-way ANOVA, F= 2.736, P=0.036). Duncan test showed that the difference is only between the control group and the massage group. Pearson correlation coefficient determined that in the massage group and the PMR group there is significant relationship between the decrease of HbA_1C level and the values of HbA_1C before intervention (r=0.428, P<0.001).

Table 1: Frequency distribution and the mean of HbA_1C in the three groups before intervention.

HbA_1C value	Control		Massage		Relaxation		Total	
	No.	%	No.	%	No.	%	No.	%
6-8.9	11	42.3	8	32	9	37.5	28	37.4
9-11.9	8	30.28	12	48	8	33.3	28	37.4
12-18	7	26.9	5	20	7	29.2	19	25.3
Mean	10.24 ±2.56		10.13±2.54		10.27±22		1021±2.41	
F= 0.21, P= 0.979								

Table 2: Frequency distribution of HbA_1C changes during study

	Control		Massage		Relaxation	
Changes of HbA_1C	No.	%	No.	%	No.	%
Increase	12	46.2	7	28	9	37.5
No change	1	3.8	1	4	0	0
Decrease	13	50	17	68	15	62.5
Mean±SD	0.96±0.66		0.23±0.516		0.154±0.325	
F= 2.736, P= 0.036						

Discussion:

HbA1c is an indicator for mean of blood glucose level and metabolic control during previous 10-12 weeks. Glucose binds to red blood cells during their life expectancy (120 days). In a patient with normal blood glucose level, 50% of HbA1c formed during last month, 25% during the month before last month and 25% during 2-4 month before 2 previous months (4-6 months before sampling) [11]. So, 75% of HbA1C forms during 2 previous months of measurement. Higher levels of recent blood glucose lead to higher level of HbA1c.

This study indicated that both techniques (massage and progressive muscle relaxation) could decrease blood glucose level in diabetic children. Study of Gerald W. Vest also had the same results [12].

Surwit and et al's study on the effects of stress management on metabolic control of type 2 diabetic patients found that muscle relaxation could decrease HbA_1C [9]. The present study supported Surwit and et al's study results. However there are differences between the designs of the two studies. Our protocol offered PMR in type 1 diabetes mellitus while their study offered it in type 2 diabetes mellitus. Feinglos and et al's study showed

relaxation therapy may not be as useful for enhancing blood glucose control in patients with type 1 diabetes mellitus as in those with type 1 diabetes [13].

According to study which carried on in Touch Research Center, massage therapy is more effective than progressive muscle relaxation therapy to decrease the blood glucose level [14]. The present study is in accordance with it. However we studied the HbA_1C.

In the present study changes of HbA1c levels was not different between the control group and the PMR group, while this difference was significant between the control group and the massage group, it may due to role of parents in PMR as observers, while in massage group they had active role to touch their children. This could be effective to decrease stress and anxiety in children.

On the other hand in massage therapy the role of child is passive while in the PMR child has an active role and must do the technique truly and with full attention.

There are a number of limitations to this study. The total number of weeks for active interventions was 10 weeks. The lack of long term follow up information limits our ability to predict ongoing effectiveness of the massage therapy and/or PMR therapy as adjunctive to diabetes regular management. The study is also limited by the relatively small sample size and the low minority representation.

In summary massage therapy and PMR therapy may be as useful adjunct to standard medical care of diabetic children. So these techniques could be recommended to diabetic children and their parents for optimal long term improvement in HbA_1c. However more prolonged studies are needed in our community.

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