

In the name of God



Department of Internal Medicine

Shiraz E-Medical Journal
Vol. 9, No. 1, January 2008

<http://semj.sums.ac.ir/vol9/jan2008/dm.htm>

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

Ghazavi Z*, Talakoob S*, Abdeyazdan Z**, Attari A^Ω, Joazi M[±].

* Instructor, ** Associate Professor, Nursing and Midwifery faculty, ^Ω Professor, Department of Psychiatry, Isfahan University of Medical Sciences, Isfahan, Iran, [±] Instructor, Azad University, Najafabad, Iran.

Correspondence: Dr. Z Abdeyazdan, Hezarjerib Ave, Pediatric Department. Nursing and Midwifery Faculty. Isfahan University of Medical Sciences. Isfahan. Iran, Tel: +98 (311) 792-2906, Fax: +98(311) 624-7080, Email: abdeyazdan@nm.mui.ac.ir.

Received for Publication: August 12, 2007, Accepted for Publication: November 26, 2007.

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 statistical 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 drawn 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 HbA_{1c} 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 HbA₁C 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 deter-

mined that in the massage group and the PMR group there is significant relationship between the decrease of HbA₁C level and the values of HbA₁C before intervention ($r=0.428$, $P<0.001$).

Table 1: Frequency distribution and the mean of HbA₁C in the three groups before intervention.

HbA ₁ C 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 HbA₁C changes during study

Changes of HbA ₁ C	Control		Massage		Relaxation	
	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 HbA₁C ⁽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 HbA_{1c} 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 improve-

ment in HbA_{1c}. However more prolonged studies are needed in our community.

Acknowledgment:

We are grateful to the Research vice chancellor of Isfahan University of Medical Sciences for their financial support, and to the head of Endocrine and Metabolism Research Center, also all the children and their parents who participated in the study.

References:

- 1- Field T, Touch therapy. London: Churchill Livingstone 2000: 171.
- 2- Decoster VA. Challenges of type 1 diabetes and role of health care social workers. Health-care social work.2004:26.
- 3- Behrman RE, Kliegman RM, Jenson J .Nelson Text book of Pediatrics. W B Saunders.16th edition, USA, 2000:1780.
- 4- Chrousos GP, Gold PW. A healthy body in a healthy mind and vice versa: the damaging power of uncontrollable stress. J Clin Endocrinol Metab.1998,83:1842-1845.
- 5- Lioyed C E, Dyer Ph, Lancashire RJ, Harris T, et al. Association between stress and glycaemic control in adults with type 1 diabetes .Diabetes care. Alexandria. 1999. 2,8: 1278.
- 6- Lewis, Heitkemper, Dirksen, Medical – Surgical Nursing, 6th edition, Mosby, USA:1285.
- 7- Bauman A. Chill out to fight diabetes. Prevention, Chicago. 2002: 44.
- 8- Borkove C T D, Russcio A M. psychotherapy for generalized anxiety disorder/Discussion. J Clinical Psychiatry.2001:621.
- 9- Surwit SR. Stress management improves long-term glycaemic control in type 2 diabetes. Diabetes care 2002,25:30-34.
- 10- Field T, Massage therapy lowers blood glucose level in children with diabetes mellitus . Diabetes spectrum.1997.1: 237-239.

11- kilpaterick ES. Glycated haemoglobin in year 2000. J of clinical pathology. 2000: 335-337.

12- Vest WG, Massage Magazine: Research, available from:
<http://www.massagemag.com/researchoo/R86.htm>

13- Feinglos MN, Hastedt P, Surwit RS. Effects of relaxation therapy on patients with type 1 diabetes mellitus. Diabetes care 1987.10(1): 72-5.

14- Mitzel A. Massage therapy as a nursing Practice. Holistic Nursing Practice, 2000:48-56.