

## PRIMARY APPLICATION OF CONJUNCTIVE GROUP THERAPY IN ADULT TYPE 1 DIABETES MELLITUS PATIENTS

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*Key words: type 1 diabetes mellitus, group therapy, Conjunctive Group Therapy, psychological adjustment, self-care, stress, quality of life, social cycle, diabetes redefinition, metabolic control*

### SUMMARY

*The present qualitative study included 32 adult type 1 diabetes mellitus patients attending 2-year Conjunctive Group Psychotherapy in addition to medical treatment at Greek state hospitals. Qualitative data were collected from focused interviews and HbA<sub>1c</sub>% measures before and after the intervention, in relation to psychological adjustment, self-care and everyday life, stress, quality of life, family and friends, redefinition of the disease, mood and metabolic control. Thematic analysis of the interviews was performed using grounded theory methodology. Findings showed that after the group intervention there was an increase in the number of patients having achieved better adjustment to their disease according to patient interviews, were engaged in self-care behaviors, managed stress, improved their mood, and*

*stated to have achieved better social relationships, quality of life in general, redefinition of diabetes and good diabetes regulation.*

### INTRODUCTION

Diabetes mellitus (DM) is a chronic disease and significant public health problem, as diabetes complications are responsible for high morbidity and in many cases premature mortality (1-3). In Greece, it is estimated that there are around 800,000 DM patients (8% of the population), of which 10% (80,000) suffer from type 1 DM, according to the National Center of Research, Prevention and Therapy of Diabetes Mellitus and DM Complications (4). Type 1 DM develops early in life and insulin injection is an integral part of medical therapy of the disease.

As a chronic disease, type 1 DM brings patients up against complicated psychological challenges, as changes induced by the onset of type 1 DM may be detected at the biological as well as emotional level (5). The course of the disease is considered psychosomatic, as it affects and is affected by the patient's psychological functioning, social relationships and activities, professional life and family relations and functioning (6). There is evidence that life events play an important role in metabolic control

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in insulin-dependent DM patients (7). The demands of the disease are continuous and diabetes self-care may create emotional and social issues to the patients.

It is noticed that Greek type 1 DM patients often address their medical problem exclusively to endocrinologists and usually have problems with regimen compliance, and thus metabolic control. The present study argues that therapy of adult type 1 DM mellitus patients should focus not only on the organic-medical aspects, but also on the psychological factors that contribute to the course of the disease. Therefore, there is the need for a more holistic approach to diabetes, which could be provided by medical treatment combined with group psychotherapy. The 2-year group psychotherapeutic intervention used in the present study is based on the principles of Conjunctive Group Therapy (8-10). Group psychotherapy for patients with physical illness is broadly used in applied clinical research and practice (11,12), and is based on the biopsychosocial model and the effectiveness of group psychotherapy (10). Group therapy is therefore often considered a priority in healthcare context due to the need for simultaneous treatment of many patients and its effectiveness as a therapeutic technique.

Conjunctive Group Therapy for adult type 1 DM patients is a model that combines principles and techniques from various psychotherapeutic models including the Strategic School of Family Therapy (13,14), Focused on the Strategic School (15) (FDST), Systems-centered Therapy for Groups (16), and Supportive Psychotherapy for people suffering from physical disease (12,17). The basic target of the model is improvement of metabolic control through the following mechanisms: (a) acceptance of the disease; (b) modification of knowledge, attitude and behavior of self-care; (c) resolution of psychological conflicts so as to obtain control of the disease; and (d) rendering the disease as part of the ‘unified self’. Diabetes education (psychoeducation) is an integral part of Conjunctive Group Therapy.

The patients that participate in Conjunctive Group Therapy are expected to develop their self through the system of the group, a procedure that involves learning of new attitudes, beliefs, roles and behaviors, and make transition from the ‘self-centered system’ over to

**Table 1. Demographic and clinical characteristics of study sample: sex, marital status, living with family, nationality, level of education, occupation, modality of medical treatment for diabetes mellitus (DM), type of DM medical treatment, diabetes complications, and history of antidepressant therapy**

Demographic and clinical characteristics		Frequency	Valid percent
Sex	Male	13	40.6
	Female	19	59.4
	Total	32	100.0
Marital status	Single	21	75.0
	Married	6	21.4
	Divorced	1	3.6
	Total	28	100.0
	Unknown	4	
Living with family	No	19	59.4
	Yes	13	40.6
	Total	32	100.0
Nationality	Greek	31	96.9
	Total	31	100.0
	Unknown	1	
Level of education	Total	32	
	Elementary	1	3.2
	High school	11	35.5
	Technological studies	7	22.6
	University	12	38.7
	Total	31	100.0
Occupation	Unknown	1	
	Total	32	
	Professional	9	31.0
	Managerial and technical	3	10.3
	Manual	1	3.4
	Partly-skilled	16	55.2
Modality of DM medical treatment	Total	29	100.0
	Unknown	3	
	Total	32	
Type of DM medical treatment	Injection	25	78.1
	Pump	7	21.9
	Total	32	100.0
Diabetes complications	Plain	5	33.3
	Intensive	10	66.7
	Total	15	100.0
	Unknown	17	
History of antidepressant therapy	Total	32	
	No	23	79.3
	Yes	6	20.7
	Total	29	100.0
History of antidepressant therapy	Unknown	3	
	Total	32	
	No	23	76.7
	Yes	7	23.3
History of antidepressant therapy	Total	30	100.0
	Unknown	2	
	Total	32	

Table 2. Demographic and clinical characteristics of study sample: age, age at the time of diabetes diagnosis, duration of disease (years), and last HbA<sub>1c</sub>% level

	N	Range	Min	Max	Mean	Standard deviation
Age	32	19	19	38	31.5	5.2
Age at diagnosis	32	32	1	33	16.4	8.4
Duration	32	33.0	3.0	36.0	15.2	8.6
HbA <sub>1c</sub> %	32	6.7	5.1	11.8	7.3	1.7

the ‘systems-centered system’ (16). Some specific targets of the model are as follows: to modify the request for ‘diabetes regulation’ to the request for ‘patient regulation’; elimination of embarrassment on mentioning the diagnosis to the social environment; integration of the disease into self; help the patients become aware of the connection between emotion-behavior-metabolic control through mirroring among group members; enhance the quality of life; reinforcement of supportive contexts; promotion of self-responsibility for disease management; individual choice for cooperating with a diabetologist; and redefinition of type 1 diabetes mellitus. The most important concern in psychotherapy is the adjustment of therapeutic processes to the members’ individual needs. All the above factors are expected to have an effect on the patients and facilitate change.

The present paper refers to the primary application of Conjunctive Group Therapy on adult type 1 DM patients, and the purpose was to examine changes that took place in the patients after participating in a 2-year Conjunctive Group Therapy intervention, as to the following areas: psychological adjustment, self-care and everyday life, stress and metabolic control, quality of life, family and friends, redefinition of the disease, metabolic control, depressive symptoms, and finally diabetes regulation.

## MATERIALS AND METHODS

The study examined data collected from 32 type 1 DM adult outpatients administered medical monitoring at Diabetes Clinic, Evangelismos General Hospital (Department of Endocrinology, Diabetes and Metabolism) and IKA Third Hospital for Emergency Medicine (social insurance institution) in Athens. Demographic and clinical characteristics of the patient sample were: sex, marital status, living with family, nationality, level of education, occupation, type 1 DM

medical treatment modality, type of DM medical treatment; diabetes complications, use of anti-depressant therapy in the past (Table 1), age, age at the time of type 1 DM diagnosis, duration of disease in years, and last measure of HbA<sub>1c</sub> (Table 2). Thirty two patients took part in the intervention based on referral from the endocrinologists (endocrinologists from the two hospitals selected patients according to the order of attendance, first in), patient consent for assessment of the psychological aspects of the disease, and patients’ personal request for intervention that would improve their metabolic control (in addition to the physician’s referral).

The participants were informed: (a) that the intervention involved the psychological aspects of the disease; (b) that an endocrinologist was going to be present at the group meetings as a participative observer; (c) in case that medical or nutritional issues of the disease came up during the group meetings, there would be a common decision on arranging an extra session with the doctor or dietitian, respectively, for educational reasons (without the presence of the psychotherapist); and (d) on the rules and regulations of the group psychotherapeutic procedure: discretion, confidence, open expression, and non-guided topics of discussion. The clinical psychologist, as the group leader, cooperated with two endocrinologists and two dietitians (from both hospitals where the intervention took place) throughout the intervention.

The following methodological tools were used on data collection and analysis:

- Focused interview to each participant, before and after termination of the group intervention. The type of interview used in the present study follows the model of focused interview by Merton and Kendall (18), which puts emphasis on the subjective answers of the participant. Rapport is a significant factor for the course of the interview (19,20). The interviews were

conducted by a psychologist, who did not participate in the group psychotherapeutic intervention, in order to eliminate bias. The focused interviews involved minimal guidance, clarification questions, non verbal remarks and open questions; the participants gave free answers which were summarized and repeated to them, with emphasis on the patients' emotional state during the interview. As an example, the following are

some of the open questions used, to cover the category of 'psychological adjustment to type 1 diabetes mellitus': (a) How did you adjust to type 1 diabetes mellitus? (b) What are your thoughts about announcing diabetes to your social environment? (c) What are your concerns about diabetes complications? and (d) How do you feel before and after a hypoglycemic episode?

Table 3. Number and percentage of patients with equivalent statement valid, before and after the intervention; main category: 'Psychological adjustment to type 1 diabetes mellitus' (N=32)

Psychological adjustment to type 1 diabetes mellitus % subcategories	Before		After	
	No. of patients	%	No. of patients	%
<b>Positive</b>				
Diabetes acceptance	12	37.5	20	62.5
Faith in self	5	15.6	19	59.4
Group support and emotional expression	0	0.0	16	50.0
Psychological support	0	0.0	11	34.4
Psychological support, self-awareness and emotional expression	0	0.0	9	28.1
Individualized treatment of diabetes	4	12.5	7	21.9
Emotional autonomy	1	3.1	4	12.5
<b>Negative</b>				
Diabetes compromise	13	40.6	4	12.5
Selective announcement of diabetes	9	28.1	4	12.5
Fear of diabetes complications	14	43.7	2	6.2
Diabetes as 'burden/stigma/trauma'	21	65.6	1	3.1
Diabetes and sense of inferiority and childbearing/choosing partner	12	37.5	1	3.1
Fear of hypoglycemia	11	34.4	0	0.0
Diabetes denial	8	25.0	0	0.0
Diabetes as a negative 'change' in life	7	21.9	0	0.0
Embarrassment/avoidance of diabetes announcement	6	18.7	0	0.0
Ostentatious announcement of diabetes	2	6.2	0	0.0

Table 4. Number and percentage of patients with equivalent statement valid, before and after the intervention; main category: 'Self-care, everyday life and type 1 diabetes mellitus' (N=32)

Self-care, everyday life and type 1 diabetes mellitus % subcategories	Before		After	
	No. of patients	%	No. of patients	%
Individual responsibility in diabetes self-care	15	46.9	22	68.7
Diabetes medical knowledge	11	34.4	17	53.1
Diabetes and self (priorities)	3	9.4	15	46.9
Self-responsibility in life and in diabetes	6	18.7	15	46.9
Diabetes self-care	0	0.0	12	37.5
Glucose self-control	1	3.1	12	37.5
Awareness of improper behavior in diabetes self-care	0	0.0	9	28.1
Awareness of extreme behaviors	0	0.0	2	6.2
<b>Medical relationship - medical model</b>				
Dependence on doctor's directions	13	40.6	5	15.6
Insufficient diabetes medical knowledge	14	43.7	0	0.0
Absence of diabetes medical knowledge	1	3.1	0	0.0

The answers of the participants given in the interviews were content-analyzed using grounded theory methodology (21-23). Grounded theory seeks to derive theoretical frameworks (thematic categories) from initial data (e.g., interviews). In the present study, the basic thematic categories that emerged were: psychological adjustment, self-care and everyday life, stress and metabolic control, quality of life, family and friends, redefinition of the disease, metabolic control and depressive symptoms; for each category various subcategories emerged. The process was reiterated several times in order to examine emerging thematic categories. Validation of the approach was considered to have been achieved when repeated data analysis revealed no new thematic frameworks (21). Then the researchers gathered the number of participants for which each subcategory was valid (out of the total number of group participants) and calculated percentages with the use of Microsoft Excel Program. The same analysis was followed for focused interviews before and after the group psychotherapeutic intervention. The thematic categories and subcategories express the criteria according to which the researchers study potential changes in the participants after the completion of the intervention.

- HbA<sub>1c</sub>% blood counts (before and after termination of the group intervention) (HbA<sub>1c</sub>% analysis method: HPLC). HbA<sub>1c</sub>% (glycosylated hemoglobin) is a biological index, which counts the quality of diabetes regulation during the last 2 months. A high percentage value of HbA<sub>1c</sub>% indicates poor diabetes regulation during the last weeks (good regulation: <6.5%-7%, marginal regulation: 6.5%-7.5%, and poor regulation: >7.5%).

The procedure was as follows: the participants were divided into 4 groups: group A (7 patients), group B (8 patients), group C (9 patients), and group D (8 patients), as the clinical psychologist decided to create groups of few members to ensure cohesion and make the intervention groups psychotherapeutically consistent. The participants were assigned to each group according to their individual choice and will. The meetings of groups A and B took place at Evangelismos Hospital, whereas the meetings of groups C and D took place at IKA Hospital. The

agenda in each session was formed according to the patients' needs, phase of therapy and therapeutic targets. The group psychotherapeutic intervention, for all therapeutic groups, lasted two years, each session lasted two hours, and the groups met twice *per* month.

## RESULTS

Study results are shown in Tables 3-10. There is comparison between two phases, i.e. before and after the intervention. Tables show the number of patients for whom the equivalent statement (subcategory of each main category) was valid, out of the total sample (N=32) and the same numbers expressed as percentage.

More precisely, there were changes in various aspects regarding the 'psychological adjustment to type 1 DM' category. There was an increase in the number of subjects that accepted diabetes, obtained faith in self, self-awareness and emotional autonomy, were able to express their emotions, had a sense of support from the group and began to engage more in diabetes treatment after the completion of the group intervention; at the same time, the number of participants that perceived diabetes as a compromise, announced disease diagnosis selectively/ostentatiously or not at all to their social environment, feared hypoglycemia and diabetes complications, had a sense of stigma and inferiority towards choice of partner or childbearing, denied diabetes in general or had a negative sense of the disease, decreased or in some cases nullified (0%) (Table 3).

Regarding the 'self-care, everyday life and type 1 DM' category, there was an increase in the percentage of patients that perceived their own responsibility in diabetes self-care and an active role within the patient-doctor relationship, enhanced their medical knowledge, set priorities, undertook self-care, achieved glucose control, and recognized past improper/extreme behaviors in diabetes self-care (Table 4).

Considering the 'stress and metabolic control' category, the results showed an increase in the number of patients feeling they had psychological support from the group, could manage stress and could avoid

Table 5. Percentage of patient answers in 7 subcategories of the 'Stress and metabolic control' main category

Stress and metabolic control % subcategories	Before		After	
	No. of patients	%	No. of patients	%
<b>Positive</b>				
Support from group, psychological support and stress management	0	0.0	25	78.1
Avoidance of diabetes complications	7	21.9	11	34.4
<b>Negative</b>				
Stress for and fear of diabetes complications	14	43.7	2	6.2
Intense stress, depressive symptoms and increase in glucose levels	24	75.0	0	0.0
Hypoglycemic episodes and poor metabolic control	22	68.7	0	0.0
Fear of hypoglycemia	11	34.4	0	0.0
Intense stress, depressive symptoms and hypoglycemia	4	12.5	0	0.0

Table 6. Number and percentage of patients with equivalent statement valid, before and after the intervention; main category: 'Type 1 DM and quality of life' (N=32)

Type 1 DM and quality of life % subcategories	Before		After	
	No. of patients	%	No. of patients	%
Positive attitude towards life	2	6.2	24	75.0
Positive image of body and self	5	15.6	21	65.6
Faith in self	5	15.6	19	59.4
Satisfaction from life	9	28.1	16	50.0
Quality of life	3	9.4	13	40.6
Set of targets	1	3.1	7	21.9

Table 7. Number and percentage of patients with equivalent statement valid, before and after the intervention; main category: 'Family, friends and type 1 DM' (N=32)

Family, friends and type 1 DM % subcategories	Before		After	
	No. of patients	%	No. of patients	%
<b>Positive</b>				
Application of communication skills	0	0.0	24	75.0
Adaptability in relationships	0	0.0	14	43.7
Positive attitude towards expanding social cycle	0	0.0	9	28.1
Positive attitude towards choice of partner	0	0.0	4	12.5
Positive attitude towards creating a family	0	0.0	3	9.4
<b>Negative</b>				
Diabetes as a criterion of evaluating friendly relationships	9	28.1	4	12.5
Diabetes, sense of inferiority and childbearing	4	12.5	0	0.0
Diabetes affects friendly relationships	4	12.5	0	0.0
Diabetes, sense of inferiority and partner	8	25.0	0	0.0
Diabetes affects choice of partner and potential plans for marriage	19	59.4	0	0.0

Table 8. Number and percentage of patients with equivalent statement valid, before and after the intervention; main category: 'Redefinition of type 1 DM' (N=32)

Redefinition of type 1 DM % subcategories	Before		After	
	No. of patients	%	No. of patients	%
Diabetes as motivation for self-awareness	0	0.0	17	53.1
Diabetes gives strength and will to live one's life	3	9.4	9	28.1
Diabetes as part of self	1	3.1	9	28.1
Diabetes provides benefits and legal facilitations	1	3.1	8	25.0

diabetes complications after the completion of the intervention. At the same time, the number of patients with fear of complications and hypoglycemia, intense stress, depressive symptoms, hypoglycemic episodes and poor metabolic control decreased (Table 5).

After the group intervention there was also an increase in the number of patients with regard to a number of factors related to the patients' 'quality of life'. More specifically, after the group intervention there were more patients than before that developed a positive attitude towards life and positive image of their body and self, began to have faith in themselves, obtained satisfaction from life, set new targets and generally considered that the quality of their life had improved (Table 6).

The results for the 'family, friends and type 1 DM' category were as follows: prior to the group intervention, none of the patients believed that they were able to apply communication skills, to be adaptable in social relationships, to be positive towards expanding their social cycle, choosing a life partner and creating a family of their own. The results showed an increase in the above percentages. On the other hand, the percentage of patients that perceived diabetes as a criterion of evaluating friendly relationships decreased after the intervention, whereas the number of patients feeling inferior to choose a partner, get married and have children due to diabetes, and believing that the disease affected friendly relationships was reduced to none (Table 7).

In addition, the results showed that DM patients began to redefine the disease in their life after the completion of Conjunctive Group Therapy. The increased percentages showed that after the intervention more patients considered diabetes as a motivation for self-awareness, as a source of strength and will to live their lives, as part of their self and as a source of benefits and legal facilitations (Table 8).

According to the results, there was also an increase in the aspects that have to do with the achievement of metabolic control. After the group intervention, the number of patients that presented for medical follow up, received psychological support and managed their stress, set schedule, received support from significant

others, were more emotionally autonomous, engaged in self-care, felt less depressed and reached better emotional equilibrium increased (Table 9).

Finally, the percentage of DM patients that experienced depressive symptoms, used to be negative against intimate relationships and about the image of their self, were embarrassed regarding the way and time of diabetes announcement, worried about their physical health, denied the disease and were not satisfied with their life in general decreased (Table 10).

The results obtained on two HbA<sub>1c</sub>% measurements before and after the group psychotherapeutic intervention showed a mean HbA<sub>1c</sub>% of 7.3% and 6.39% before and after the intervention, respectively, the former indicating poor diabetes regulation and the latter pointing to good diabetes regulation after the intervention (Table 11).

## DISCUSSION

The researchers consider that a psychotherapeutic intervention to Greek adult DM patients in addition to medical treatment is very important. It was therefore considered appropriate to apply Conjunctive Group Psychotherapy in type 1 DM patients in order to examine the potential changes in patients in relation to their psychological adjustment, self-care and everyday life, stress and metabolic control, quality of life, social cycle, redefinition of the disease, mood and metabolic control. In the present study, the researchers used focused interviews and grounded theory methodology to investigate changes in the patients' personal beliefs and opinions in terms of the above categories.

The results of the study showed that by the end of Conjunctive Group Therapy there were noticeable positive changes in the patients according to the 8 areas assessed and also that good diabetes regulation was achieved as shown by the improvement in HbA<sub>1c</sub>% levels.

The researchers consider that medical treatment of type 1 DM in combination with Conjunctive Group Therapy has played a determining role in the above positive changes in the patients' opinions and attitudes. Numerous studies found group therapy to be an

**Table 9. Number and percentage of patients with equivalent statement valid, before and after the interventionM main category: 'Achievement of metabolic control' (N=32)**

Achievement of metabolic control % subcategories	Before		After	
	No. of patients	%	No. of patients	%
Medical monitoring	2	6.2	26	81.2
Group support, psychological support - stress management	0	0.0	25	78.1
Schedule		37.5	16	50.0
Emotional support (from partner/significant others)	0	0.0	11	34.4
Psychological support - emotional autonomy	0	0.0	11	34.4
Group support and diabetes self-care	0	0.0	7	21.9
Group support and decrease of depressive symptoms	0	0.0	7	21.9
Emotional equilibrium	0	0.0	5	15.6

**Table 10. Number and percentage of patients with equivalent statement valid, before and after the intervention; main category: 'Depressive symptoms' (N=32)**

Depressive symptoms % subcategories	Before		After	
	No. of patients	%	No. of patients	%
Depressive symptoms (request for psychological support)	1	3.1	0	0.0
Refusal of intimate relationships	2	6.2	0	0.0
Negative image of self	2	6.2	0	0.0
Embarrassment regarding way and time of diabetes announcement	3	9.4	0	0.0
Physical health concerns	3	9.4	0	0.0
Depressive symptoms (due to diabetes and/or diabetes complications)	3	9.4	0	0.0
Negative image of body and self	4	12.5	0	0.0
Depressive symptoms	6	18.7	0	0.0
Diabetes denial	8	25.0	0	0.0
Emotional difficulties	8	25.0	0	0.0
Depressive image of self	13	40.6	0	0.0
Insufficient satisfaction from life (anhedonia)	22	68.7	0	0.0

effective treatment of chronic disease, through exchange of ideas, attitudes and values among group members (12,24-26). Moreover, there is evidence that group therapy is an effective treatment for DM (27,28) and type 1 DM (29-31).

In particular Conjunctive Group Therapy is hypothesized to be an effective method of group therapy for adult type 1 DM patients, as it is a combined intervention towards the psychological and biological aspects of type 1 DM, and care is oriented towards the 'whole person' (whole-person care) (32), the 'psychosomatic wholeness' (33) and the 'unified self'. Emphasis is put on the factors that contribute to the psychological well-being of the individual towards the challenge they come across due to the disease (34). These factors include reinforcement of emotional expression of feelings that existed prior to the disease onset and examination of those that give personal

**Table 11. HbA<sub>1c</sub>% measurements before and after group psychotherapeutic intervention**

	Before	After
HbA <sub>1c</sub> % level	7.3	6.4

meaning for each member; gradual accomplishment of realistic and feasible targets not only concerning the regimen, but also every-day activities, which provide satisfaction, pleasure and give the patients' life a positive meaning (35,36); exchange of information, advice and emotions among the members, not only about effective treatment of the disease, but also about every aspect of life (37); and development of new types of behavior within the context of acceptance, emotional expression and mutual understanding.

There are several negative emotions that emerge in a chronic patient such as isolation, dependence and emotional difficulties including anger, denial,

hopelessness, or depression (38). Examination of the above factors in the group gives the members an opportunity to share common experience and negative emotions that seem to isolate them from the 'healthy' population (39). It is considered important that after the group intervention the majority of patients reported that the supportive environment of the group helped them manage their stress and deal with depressive symptoms. Negative emotional state has been related to unstable metabolic control (7,40), and psychological interventions have been shown to improve metabolic control and quality of life (41).

Furthermore, adaptability in human relations, communication skills and destigmatization of the disease are also factors that patients report to have come across during group sessions. Stigmatization is a cultural construct and affects the meaning of the disease, the patient's everyday life (42), and reinforces negative beliefs about self. The fear of marginalization is the reason why patients usually avoid mentioning the disease to the others (43). After all, identity is a continuous procedure with changes and adjustments according to the reflection of the self on significant others (44). Thus, overall, the therapeutic factors of the group are considered to have facilitated the patients' positive change (12,25,45-49).

The present group intervention involves both psychotherapeutic techniques and diabetes education. It is not possible to differentiate between the effects of psychotherapy or diabetes education on patients due to methodological limitations, nor does the study allow conclusions about causality. Moreover, in many cases patients were referred by the endocrinologist for participation in the group intervention, which means that some of the patients did not request psychotherapy

directly. This fact decreases their motivation for change. Additionally, the sample was small and selected from specific state hospitals, and referrals were made by the endocrinologists from the same two hospitals. No follow up sessions were conducted.

Due to methodological limitations, it is not possible to extrapolate the findings of the present approach to other DM patients or to chronic patients in general. Further investigation and replication of the group intervention would be needed to see whether the results will be repeated in studies with larger samples and in different clinical contexts. Additionally, cost-effectiveness comparative studies of different treatment regimens for type 1 DM are recommended. Finally, further investigation of the specific psychological factors arisen in the present study is warranted, with the use of different methodological tools.

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## REFERENCES

1. Jörgens V, *et al.* To vivlio mou gia to Sakcharodi diaviti typou 1 (My book about type 1 diabetes mellitus). Roche (Hellas) A.E., Tmima Diagnostikon gia atoma me diaviti typou 1; 2002.
2. Atkinson MA, Maclaren NK. The pathogenesis of insulin-dependent diabetes mellitus. *N Engl J Med* 1994;331:1428-1436.
3. Mygdalis IN. O rolos tis genetikis stin aitiopathogeneia tou sakharodous diaviti typou 1 (The role of genetics in DM1 pathogenesis). In: Mygdalis IN, editor. *Stratigikes stin dierevnisi kai antimetopisi tou sakxarodous diaviti* (Strategies in exploration and treatment of diabetes mellitus). Athens: Iatrikes Ekdoseis «Zita»; 2000; 19-29.

4. National Center of Research, Prevention and Therapy of Diabetes Mellitus and DM Complications [Internet]. Available from: <http://www.hndc.gr>
5. Cox DJ, Gonder FL. Major developments in behavioral diabetes research. *J Consult Clin Psychol* 1992;60:628-638.
6. Clay MA. Group therapy as a means of enhancing patient compliance with treatment regimens and improving self esteem among insulin dependent adult diabetics. University of Manitoba, 1992.
7. Stenström U, Wikby A, Hörnquist JO, Andersson PO. Recent life events, gender, and the control of diabetes mellitus. *Gen Hosp Psychiatry* 1993;15:82-88.
8. Grotjahn M, Klein FM, Freidman CTH, eds. Group psychotherapy with psychosomatic patients. In: *Handbook of group therapy*. New York: Van Norstrand Reinhold Company, 1983.
9. Stone WN, Rodenhauser P, Market RJ. Combining group psychotherapy and pharmacotherapy: a survey. *Int J Group Psychother* 1991;41:449.
10. Yiannitsi S. *Psychosomatiki kai Omadiki Psychotherapeia (Psychosomatic and group psychotherapy)*. Athens: Ellinika Grammata, Panepistimiakes Ekdoseis, 1997.
11. Scheidlinger S. An overview of nine decades of group psychotherapy. *Hosp Commun Psychiatry* 1994;45:217-225.
12. Yalom I. *Theoria kai praksi tis omadikis psychotherapeias (Theory and practice of group psychotherapy)*. Athens: Ekdoseis Agra, 2006.
13. Minuchin S. *Families and family therapy*. Cambridge, MA: Harvard University Press, 1974.
14. Minuchin S. *Oikogeneies kai oikogeneiaki therapeia. Ergastirio dievrinsis anthropon scheseon (Families and family therapy. Human relations laboratory)*. Athens: Ellinika Grammata, 2000.
15. Mc Lendon D, Mc Lendon T, Petr CG. Family-directed structural therapy. *J Marital Fam Ther* 2005;31(4):327-339.
16. Agazarian YM. *Systems-centered therapy for groups*. New York: The Guilford Press, 1997.
17. Sifneos PE. Criteria for psychotherapeutic outcome. *Psychother Psychosom* 1975;26:49-58.
18. Cohen L, Manion L. *Methodologia ekpaideftikis erevnas (Educational research methodology)*. Athens: Metaichmio, 1994.
19. Denzin NK, Lincoln YS. Introduction. *Entering the field of qualitative research. Handbook of qualitative research*. Thousand Oaks: Sage, 1994.
20. ĚCorkle R, Youhg K. Development of a symptom distress scale. *Cancer Nurs* 1978;1:373-378.
21. Strauss A, Corbin J. *Basics of qualitative research*. Thousand Oaks, California: Sage Publication, 1998.
22. Lundin CS. *Living with diabetes during transition to adult life – relationships, support of self-management, diabetes control and diabetes care*. Sweden: Intellecta Docusys AB Västra Frölunda, 2008.
23. Kumagai AK, Murphy EA, Ross PT. Diabetes stories: use of patient narratives of diabetes to teach patient-centered care. *Adv Health Sci Educ* 2009;14:315-326.
24. Pelsler HE, Groen JJ, Stuyling de Lange MJ, Dix PJ. Experiences in group discussions with diabetic patients. *Psychother Psychosom* 1979;32:257-269.
25. Van der Ven N. Psychosocial group interventions in diabetes care. *Diabetes Spectrum* 2003;16:88-95.
26. Mensing CR, Norris SL. Group education in diabetes: effectiveness and implementation. *Diabetes Spectrum* 2003;16:96-103.
27. Cigrang JA. *Psychosocial intervention for youths with insulin-dependent diabetes: a study of the metabolic and psychosocial effects of group therapy*. Memphis State University, 1991.

28. Weigner K. Group interventions: emerging applications for diabetes care: preface. *Diabetes Spectrum* 2003;16:86-87.
29. Mannucci E, Pala L, Rotella CM. Long-term interactive group education for type 1 diabetic patients. *Acta Diabetol* 2005;42:1-6.
30. Snoek FJ, Van der Ven NCW, Lubach CHC, Chatrou M, Adèr HJ, Heine RJ, Jacobson AM. Effects of cognitive behavioural group training (CBGT) in adult patients with poorly controlled insulin-dependent (type I) diabetes: a pilot study. *Patient Educ Counsel* 2001;45:143-148.
31. Wolff HH. The therapeutic and developmental functions of psychotherapy. *Br J Med Psychol* 1971;44:117-130.
32. Shillitoe RW. *Psychology and diabetes. Psychological factors in management and control.* London: Chapman and Hall, 1988.
33. Karush Á, Daniels G, O'Connor J, Stern LO. The response to psychotherapy in chronic ulcerative colitis. II. Factors arising from the therapeutic situation. *Psychosom Med* 1969;31:201-226.
34. Folkman S, Greer S. Promoting psychological well-being in the face of serious illness: when theory, research and practice inform each other. *Psychooncology* 2000;9:11-19.
35. Moorey S, Greer S. *Psychological therapy for patients with cancer.* London: Heinemann Medical Books, 1989.
36. Greer S, Moorey S, Bartuch JDR, Watson M, Robertson BM, Manson A, Rowsen L, Law MG, Bliss JM. Adjuvant psychological therapy for patients with cancer: a perspective randomized trial. *BMJ* 1992;304:675-680.
37. Cain EN, Kohom EI, Quinian DM, Latimer K, Schwartz PE. Psychosocial benefits of a cancer support group. *Cancer* 1986;57:183-189.
38. Cordinea CM, Wilson LA. Group psychotherapy for hospital patients with chronic physical illness. *Health Bull (Edinb)* 1982;40(10):16-19.
39. Rutan JS, Stone WN. *Psychodynamic group psychotherapy.* Lexington, MA: Collamore Press D.C. Health, 1977.
40. DeVries JH, Snoek FJ, Heine RJ. Persistent poor glycemic control in adult type 1 diabetes. A closer look at the problem. *Diabetes Med* 2004;21:1263-1268.
41. Fisher EB, Thorpe CT, DeVellis BM, DeVellis RF. Healthy coping, negative emotions, and diabetes management. A systematic review and appraisal. *Diabetes Educator* 2007;33(6):1080-1103.
42. Goldman J. *Narratives of living with diabetes: an examination of self, identity, and the body.* University of Toronto, 1997.
43. Bernstein J. *The diabetes world: the development of sense of self and identity in adults with early onset, type 1 diabetes.* UMI, 2004.
44. Viviers LJ. *The different voices of chronic illness.* University of South Africa, 2005.
45. Antoniou-Karaolidou M. *Oi therapeftikoi paragontes stin omadiki psychotherapeia. Kritiki vivliografiki anaskopisi (Therapeutic factors in group psychotherapy. Review).* Athens: Institouto Omadikis Analysis (Institute of Group Analysis), 1992.
46. Valbak K. Specialized psychotherapeutic group analysis: how do we make group analysis suitable for "non-suitable" patients? *The Group-Analytic Society (London)* 2003;36(1):73-86.
47. Kapur R, Miller K, Mitchell G. Therapeutic factors within in-patient and out-patient psychotherapy groups. Implications for therapeutic techniques. *Br J Psychiatry* 1988;152:229-233.
48. González de Chávez M, Gutierrez M, Ducaju M, Fraile JC. Comparative study of the therapeutic factors of group therapy in schizophrenic inpatients and outpatients. *Group Analysis* 2000;33:251-264.

49. Holleman WN, Bray JH, Davis L, Holleman MC. Innovative ways to address the mental health and medical needs of marginalized patients: collaborations between family physicians, family therapists, and family psychologists. *Am J Orthopsychiatry* 2004;74(3):242-252.