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**PSYCHOTHERAPY INTERVENTION WITH HYPNOSIS IN
PATIENTS WITH TYPE 1 DIABETES MELLITUS**

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Abstract

Type 1 Diabetes *Mellitus* is a chronic disease with high mortality and morbidity rates which entails early negative effects to the life of diabetics. Given the scant investigation of the effectiveness of hypnotherapy in type 1 diabetes, one might ask: can psychotherapy with hypnosis and using Guided and Creative Imagery lower blood sugar levels? This current investigation aims to study the efficiency and effectiveness of analytic hypnotherapy - a person centered approach focused on solutions that we called hypnotherapy without (or with) hypnosis - and of guided imagery, at the same time monitoring type 1 diabetes by glycemia and glycosylated hemoglobin. This investigation involved 28 diabetic participants from the Association of Diabetics of Ovar, northern Portugal. Participants were randomized, 15 of which were part of the experimental group while 13 of them were part of the control group, benefited by a relaxing technique. The research was conducted during three sessions, with needle prick and blood tests. The results have shown statistically non-significant differences between the two groups. However, we found statistically significant differences between the two groups as far as the reduction of levels of glycemia in association with guided imagery by direct suggestions, post-hypnotic suggestions and self-hypnosis. Results suggest that hypnotherapy seems to have been useful for the reduction of glycemia levels only when psychotherapy combined with guided imagery by direct suggestions, post-hypnotic suggestions and self-hypnosis were used. In short, psychotherapy combined with hypnosis may have contributed to an improvement in glycemic control of the studied diabetic patients.

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Keywords: Psychotherapy, Hypnosis, type 1 diabetes *mellitus*, glycemia, glycosylated haemoglobin.



1. Introduction

Type 1 Diabetes *Mellitus* type 1 (T1DM) is a chronic disease, with high morbidity and a high mortality risk (Ferreira, 2015). Psychological factors play a crucial role in this chronic disease (Gatchel & Oordt, 2015). Thus, in addition to medical therapies and nutritional prescriptions, the intervention of the psychologist is regarded as fundamental and constitutes an added value (Gatchel & Oordt, 2015). However, in addition to interventions to increase diabetic patients adherence to treatments and lifestyle changes, hypnotherapy may be an excellent complementary "therapeutic" tool (Trujillo, 2010).

However, given the scant investigation of the effectiveness of scientific clinical hypnosis in T1DM, one might ask: do psychotherapy with analytical hypnosis coupled with Guided and Creative Imagery (GCI) lower blood sugar levels?

1.1. Diabetes Mellitus

Diabetes *Mellitus* (DM) is a chronic, severe, progressive metabolic pathology that imposes specific transformations on patients' lifestyles (Rodrigues & Costa, 2013). It is characterized by chronic hyperglycaemia and disruption of the metabolism of carbohydrates, fats and proteins (World Health Organization, 2015). In Portugal, as in other developed countries, there is a true diabetes pandemic, affecting more and more people and being recognized as a major cause of death (Rodrigues & Costa, 2013).

1.2. Type 1 Diabetes Mellitus

T1DM, or type 1 diabetes, also known as Insulin-Dependent Diabetes Mellitus, results from the progressive selective autoimmune destruction of the beta cells of the pancreatic islets, triggering a deficiency in the secretion of the hormone insulin produced by the pancreas (Rodrigues & Costa, 2013; World Health Organization, 2015). T1DM represents 5% to 10% of all cases of diabetes and patients require lifelong insulin injections to survive (World Health Organization, 2015).

The essential goals of diabetes treatment are the metabolic compensation or control and consequent prevention of acute complications (hyperglycemia and hypoglycemia) and prevention or delay in the development of chronic complications, which are respectively an immediate danger to the patient's life and a slow and progressive threat to their health (Almeida, Ferrão, & Zangeronimo, 2013). Treatment of T1DM requires a careful balance between diet, exercise and insulin injections as well as frequent self-monitoring of blood glucose levels, self-care that tend to vary from patient to patient (Almeida et al., 2013). Since T1DM effects inevitably have a substantial and negative impact on patients quality of life (Ferreira, 2015), in addition to medical therapies and nutritional prescriptions, psychologist intervention can be an advantage as far as diabetes treatment is concerned (Gatchel & Oordt, 2015).

1.3. Diabetes Mellitus, Psychology and Hypnosis

The most common psychological treatments of T1DM have been cognitive-behavioral in nature, whose main objectives are the reduction of negative emotions and the increase in the perception of self-efficacy, aspects considered essential for adherence to diabetes self-care and good glycemic control (Van der Ven et al., 2005). In this sense, the increasing use of hypnosis as an adjuvant therapy in the

management of immunity, through the activation of the most powerful healer - the human mind (Trujillo, 2010). Hypnosis is one of the oldest non-medical treatments and a non-pharmacological medium, so it has no adverse side effects or interactions, is cost-effective and can produce results in one session (Trujillo, 2010). In addition, this therapy is also a self-management tool, since self-hypnosis is easily taught and tends to become an asset for life (Trujillo, 2010).

Hypnosis has been shown to be an effective method for the management of autoimmune diseases such as rheumatoid arthritis (Trujillo, 2010), Osteoarthritis (Ferreira, Repolho, Ribeiro, & Sepodes, 2012), Multiple Sclerosis (Hosseinzadegan, Radfar, Shafiee-Kandjani, & Sheikh, 2017), fibromyalgia (Picard et al., 2013) and lupus, asthma (Trujillo, 2010), and cancer (Roe et al., 2016).

Specifically in DM, are ancient studies with hypnosis has shown beneficial effects, notably in the decrease of blood glucose levels and Glycosylated or Glycated Hemoglobin (HbA1c), in the spontaneous reduction in their daily dose of insulin, in the metabolic control of diabetes, increased blood flow to the extremities, and reduced diabetic foot problem, as well as the reduction of diabetes-related stress (Xu & Cardena, 2008). That is, hypnosis appears to be an adjunct to diabetes management and monitoring as well as metabolic control (Xu & Cardena, 2008).

The most recent definition of the American Psychological Association's Division 30 (Society of Psychological Hypnosis) argues that *hypnosis* is "a state of consciousness that involves focused attention and reduced peripheral awareness, characterized by a strengthened ability to respond to suggestion" (Elkins, Barabasz, Council, & Spiegel, 2015) and *hypnotherapy* as "the use of hypnosis in the treatment of a medical act, disorder or psychological concern" (Elkins et al., 2015).

Given the relationships between behavior, psychosocial factors and the nervous, endocrine and immune systems, with the emergence of diseases, Ader and Cohen (1975) developed the concept of involvement of the neuroendocrine pathways in the immune responses – *Psychoneuroimmunology*. Due to the multiple interrelationships between the organic systems involved in the process, it can also be called *Psychoneuroimmunoendocrinology* (Ader & Cohen, 1975).

Thus, hypnosis seems to produce concrete and measurable positive changes in the immune system, being this system fully open and operational from Theta waves (4-7 cycles per second (cps)) (Bastarache & Bastarache, 2014). According to the six levels of the *René Bastarache Hypnotizability Scale*, the deeper the more receptive to immunity changes (Bastarache & Bastarache, 2014). It should also be noted that the simple eye-closure process releases approximately 80% *Beta* activity (14-21 cps), that is, approximately 80% passes to the *Alpha* brain wave state (7-14 cps), which is probably the best state for most programming (Bastarache & Bastarache, 2014).

1.4. Guided and Creative Imagery

Since the mind does not distinguish a real image from that which is imagined (Rossi, 1995), making it possible to perceive a non-existent object simply by believing in it. This is a process of orienting thought patterns during the practice of the imagination, in which the mind, through thoughts, images, beliefs, memories and emotions, can alter the biochemical structure of the nervous system and induce the body to react to the mental image as if it were real, and this interaction is constant and involuntary (Rossi, 1995).

Direct suggestion may affect a change in patient behavior and result in symptomatic cure, at least temporarily (Rossi, 1993). However, "healing" is simply a response to suggestion and does not imply the reassociation and reorganization of ideas, which are essential for real healing. It is this experience of reassociation and reorganization of his own experiential life that enables healing (Rossi, 1993). Therefore, relaxation and attention focused on the thoughts and ideas that can help a person achieve the desired outcome in their life, highly enhances the chances of success (Petruzzi, 2016). With a strong motivating desire change, the direct suggestions and post-hypnotic suggestions may be enough to provide a lasting benefit to some clients during some of the time (Hunter & Eimer, 2012).

1.5. Suggestibility

Suggestibility refers to the way an individual learns and the means to which he/she is most receptive to learning, which varies with the individual (Kappas, 2001). Hypnosis gets results when the induction and suggestions made during the process are based on the client's suggestibility characteristics. John Kappas (2001) determined that there are three types of suggestibility, or styles of learning / communication: emotional, physical, and somnambulist.

The above mentioned types of suggestibility are equally valid, they only help to know the style of processing and communication for a better relationship with others (Kappas, 2001). When a client's type of suggestibility is known and used, hypnosis achieves results with the least effort and least amount of time (Kappas, 2001).

1.6. Hypnotherapy Without (or With) Hypnosis

All behavior, thought, or habit is motivated by something, has a purpose and this is positive (Hunter & Eimer, 2012). There is an enormous wealth of material stored in the Nonconscious Mind (NCM) and in the psychosomatic problems such as eczema, irritable bowel, colitis, asthma, allergies, rheumatoid arthritis and some types of autoimmune diseases, such as T1DM, the "reason" is usually "not conscious" (Ewin & Eimer, 2007). Since these "reasons" are not conscious, the patient cannot consciously know them or verbalize them, apart from being "protective" or at least having a positive purpose (Ewin & Eimer, 2007).

In the present paper an innovative and promising psychotherapeutic mind - body approach was used, which seeks the solution of internal conflicts or the "cure" of psychosomatic diseases through the communication of internal processes. *Hypnotherapy Without (or With) Hypnosis* (HWH) integrates *Subliminal Therapy, Analytical Hypnotherapy and Transactional Analysis*. The analytical techniques we have followed in this research are person-centered and focused on solutions, since people have all the resources they need and that the answers to their problems lie within their mind (Hunter & Eimer, 2012). These techniques help to "un-cover" (in the sense of "un-covering", making visible) the reason (intention/purpose) behind the problem and re-meaning the patients' underlying pathogenic factors and symptoms. In this way, it is possible to adequately reinterpret the need underlying the presence of this dysfunctional behavior and replace the symptom with a more appropriate behavior (Oliveira, 2015).

In this sense, Yager (2011, pp. 17-20), creator of *Subliminal Therapy*, lists four assumptions of the mental superstructure of NMC: [1] In our mind, there is an intelligent capacity that is nonconscious,

which we call Nonconscious Intelligence NCI); [2] communication between the NCM and the Conscious Mind (CM) is possible in several ways (visual, auditory, kinesthetic); [3] NCM consists of a set of parts (subsystems) that can operate autonomously; [4] in the NCM there is an entity that can be considered and described as "superior intelligence" (NCI) that is not clearly definable consciously but easily subjectively authenticated. The NCI, the smarter part of nonconscious mental life, is set up as a bank of memories, like a computer, in which the NCM creates, stores, and keeps everything that happens to us, and through hypnotic regression it is possible to explore the deposit of memories that may be forgotten by the NCM (Hunter & Eimer, 2012). This instance of the mind regulates involuntary functions of the Autonomic Nervous System (like the heart, breathing, among others), is the seat of emotions and imagination, controls habits and is a kind of dynamics, a directed energy that motivates us (Hunter & Eimer, 2012).

2. Problem Statement

Despite investigations and theoretical rationale for using hypnosis in DM, studies to evaluate the efficiency of hypnotherapy in the management and monitoring of diabetes, namely in T1DM have not yet been performed.

3. Research Questions

Given the scant investigation of the effectiveness of scientific clinical hypnosis in T1DM, one might ask: do psychotherapy with analytical hypnosis coupled with Guided and Creative Imagery (GCI) lower blood sugar levels?

Two groups were randomly assigned: an experimental group (EG) in which the participants were submitted to said protocol of HWH an GCI, and a control group (CG) in which participants only saw a film about the human body, but without any reference to the pancreas and DM.

Thus, we hypothesized that:

- H1 - Patients with T1DM of EG are expected to lower blood sugar and HbA1c levels compared to CG.

H2 - It is expected that in patients with T1DM the decrease in blood glucose will be greater from the 2nd needle prick (during GCI) to the 3rd needle prick (after the posthypnotic suggestions and the command for self-hypnosis).

4. Purpose of the Study

In this sense, the present study seeks to investigate the efficiency of analytic hypnotherapy in a person-centered and solution-focused approach, called HWH - Hypnotherapy Without (or with) Hypnosis, combined with Guided and Creative Imagery, in the monitoring of diabetes in patients with T1DM (glycemia and glycosylated hemoglobin).

5. Research Methods

5.1. Participants

In order to select the individuals in the study, they had to fulfill the following inclusion criteria: diagnosis of T1DM, users and/or members of the Ovar Diabetic Association, diagnosed for at least one year, on an outpatient basis (not hospitalized), without any acute disease and non-pregnant. Participation of the individuals was voluntary and they signed a consent and voluntary agreement for participation in the study.

The sample consisted of 30 participants, 19 (63.30%) female and 11 (36.70%) male, between 11 and 51 years, with a mean age of 31.73 years (SD = 11.47). The CG comprised 15 participants, 10 females and 5 males, with a mean age of 34.00 (SD = 12.80). The EG, intervention with HWH and GCI, consisted of 15 participants, 9 females and 6 males, with a mean age of 29.47 years (SD = 9.88). During the investigation, it was found that two female subjects had an Insulin Infusion Pump and were therefore excluded, making up a final sample of 28 participants.

The sociodemographic characteristics are presented in Table 1.

Table 01. Sociodemographic Characteristics

		Sample Total (n = 30) n (%)	EG n (%)	CG n (%)
Marital Status	Single	15 (50.00%)	9 (60.00%)	6 (40.00%)
	Married	13 (43.30%)	5 (33.30%)	8 (53.30%)
	Civil Union	1 (3.30%)	1 (6.70%)	0 (0.00%)
	Widow/widower	1 (3.30%)	0 (0.00%)	1 (6.70%)
Educational Level	2º Cicle	1 (3.30%)	0 (0.00%)	1 (6.70%)
	3º Cicle	7 (23.30%)	2 (13.30%)	5 (33.30%)
	Secondary	14 (46.70%)	8 (53.30%)	6 (40.00%)
	College/University	8 (26.70%)	5 (33.30%)	3 (20.00%)
Current Employment Status	Employed	15 (50.00%)	8 (53.30%)	7 (46.70%)
	Unemployed	5 (16.70%)	2 (13.30%)	3 (20.00%)
	Student	7 (23.30%)	4 (26.70%)	3 (20.00%)
	Retired (due to disability)	3 (10.00%)	1 (6.70%)	2 (13.30%)

Labeling: EG – Experimental Group, CG – Control Group

5.2. Materials

- *Suggestibility Questionnaire*

The Suggestibility Questionnaire is the translation by Celso Oliveira & Fabiana Rodrigues of the Kappas Physical and Emotional Suggestibility Tests (Kappas, 2001), with permission. This instrument serves to distinguish the profiles of suggestibility: physical and emotional. It consists of two questionnaires, one for each profile, each with 18 affirmations, with a dichotomous "yes / no" answer.

In order to know the suggestibility of each participant, the following procedure is followed, according to the original version: [1] the number of answers "Yes" is counted in each one of the

questionnaires and 10 points are assigned to questions 1 and 2 and five points to questions 3 to 18; [2] questionnaire scores are added together to get the combined score. [3] the combined score is located on the upper horizontal line of the double-entry matrix; [4] the score for Questionnaire # 1 is located to the left of the vertical column of the double entry matrix; [5] a horizontal line is drawn across the score page of Questionnaire #1 and a vertical line down the combined score; [6] the number where the two lines intersect represents the percentage score adjusted for Questionnaire #1. That is, the value indicates the percentage of physical suggestibility; [7] subtract at 100 the value of the percentage of physical suggestibility to determine the percentage of emotional suggestibility (Kappas, 2001). This procedure allows to infer the suggestibility profile.

A benchmarking study was not carried out to obtain the percentiles for the Portuguese population, since it would be unacceptable in terms of time and in financial terms, within the scope of a master's thesis. This fact is an obvious limitation, even though validity was guaranteed by the judges' method and the spoken reflection with 20 diabetics who did not participate in the study.

To measure glucose, we used disposable lancets, test strips, glucometer, cotton and registration sheet. In the control group we used the computer, the film and the structured script.

5.3. Procedure

Initially, informed consent was given to the participants, which contained relevant information such as the purpose of the study, benefits to the participants, risks, among others. All the participants signed this consent, filling in the Sociodemographic Questionnaire.

The research was conducted in three face-to-face sessions, each lasting approximately 60 minutes. In this session, when the prerequisites for participation in the investigation were fulfilled, the questionnaire of suggestibility was submitted to fill in and the value of HbA1c of the last blood test (pre-intervention) was requested. In the first session, the participants were educated for the hypnosis process, using metaphors and hypnotizability tests, and a communication set-up was made with the NCI. The second session took place in the following two weeks, in which the participants went through their respective conditions. The EG was submitted to the structured intervention (HWH) proposed by Oliveira (2015) and GCI, according to the protocol of intervention, while the CG visualized a film about the human body. Considering that the NCI listened and worked without the conscious consent of the patient, we paid particular attention to the neutral content of the film, since any suggestion related to the pancreas and/or T1DM could constitute a parasite variable. After a week, the third session was held, where a debriefing was held. Three months after the last blood test, having already passed the condition, the HbA1c value of the respective blood test (post-intervention) was requested.

The intervention protocol is outlined in Table 2.

Table 02. Intervention Protocol Scheme

	EG	CG
1st session - 60 minutes -	<ul style="list-style-type: none"> • Informed Consent • Sociodemographic Questionnaire • <i>Suggestibility Questionnaire</i> • Value of HbA1c of the last blood test (pre-intervention) • Education about the hypnosis process, using metaphors and hypnotizability tests • Set-up of communication with NCI • Clarification of doubts 	
2 nd Session - 60 minutes - (Two weeks after the first session)	<ul style="list-style-type: none"> • 1st <i>needle prick</i> <ul style="list-style-type: none"> ○ Elman's Induction (Eye Catalepsy Testing, Fractionation, Arm Failing) ○ Deepening ○ GCI from the safe place ○ HWH ○ GCI by direct suggestion • 2nd <i>needle prick</i> (GCI - decreased blood glucose) <ul style="list-style-type: none"> ○ Post-hypnotic Suggestions ○ Awakening Experimentation of self-hypnosis command • 3rd <i>needle prick</i> <ul style="list-style-type: none"> ○ Final considerations and clarification of possible doubts 	<ul style="list-style-type: none"> • 1st <i>needle prick</i> <ul style="list-style-type: none"> ○ Visualization of a film of National Geographic Movie about the human body • 3rd <i>needle prick</i>
3 rd Session - 60 minutes - (one week after the first session 2nd session)	<ul style="list-style-type: none"> • <i>Debriefing</i> 	
Three months after the blood test	<ul style="list-style-type: none"> • Value of HbA1c of blood analysis (postintervention). 	

Labeling: EG – Experimental Group; CG – Control Group; HbA1c - Glycosylated or Glycated Hemoglobin; NCI - Non-Conscious Intelligence; GCI - Guided and Creative Imagery; HWH - Hypnotherapy Without (or With) Hypnosis

5.4. Data Analysis

The data were entered into the Statistical Package for the Social Sciences ® (SPSS Software) and a data analysis was performed in the first instance to standardize all results with the transformation of the raw scores into Z scores, in order to facilitate the comparing of performances between the experimental and control groups, as well as between the different stages of intervention. Whenever normality assumptions (Kolmogorov-Smirnov test "p" values greater than .05) were guaranteed we used parametric tests, but confirmed with non-parametric tests, given that, despite the normality of the distributions, the sample N is lower than N.

We determined averages, standard deviations, minimum and maximum and median values. We performed Student's t-tests to compare the two groups, the respective non-parametric version of Mann-

Whitney U, the Wilcoxon Z test for non-parametric comparison of repeated measures in the experimental group.

As alphas to determine statistical significance, we used the value of .05 for statistically significant differences (CI = 95%), the value of .01 for statistically very significant differences and .001 for statistically significant differences.

6. Findings

In this section we present the test results of the two hypotheses.

Thus, in relation to the first hypothesis, according to which "patients with T1DM of the EG are expected to lower blood sugar and HbA1c levels in comparison with the CG", we compared the two groups in terms of the magnitudes of variations between 1st and 3rd needle pricks. Table 3 (Student's t-test) shows that there is a decrease in standardized blood glucose (z-scores) from the 1st to the 3rd needle pricks and in CG there is an increase.

Table 03. Mean and SD of standardized blood glucose variations

	Group	N	M	S.D.
Variation	GE	15	-.1276	.56624
3 rd – 1 st needle prick	GC	13	.1472	.68190

Labeling: EG – Experimental Group; CG – Control Group.

However, the variation between the two groups is not statistically significant ($t = -1.165$; $gl = 26$; $p = .255$). That is, we did not confirm the first hypothesis regarding glycemias. The non-parametric Mann-Whitney U test was in the same direction ($U = 72$; $p = .240$).

In relation to the variation of the normalized values (z-scores) of HbA1c, in order to test the first hypothesis, we found in table 4 (Student's t-test) that in the experimental group there was an increase in HbA1c and in the control group there was a decrease.

Table 04. Mean and SD of standardized HbA1c variations

	Group	N	M	S.D.
Variations of HbA1c	EG	8	.3006	.51006
	CG	8	-.1389	.28408

Labeling: EG – Experimental Group; CG – Control Group; HbA1c - Glycosylated or Glycated Hemoglobin

Yet, the variation between the two groups is not statistically significant ($t = 2.129$, $gl = 14$, $p = .051$). That is, we did not confirm the first hypothesis regarding HbA1c. The non-parametric Mann-Whitney U test, however, suggests a statistically significant difference between the EG and the CG ($U = 12$; $p = .036$), with the EG presenting a median of +36 (increase in HbA1c) and CG a median of -18 (decrease in HbA1c).

In sum, the first hypothesis was not confirmed for both measures.

Regarding the second hypothesis, according to which "it is expected that in the patients with T1DM of EG the decrease of the glycemia is greater from the 2nd needle prick (during the GCI) to the 3rd needle prick (after the post-hypnotic suggestions and the command for self-hypnosis)", Table 5 shows that in the 3rd needle prick, the median of the standardized blood glucose levels is lower than the median of the blood glucose obtained at the 2nd needle prick (GCI moment at which the participants felt decreased glycemia).

Table 05. Minimum, Maximum and Median of standardized glycemias (2nd and 3rd needle prick)

Blood Glucose (Z-notes)	N	Mínimum	Maximum	Median
2 nd needle prick	15	-1.47	2.54	-.25
3 rd needle prick	15	-1.43	1.60	-.45

That is, in the 3rd needle prick the blood glucose decreased (in the EG) in relation to the glycemia of the 2nd needle prick, the same happened with the minimum and maximum values. In relation to the decrease in medians, the difference is statistically significant ($Z = -2.272$, $p = .023$). In sum, the second hypothesis was confirmed.

In summary, and as can be seen in Figure 1, although participants in the control group started with glycemia values above the sample mean ($N = 28$), the glycemia from the 1st to the 3rd needle prick increased. The participants of the experimental group started with blood glucose values below the sample mean ($N = 28$), increased from 1st to 2nd needle prick but decreased from 2nd to 3rd needle prick.

Visual analysis (Figure 1) suggests that in EG there is a decrease in blood glucose.

However, we did not find any statistically significant differences between the groups in the 1st needle prick ($U = 74.5$, $p = .289$) and in the 3rd needle prick ($U = 66.0$, $p = .147$).

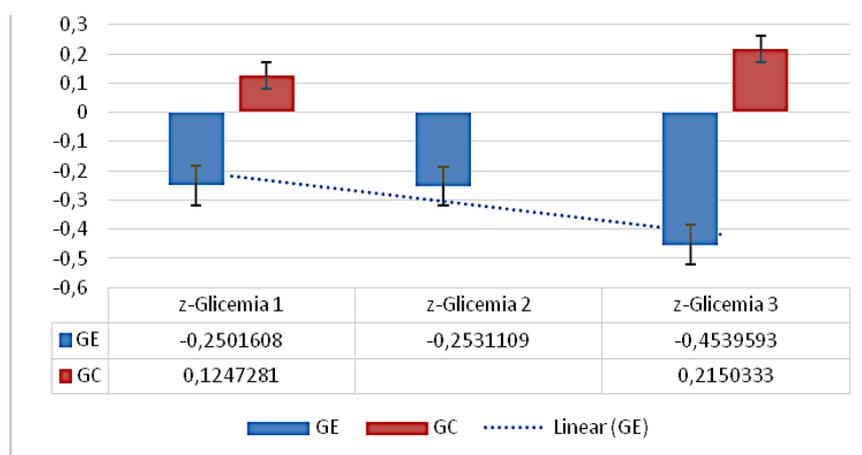


Figure 01. Graph of standardized blood glucose values of the two groups

7. Conclusion

T1DM is a chronic disease and one of the major public health problems, given the high risk of mortality and high morbidity, affecting millions of people worldwide. Failure to monitor glycemia

results in the early onset of late complications of the disease, affecting Quality of Life (Ferreira, 2015). Psychological factors play a crucial role (Martinez et al., 2016), psychological intervention is fundamental (Gatchel & Oordt, 2015), making hypnotherapy constituting a tool Potentiating and complementary psychotherapeutics (Trujillo, 2010). Due to the lack of investigation of the efficiency of hypnotherapy in T1DM, there is a great need to investigate the influence of hypnotherapy, in an analytical approach with HWH, and of GCI, in glycemia, in HbA1c.

We emphasize that, from the beginning to the end of the intervention, the hypnotic group decreased the standardized blood glucose levels, while the group that visualized the film increased. Therefore, hypnosis seems to contribute to good glycemic control.

Regarding HbA1c, we found that the variation of HbA1c between the two groups is also not statistically significant, with EG having an increase in HbA1c and a decrease in CG. However, when using the non-parametric Mann-Whitney U test, a statistically significant difference between the EG and CG is suggested.

Regarding the glycemia between the 2nd and 3rd needle prick, the results found allow us to verify that the hypnosis group decreased the glycemia in the 3rd bite (after the hypnotic suggestions and command of self-hypnosis) in relation to the 2nd needle prick. The moment of GCI in which the participants felt the glycemia to be decreased), as well as the minimum and maximum values. Moreover, we verified the difference is statistically significant between the groups in the decrease of the medians. These results may be partially corroborated by Petruzzi (2016), in the sense that when a person is relaxed and with their attention focused on the thoughts and ideas that can help them achieve the desired result in their life, Your chances of success are greatly increased.

Finally, although initially it appeared that both groups increased the glycemia, in the EG there was an inflection, with increase of the 1st to the 2nd needle prick, beginning the glycemia to descend from the 2nd to the 3rd needle prick. The tendency of glycemia (although not significant, from the 1st to the 2nd needle prick) in the hypnosis group can be related to the regression, revision and revival process, resignification, reintegration, remission and reprogramming / relearning. In the same sense, given that the NCM works without the participant's knowledge, the NCI causes the body to feel what the mind imagines (Erickson et al., 1976), when suggesting regression to the moment of entry of T1DM into the body, may have had an influence on the increase of blood sugar levels. Inflexion suggests a dose-response problem (Oliveira, 2009). Considering the results obtained, it is possible to suggest that hypnotherapy allows the decrease of glycemic, ie a good glycemic control, being a greater reduction as with GCI by direct suggestions, with post-hypnotic suggestions and with self-hypnosis.

It should be noted that the study has some limitations such as not having controlled the participants' lifestyle between the intervention sessions, such as diet or non-compliance with the diet plan, physical exercise, or insulin administration, different moments of the day they were performed, the time of insulin action since it is imagined is variable between subjects, and may have biased the results. This study also suffers from limitations inherent in the evaluation instrument, namely the *Suggestibility Questionnaire*.

Considering the results obtained, although limited, it seems important to carry out studies with children and adolescents with T1DM in a larger sample so that more generalizable and consistent conclusions can be drawn. On the other hand, it would be relevant to develop a longitudinal study, whose

intervention included more sessions / trials, in addition to the three sessions conducted in this study and follow-up sessions. The purpose of this study was to study the effect of hypnosis on the variation of blood glucose between sessions, the variation in the amount of insulin administered and changes in lifestyles, minimizing chronic complications of the disease and the well-being of people. In addition, we suggest the study of the regression to the moment of entry of T1DM into the body and its influence on blood glucose.

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