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The impact of motivational interviewing on medication compliance in type 2 diabetic patients

تأثير المقابلات التحفيزية على الامتثال للأدوية لدى مرضى السكري من النوع 2

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Abstract:

This study is a randomized control trial of motivational interviewing (MI) sessions applied to non-compliant patients with Algerian adult type 2 diabetes (T2DM). Participants are recruited outside of educational or psychotherapeutic programs in order to test motivational interviewing interventions in T2 diabetics who were not necessarily ready to change their non-compliant behavior. We assessed their MORISKY adherence scale (MMAS-8) score and measured their HbA1c concentration, over three time points. Before the MI, after the MI and after three months of the second evaluation. The results indicate that the MI intervention resulted in a significant reduction in HbA1c and a significant increase in adherence. These results suggest that the use of MI is beneficial for type 2 diabetics

Keywords: *Motivational interviewing; medication compliance; type 2 diabetics*

ملخص :

تتكون هذه الدراسة من محاولة للتحكم العشوائي في جلسات المقابلات التحفيزية (MI) المطبقة على المرضى غير الممتثلين المصابين بداء السكري من النوع 2 (T2DM) البالغين الجزائريين. يتم تجنيد المشاركين خارج البرامج التعليمية أو العلاج النفسي من أجل اختبار تدخلات المقابلات التحفيزية في مرضى السكري من النوع الثاني الذين لم يكونوا بالضرورة مستعدين لتغيير سلوكهم غير الممتثل. قمنا بتقييم درجاتهم على مقياس الامتثال MORISKY (MMAS-8) وقمنا بقياس تركيز HbA1c ، أكثر من

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ثلاث مرات. قبل MI وبعد MI وبعد ثلاثة أشهر من التقييم الثاني. تشير النتائج إلى أن تدخل MI أدى إلى انخفاض كبير في HbA1c وزيادة كبيرة في معدل الالتزام. تشير هذه النتائج إلى أن استخدام ME مفيد لمرضى السكر من النوع 2.

الكلمات المفتاحية : *المقابلات التحفيزية؛ الامتثال للأدوية ؛ داء السكري من النوع 2*

Introduction

The problematic of our study originates mainly from the non-adherence to therapy observed in patients with type 2 diabetes and the desire to find answers to it. Indeed, there is an almost chronic discordance in some patients between their behaviors and the medical prescriptions they are subject to. Moreover, the therapeutic non-adherence among type 2 diabetics in Algeria is a frequent phenomenon, its determinants are numerous and interdependent, the causes can be claiming, ranging from the sanction of hospitalization as a witness of a deficit of management or an exacerbation of the disease.

These are all reasons that have led us to seek concrete and sustainable solutions for the diabetic population, which could not be more fragile, in its compliance process by avoiding behaviors that are harmful to its health. Among the solutions we wish to explore in this article is motivational interviewing, which we consider central to therapeutic compliance in patients with type 2 diabetes. Indeed, we assume that motivational interviewing as a mode of communication and clinical approach would be perfectly suited to chronic diseases because it is the only one, in our opinion, able to detect the ambivalence of diabetic patients towards their treatments and to dissipate all the resistance they might show.

We find ourselves, therefore, at the heart of the trans-theoretical model of change, change or readiness to change, a behavioral approach introduced by psychologists James O. PROCHASKA and Carlo C. DI CLEMENTE at the end of the 1970s (Prochaska, J. O., & DiClemente, C. C. 2005. P: 147). ; Subsequently developed extensively in the field of chronic diseases. We assume that any change in behavior, which in our case is compliance, will inevitably involve a cognitive change, which from our point of view corresponds to the motivation emphasized by motivational interviewing.

The objective of our article is to test the effect of motivational interviewing (MI) on a hard criterion: the evolution of HbA1c blood concentrations, and on

the rate of adherence to the prescribed treatment evaluated using the validated standardized MORISKY scale (MMAS-8) (Ashur, S.T. et al,. 2015. P: 1).

The aim of our study is to help the patient identify his or her own motivations for change, and to examine and explain his or her ambivalence about the decision to change behavior. It aims to motivate the patient to take care of him or herself by focusing on therapeutic compliance. The aim of our article is to answer the main question: can motivational interviewing effectively contribute to improving the non-compliance behaviour of adult type 2 diabetic patients with respect to their treatment ?

1. What is motivational interviewing ?

Motivational interviewing (MI) is a communicative approach developed in the 1980s initially in the field of addiction by William R. MILLER, an American clinical psychologist, and Stephen ROLLNICK, a British psychologist. It is a patient-centered approach whose main goal is to obtain a favorable change in behavior for the patient. Even though MI shares this common denominator with psychotherapies, it is not one. Indeed, it does not aim to correct psychological functioning and can be used in conjunction with all psychological approaches and is adapted to all medical specialties (Miller, W. R., & Rollnick, S. 2019. P: 234).

The French National Authority for Health (HAS) (2008), defines MI as a way of being with our patients, particularly useful in general medicine when we want to address a change in behavior influencing health (tobacco, alcohol, physical exercise, diet, taking medication...). It is based on the assumption that most patients who come for consultation are not necessarily ready to change. Moreover, it is well established that risk factors are often multiple in the same person, and it is sometimes difficult to choose or focus on one factor in particular, from both the physician's and the patient's point of view.

Motivational interviewing is therefore both a spirit and a practice of interviewing, which has been shown to increase the effectiveness of counseling practices, whatever the nature of the change to be made: modification of consumption, risk-taking, or compliance with treatment.

1.1. Trans theoretical model of behavior change

The trans-theoretical model is an integrative model of behavior change designed by taking psychological components from several social-cognitive theories in order to better understand health behaviors. One of the foundations

for the construction of the trans-theoretical model is that no single theory can explain the complexity of human behavior. This makes the trans-theoretical model attractive, at least when used in its entirety. Indeed, the trans-theoretical model is based on several components, some of which are often ignored, which has often earned it the erroneous name of "stages of change model". These components are respectively four in number: stages of change, decisional balance, sense of self-efficacy and, above all, processes of change.

The stages of change represent the most popular, most descriptive, and certainly the most user-friendly motivational part of the trans-theoretical model. There are five stages of change: precontemplation, contemplation, preparation, action and maintenance. They explain where the individual is in terms of intentions/motivation.

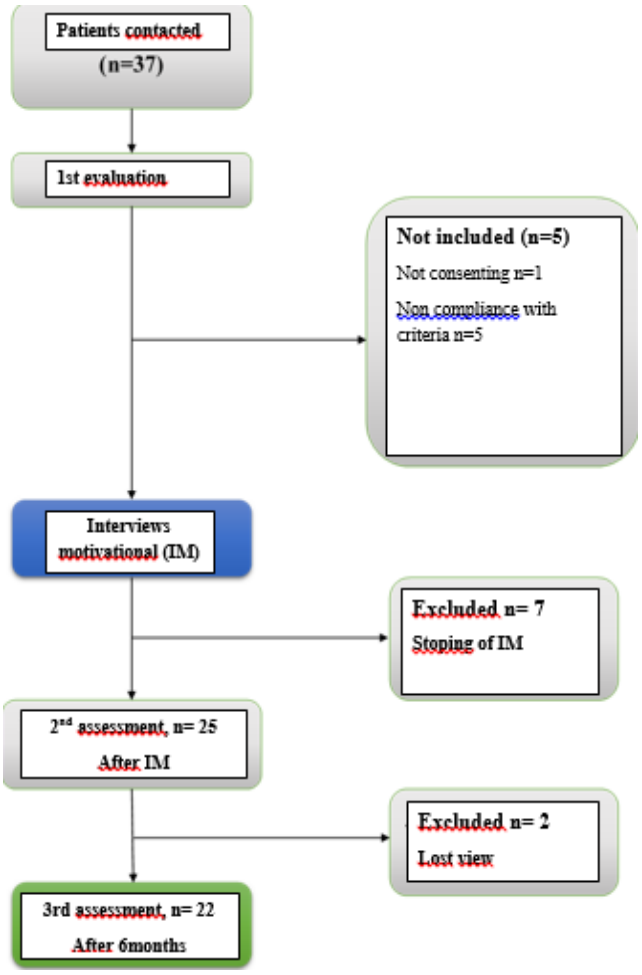
In the precontemplation stage, individuals do not intend to change their behavior in the next few months. They do not perceive any benefit from changing their behavior and are often unaware of the beneficial effects on their health of behaviors to adopt and/or the harmful effects of behaviors to limit or stop. This lack of awareness is often due to ignorance, denial, or a lack of desire following repeated failures. In the contemplation stage, individuals are often aware of their health problem and its consequences and declare that they intend to change their behaviour within the next six months. This stage is often associated with procrastination, as these individuals often tend to postpone implementing the changes they would like to make.

The third stage is preparation. In this stage, individuals have formulated an intention to change their behavior within the next 30 days. These individuals are often looking for appropriate guidance to implement the desired changes. The fourth stage is the action stage and corresponds to when the change was been made less than 6 months ago. This stage is the most likely to be discontinued because the effects of the behavioral change are not readily apparent. The final stage is the maintenance stage, when individuals have been changing their behavior for more than six months. Although the stages of change are easy to understand, it is important to remember that their primary purpose is not to guide interventions, as they are relatively static and the progression between them is mainly associated with the mediators of the trans-theoretical model, and more specifically, the processes of change (Miller, W. R., & Rollnick, S. 2019) (Brogan, M. M. et al,. 1999. P: 105).

2. Research methodology

Our method consisted of a clinical trial, with a quasi-experimental design to evaluate the effects of the motivational interviewing intervention. The study was conducted in a local public health institution (E.P.S.P.) in Bejaia, Algeria (diabetic house, *Beau séjour*). The study population was randomized from 18/09/2021 to 04/07/2022, a follow-up of nine months. The intervention was based on motivational interviewing that encompassed varieties of motivational interviewing techniques. Cited above. Among 37 subjects, we investigated 22 subjects, *see Figure 1*. Our twenty-two subjects were invited by their attending physician, then an informed consent form was signed when each patient agreed to participate. A sociodemographic questionnaire, the MMAS-8 adherence scale and an information sheet on the course of the study were administered at the time of recruitment of the participants.

Figure N° 1: Research Subject Recruitment Flowchart



This intervention consists of a single individual motivational interview, lasting 20 to 30 minutes, inspired by the principles of the trans-theoretical model and the motivational therapy manual of PROCHASKA and DICLEMENTE. The goal is to elicit and promote change in participants to modify their non-compliant behaviors, decrease dissonance in the relationship, and finally explore ambivalence to help resolve their problem behavior. Motivational interviewing was conducted by the first author, a psychologist trained in motivational interviewing.

At the second and third assessments, we met with the same subjects to administer the MMAS-8 scale and take their new glycated hemoglobin (Hba1c) measurements.

2.1. Description of the study sample

The twenty-two study subjects (n=22) had a mean age of 50.82 years. 54.5% were female and 45.5% were male. Most of the subjects 90.9% were insured with CASNOS insurance. 72.7% of the subjects were educated about the disease of diabetes (FTE). Concerning the medication treatment of the subjects 45.5% are on oral antidiabetic drugs (OADs), 27.3% of the subjects are on insulin and 27.3% have a combined treatment of OADs and insulin. The mean Hba1c of participants before MI was 9.24.

The subjects in our study met the following inclusion criteria. Patients seen in a medical or ambulatory care consultation with a follow-up record (*Beau Séjour*, Bejaia. Patients with type 2 diabetes according to accepted diagnostic criteria. Adult patients of both sexes aged between 39 and 52 years. Patients with HbA1c $\geq$ 7.5% at the last known recent measurement. Patients receiving a drug therapy per os or injectable subcutaneous. Available in Algeria. Patients who have the capacity to consent to the research.

While in:

Type 2 diabetic patients on diet alone. Type 1 diabetic patients. Patients with HbA1c $\leq$ 7.5% at the last known recent measurement. Patients with a physical or mental disability. Patients hospitalized during the study. Patients who have absences from two consecutive sessions of motivational interviewing. Patients participating in other educational or psychotherapeutic programs and patients unwilling to participate in the study were excluded from the study.

3. Discussion and analysis of results

Statistical data analysis was performed with Statistical Package for the Social Sciences (SPSS) 20.0 software. Results are presented as mean ± standard deviation or as a percentage. The 1-factor ANOVA test was applied to see the differences in the scores of the three assessment periods, the MMAS-8 scale, and the Hba1c level. The significance level was set at $P < .05$.

We will test the hypotheses of this study, which aim to determine whether motivational interviewing can effectively contribute to improving the non-compliance behavior of adult type 2 diabetic patients to their treatment.

To summarize:

Test of the first statistical hypothesis

H0: Motivational interviewing has no statistically significant effect on medication adherence in Algerian adult type 2 diabetic patients

H1: Motivational interviewing has a statistically significant effect on adherence to medication in adult Algerian type 2 diabetes patients

The table below indicates whether the hypothesis is true or false.

Table 1. One-factor analysis of variance to test the first hypothesis

	Somme des carrés	ddl	Moyenne des carrés	F	Signification
Inter-groupes	35.979	2	17.990	8.028	.001
Intra-groupes	141.176	63	2.241		
Total	177.155	65			

Source: Made by the researchers based on SPSS results

To calculate the F-value of our first statistical hypothesis, we need two pieces of information: the within-group variance and the between-group variance. The variance is the average of the squares of the deviations from the mean, and ANOVA uses the term mean square to denote variability or variance. The mean square is the average of the squared deviations. To calculate F, we need to calculate both the within-group mean square and the between-group mean square. The within-group mean square (IGS) represents the portion of the variability in the data that is produced by the combination of sources that statisticians call error. This forms the denominator or base of F. The inter-group

mean square (IMS) represents the amount of variability produced by both the error and the treatment effects in the experiment. The between-group mean square forms the numerator of the F index.

To test the significance of our F-value, we need to find the critical value, F corresponds to a whole family of distribution. We apply our degrees of freedom to locate the appropriate distribution. When we calculate the necessary mean squares of the F-value, we calculate separate degrees of freedom for CMb and CMw. The degrees of freedom (ddl) for CMb are applied to locate the critical value column by moving to the top of the table. The ddl's are 2 and 63. We chose a significance level of p = < .05 for our experiment with three groups. To be statistically significant, we need a calculated F value greater than the table value for our significance level. Our calculated F value was 8.028 the table value is 0.001 at the 0.05 threshold. Therefore our calculated F is significant. We reject the null hypothesis H0 that the treatment means came from the same population. Our calculated F value is quite large. We confirm the alternative hypothesis H1.

Test of the second statistical hypothesis

H0: Motivational interviewing has no statistically significant effect on glycated hemoglobin in Algerian type 2 diabetic patients

H1: Motivational interviewing has a statistically significant effect on glycated hemoglobin in adult Algerian type 2 diabetes patients

The table below indicates whether the hypothesis is true or false

Table 2. One-factor analysis of variance to test the second hypothesis

	Somme des carrés	ddl	Moyenne des carrés	F	Significat ion
Inter-groupes	4.616	2	2.308	.936	.398
Intra-groupes	155.313	63	2.465		
Total	159.929	65			

Source: Made by the researchers based on SPSS results

We chose a significance level of p = < .05 for our experiment with three groups. To be statistically significant, we need a calculated value of F greater than the table value for our significance level. Our calculated F value was 0.936 the table value is 0.398 at the 0.05 threshold. So our calculated F is significant. We reject the null hypothesis H0 that the treatment means came from the same

population. Our calculated F value is quite large. We confirm the alternative hypothesis H1.

Our objective was to evaluate the effectiveness of motivational interviewing in non-adherent type 2 diabetic patients. All participants invited to take part in our study had a response of interest and consent to participate, not one of defiance and resistance. Subjects also rated motivational interviewing as a favorable and valuable experience. The interpretation of this positive feedback is the reduction in absenteeism in conducting the sessions.

Our analyses of comparison of score means via ANOVA indicate that there were significant differences between the three time periods, i.e., the MI intervention resulted in a significant reduction in glycated hemoglobin (HbA1c) and a significant increase in adherence. The magnitude of the observed effects is comparable to those found in other studies employing MI with different populations with medication nonadherence.

Since 1990, the number of scientific publications on motivational interviewing (MI) has doubled approximately every 3 years. Previous studies on motivational interviewing research constitute a body of literature in themselves. Several meta-analyses have also shown that motivational interviewing is effective in improving adherence to therapy in diabetic patients. It has also been shown that motivational interviewing can contribute to lowering HbA1c levels (Reach, G. 2006).

We demonstrate that in a type 2 diabetic patient, non-adherence and HbA1c level are directly correlated. Motivational interviewing could therefore be used to modify behavioral and clinical outcomes as well as to support patients in the self-management of their OADs and/or insulin treatments. We also show that motivational interviewing reduces the blood levels of HbA1c in diabetes management (Grimaldi, A. 2005. P: 231).

Helping the patient to motivate himself means trying to transform this anxiety into positive energy for the resolution of health behavior problems. Diabetologists generally complain about the lack of motivation of type 2 diabetic patients because of the heavy management that involves: dietary recommendations; medication; monitoring tests (quarterly HbA1c, annual fundus) and physical activity.

The diabetic patient must therefore have good dietary knowledge to vary his meals as he wishes, adjusting the dose of rapid insulin or better analogous rapid

insulin accordingly. With this insulin therapy treatment, called functional insulin therapy or true basal prandial insulin therapy, the patient has a great deal of freedom in the schedule and composition of meals. In fact, insulin therapy is based on a bet that is regularly disturbed, not only because each day is inevitably different from the previous one, even if the physical activity and the carbohydrate intake are roughly similar, but also and above all because the resorption of insulin injected subcutaneously is poorly reproducible from one day to the next.

Motivational interviewing is a practice that has a place as a tool for improving medication adherence. It would be useful for health care specialists to have a minimum of training to improve their communication style with patients. This is a powerful tool for exploring patients' motivations for treatment and for avoiding a potentially confrontational approach in the event of non-adherence. Many points still need to be considered in order to propose and evaluate the best way to use this technique, which seems to be more effective on an individual basis.

Conclusion:

In conclusion, Motivational Interviewing (MI) offers a structured and testable way to think about constructive conversations about change. MI is simple but not easy. It involves the specific use of communication principles and tools to enhance the patient's motivation to change, based on the caregiver's relational attitude, communication strategies and interviewing skills. The knowledge and skills administered to patients are necessary to fill knowledge gaps that might seem indispensable for the treatment of diabetic patients. To conclude our article, we will ask a few perspective questions, in order to open up other avenues of research in the same field at a later date; does therapeutic patient education in combination with motivational interviewing improve compliance and glycated hemoglobin in diabetic patients ?

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