

## The effectiveness of motivational interviewing on the intrinsic motivation in type 2 diabetes patients

### فعالية المقابلات التحفيزية حول الدافع الداخلي لمرضى السكري من النوع 2

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Received: 20/03/2023

Accepted: 21/06/2023

#### Abstract:

This study is a clinical trial of motivational interviewing (MI) sessions applied to adult Algerian patients with type 2 diabetes (T2D) to enhance their motivation to change their non-compliant behavior. Participants were recruited outside of educational or psychotherapeutic programs to test the effectiveness of motivational interviewing in type 2 diabetics who were not necessarily ready to change their non-compliant behavior. We assessed their URICA scale score and measured the CGI scale at three different time periods. Before MI, after MI and after three months of the second assessment. The results indicate that the MI intervention resulted in a significant improvement in patient motivation and a significant increase in the overall clinical status of the T2DM patients. These results suggest that the use of MI is beneficial for type 2 diabetics.

**Keywords:** Motivation; motivational interviewing; behavior change; type 2 diabetes; clinical global impressions.

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**ملخص:**

هذه الدراسة عبارة عن تجربة سريرية لجلسات المقابلات التحفيزية (MI) المطبقة على المرضى الجزائريين البالغين المصابين بداء السكري من النوع 2 (T2D) لتعزيز حافزهم لتغيير سلوكهم غير الممتثل. تم تجنيد المشاركين خارج البرامج التعليمية أو العلاج النفسي لاختبار فعالية المقابلات التحفيزية في مرضى السكري من النوع 2 الذين لم يكونوا بالضرورة مستعدين لتغيير سلوكهم غير المتوافق. قمنا بتقييم درجة مقياس URICA الخاصة بهم وقمنا بقياس مقياس CGI في ثلاث فترات زمنية مختلفة. قبل MI وبعد MI وبعد ثلاثة أشهر من التقييم الثاني. تشير النتائج إلى أن تدخل MI أدى إلى تحسن كبير في تحفيز المريض وزيادة ملحوظة في الحالة السريرية العامة لمرضى T2DM. تشير هذه النتائج إلى أن استخدام MI مفيد لمرضى السكر من النوع 2.

**الكلمات المفتاحية:** التحفيز، المقابلات التحفيزية، تغيير السلوك، داء السكري من النوع 2، الانطباعات السريرية.

**Introduction**

The problem of our study originates mainly from the degree of motivation to change health behaviors observed in patients with type 2 diabetes and the wish to find answers to them. Indeed, there is an almost chronic discordance in some patients between their behaviors and the medical prescriptions they are subject to. Especially, as the degree of motivation to medication among type 2 diabetics in Algeria which is a frequent phenomenon, its determinants are numerous and interdependent, the causes can be claiming, going from the sanction of hospitalization as a witness of a deficit of care or an aggravation of the disease. These are all reasons that led us to look for concrete and sustainable solutions for the diabetic population, which is very fragile, in its compliance process by avoiding behaviors that are harmful to its health. Among the solutions we wish to explore in this article are motivational interviewing, which we consider central to motivation in patients with type 2 diabetes. Indeed, we suppose that motivational interviewing as a mode of communication and clinical approach would be perfectly suitable for 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 that 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); subsequently developed extensively in the field of chronic diseases. We proceed from the principle that any change in behavior would inevitably involve a cognitive change which, from our point of view, corresponds to the motivation developed by motivational interviewing. The objective of our article is to examine the effect of motivational interviewing (MI) on intrinsic motivation and the global clinical state of patients with T2DM. 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 himself by focusing on his intrinsic motivation. Our article will aim to answer the main question: can motivational interviewing effectively contribute to improving the general clinical condition and to reinforcing the motivation to change non-compliant behavior of adult patients with type 2 diabetes to follow their treatment?

### **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

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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.

### **The 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 behavior 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.

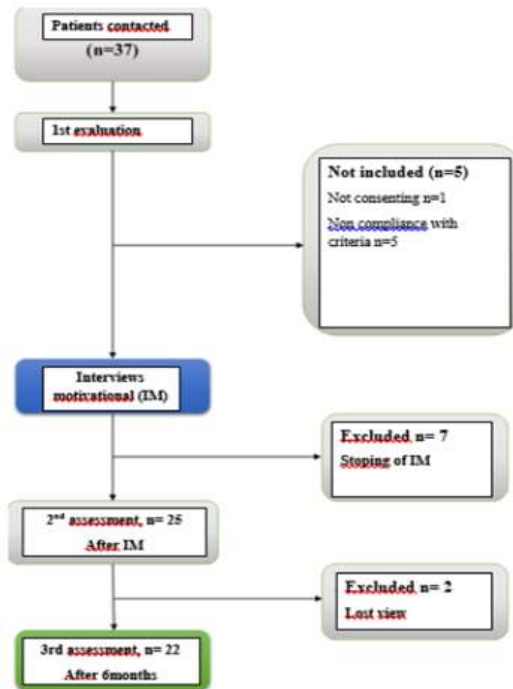
The third stage is preparation. In this stage, individuals have formulated an intention to change their behavior within the next 30

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).

### Method

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 (*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 University of Rhode Island URICA Change Assessment Scale, the CGI Clinical Global Scale, and a study information sheet were administered at the time of participant recruitment.

Figure N°1: Research subject recruitment flowchart



Source: By author

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 noncompliant 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 URICA scale and CGI scale.

### 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 (TPE). Concerning the medication treatment of the subjects 45.5% are on oral antidiabetic medication (OAD), 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.

## 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  $\pm$  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 URICA scale and the CGI scale. 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 enhancing motivation to change treatment noncompliance behavior in adult type 2 diabetic patients.

Motivational interviewing can contribute to strengthening intrinsic motivation for behavior change of non-adherence to treatment in adult type 2 diabetic patients.

In summary:

**Test of the first statistical hypothesis**

***H0***: Motivational interviewing has no statistically significant effect on motivation to change noncompliance behavior in Algerian adult type 2 diabetic patients

***H1***: Motivational interviewing has a statistically significant effect on motivation to change noncompliance behavior in adult Algerian type 2 diabetes patients

The table below indicates whether the hypothesis is true or false

Table N°1: One-factor analysis of variance to test the first hypothesis

Central tendency measurements	Sum of the squares	ddl	Average of squares	F	Signification
Inter-group	85.834	2	42.917	23.615	.000
Intra-group	114.492	63	1.817		
Total	200.326	65			

Source: Made by the researchers based on SPSS results

To calculate the F-value of our third 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 between group mean square (GMS) 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

O 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.

We chose a significance level of  $p = < 0.05$  for our experiment with three groups. To be statistically significant, we need a calculated F value greater than the value in the table for our significance level. Our calculated F value was 23.615 the table value is 0.000 at the 0.05 level. So our calculated F is significant. We reject the null hypothesis H0 which considers that the treatment means came from the same study population. Our calculated F value is quite large. We confirm the alternative hypothesis H1 and conclude that there is sufficient evidence to support the claim that motivational interviewing has a statistically significant effect on motivation to change noncompliant behavior in adult Algerian type 2 diabetic patients.

**Test of the second statistical hypothesis**

**H0:** Motivational interviewing has no statistically significant effect on the general clinical status of the adult Algerian type 2 diabetic patient

**H1:** Motivational interviewing has a statistically significant effect on the general clinical status of the adult Algerian type 2 diabetic patient

The table below indicates whether the hypothesis is true or false

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

Central tendency measurements	Sum of the squares	ddl	Average of squares	F	Signification
Inter-group	43.303	2	21.652	20.154	.000
Intra-group	67.682	63	1.074		
Total	110.985	65			

Source: Made by the researchers based on SPSS results

We chose a significance level of  $p = < 0.05$  for our experiment with three groups. To be statistically significant, we need a calculated

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value of F greater than the table value for our significance level. Our calculated F value was 20.154 the table value is 0.000 at the 0.05 level. So our calculated F is significant. We reject the null hypothesis H0 which considers that the treatment means came from the same study population. Our calculated F value is quite large.

We confirm the alternative hypothesis H1 and conclude that there is sufficient evidence to support the claim that motivational interviewing has a statistically significant effect on the general clinical condition of Algerian adult type 2 diabetic patients.

### **CONCLUSION**

Our first objective was to evaluate the effectiveness of motivational interviewing on the motivation to change non-compliance behavior of adult type 2 diabetic patients Bejaia Algeria and their overall clinical condition. Among 37 subjects with T2DM, 22 participated in the study.

Our twenty-two subjects were asked to respond to two scales: the URICA Behavior Change Motivation Scale; and the CGI Clinical Global Impression Scale. Before motivational interview and two assessments after motivational interview. Eight weekly individual MI sessions were conducted with the entire study population. The results of the present experiment confirmed our general hypothesis according to which motivational interviewing acts on the intrinsic motivation of behavioral change, the non-observance of drug treatment and the overall clinical condition of adult type 2 diabetic patients from the region of Bejaia. The overall clinical condition of the diabetic patient implies the adoption of appropriate health behaviors, such as self-monitoring of blood glucose, taking medication (oral antidiabetics and/or insulin), performing monitoring tests (e.g. quarterly HbA1c), monitoring by the health care team (general practitioner, diabetologist, nurse, dietician, possibly hospital consultation, day hospitalization, etc.). As we have already seen, adherence is defined by the adequacy of the patient's behaviors in relation to the recommendations made to him/her, and may concern each of these aspects of treatment. The health care offer in Algeria has been developed around different structures, such as dispensaries, health centers, policlinics, and hospitals. Each of these structures is involved and participates at different levels in the screening of diabetes, the follow-up, and the therapeutic education of each patient. All these parameters are inseparable in the global management of the diabetic patient. Therapeutic patient education

(TPE) plays an essential role, and needs to be developed on the preventive and curative aspects by trained health professionals. Several models were proposed between 1950 and 1980 in an attempt to understand how health behaviors are adopted (Reach, G. 2006). These models are based in psychology, sometimes referred to as "behavioral science," and more specifically here, one of its relatively new fields. As a science, psychology must show through rigorous "empirical" investigations that statistically significant correlations can be demonstrated between assumed determinants and observed phenomena. It essentially uses models that are almost all derived from the mainstream of psychology, which is clearly socio-cognitive in orientation. It is important to remember that the spirit that underlies MI is more important than its techniques. MI is indeed a way of being with people and the spirit that underlies it is built through the understanding of human nature and the relationship with the other. KAFKA's aphorism thus seems as true today as it was in 1917: "prescribing is so easy, understanding people so difficult".

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