The Use of Motivational Interviewing by Healthcare Providers to Improve Glycemic Control in Patients with Type 2 Diabetes

Anna Dickey

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The Use of Motivational Interviewing by Healthcare Providers to Improve Glycemic Control in Patients with Type 2 Diabetes

Abstract

**Background:** Type 2 diabetes mellitus (T2DM) is a multi-factorial disease which requires significant patient self-management in order to maintain glycemic control. Patients with T2DM must be vigilant in maintaining a good diet and consistent exercise while also monitoring blood glucose levels. Many patients are ambivalent about making these necessary lifestyle changes. Motivational interviewing (MI) is a patient centered counseling technique which focuses on allowing patients to explore ambivalence to lifestyle changes. This review examines the efficacy of training healthcare providers in motivational interviewing in an effort to improve clinical outcomes of Hemoglobin A1c, BMI, blood pressure and total cholesterol.

**Method:** An exhaustive search of available medical literature was conducted using Medline, CINAHL, Web of Science and EBMR Multifile to identify studies that incorporated MI training of healthcare providers to effect lifestyle changes in patients with T2DM and thus decrease hemoglobin A1c (HbA1c) blood pressure, body mass index (BMI) and total cholesterol. The logistics of MI training and its ability to be incorporated into usual care were also examined. Two studies met the inclusion criteria and one additional study was used for discussion purposes.

**Results:** The two RCTs reviewed showed there was no enduring improvement in HbA1c, blood pressure, BMI or total cholesterol when comparing motivational interviewing was added to usual care.

**Conclusion:** Although health care providers could successfully demonstrate the tenets of MI, motivational interviewing showed lackluster results in improving clinical outcomes in patients with type 2 diabetes. Any improvements in glycemic control are short lived. Training in MI and applying its tenets in practice is time consuming and requires a significant commitment on the part of healthcare providers.

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The Use of Motivational Interviewing by Healthcare Providers to Improve Glycemic Control in Patients with Type 2 Diabetes

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A Clinical Graduate Project Submitted to the Faculty of the
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Faculty Advisor: Dr. Robert Rosenow, Pharm.D., O.D.
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Biography

Anna Hess Dickey was raised in Dallas, Texas but has spent the majority of her years in Colorado. She earned Bachelor Degrees in both Political Science and Communications from the University of Texas, Arlington. She worked as a paralegal for several years before starting her own business in asset location and judgment collection. She has also worked as an EMT and a volunteer firefighter. She has three beautiful children and has been married to Russell Dickey for many, many years.
Abstract

**Background:** Type 2 diabetes mellitus (T2DM) is a multi-factorial disease which requires significant patient self-management in order to maintain glycemic control. Patients with T2DM must be vigilant in maintaining a good diet and consistent exercise while also monitoring blood glucose levels. Many patients are ambivalent about making these necessary lifestyle changes. Motivational interviewing (MI) is a patient centered counseling technique which focuses on allowing patients to explore ambivalence to lifestyle changes. This review examines the efficacy of training healthcare providers in motivational interviewing in an effort to improve clinical outcomes of Hemoglobin A1c, BMI, blood pressure and total cholesterol.

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**Keywords:** Motivational interviewing, type 2 diabetes mellitus, Hemoglobin A1c, lifestyle changes, efficacy, healthcare providers.
Acknowledgements

To my husband and children, my sister and my wonderful friends who have all shared this journey with me. Your unfailing support and counsel have given me great comfort and guidance. And, to Robin and Jane, you ride on my shoulders like the angel and the devil. Your lessons were hard taught; my epiphanies richly earned.
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List of Abbreviations

BMI…………………………………………………………………… Body Mass Index
CDE………………………………………………………..Certified Diabetes Educator
GP……………………………………………………………………..General Practitioner
HbA1c…………………………………………………………………... Hemoglobin A1c
MI.................................................................................................Motivational Interviewing
T2DM………………………………………………………….…Type 2 diabetes mellitus
The Use of Motivational Interviewing by Healthcare Providers to Improve Glycemic Control in Patients with Type 2 Diabetes

BACKGROUND

As the incidence of type 2 diabetes increases worldwide, innovative treatments are needed if healthcare providers are to support diabetic patients in achieving glycemic control and becoming proficient with at-home self-management. Diabetes is a multifactorial disease requiring a multi-pronged approach to delay its onset and progression to life threatening complications. In addition to regular appointments with healthcare providers, much of diabetes treatment takes place at home, from blood glucose monitoring to making diet choices and increasing physical activity. Accordingly, comprehensive treatment should encompass 1) evidence based medical care and 2) educating patients in the disease process and teaching skills needed for effective self-management.

Successfully accomplishing lifestyle changes, such as improved diet and increased physical activity, can bring improvements in HbA1c, blood pressure, BMI and total cholesterol. But, finding the motivation to make lifestyle changes is difficult for many patients. Their lifestyle habits are deeply ingrained. Motivational interviewing (MI) is a novel adjunct to usual care. It is patient centered as opposed to provider imposed. MI aids the patient in focusing on past experiences which may present barriers to change.¹

In contrast to traditional, more paternalistic counselling styles, MI gives the patients’ knowledge and experiences a central role in finding the best
behaviour change strategies. The motivation to change should originate from the patient instead of being imposed by the health care professional. Motivational interviewing is centered on the following concepts:

- Explores ambivalence to change
- Explores barriers to and facilitators of success
- Elicits and reinforces change talk
- Reflective listening
- Resists offering advice without permission
- Allows patients to reach his/her own conclusions rather than confronting

While originally developed to assist patients struggling with alcohol addiction, the concepts of motivational interviewing are being applied in other areas including weight loss and diabetes.

**METHODS**

A comprehensive literature search was conducted using the following search engines: Medline, CINAHL, Web of Science and Evidence Base Medicine Reviews Multifile. The following search terms were used: diabetes mellitus type 2, motivational interviewing, A1c, glycemic control and efficacy.

The studies relating to MI and diabetes management take two different perspectives. Several studies randomized patients to usual care alone or usual care plus MI. Other studies were from the point of view of the clinician and examined complexities of MI training. The focus of this review examines the efficacy of healthcare providers in applying MI counseling techniques in order to improve clinical outcomes.
Inclusion criteria

Studies published within the last ten years and which examined the efficacy of training healthcare providers to deliver motivational interviewing counseling techniques to adult patients with type 2 diabetes (T2DM) were included. Only those studies which randomized healthcare providers and which used the clinical outcomes of HbA1c, BMI, blood pressure and total cholesterol were included. Studies were included regardless of the number of MI sessions that occurred or whether the MI sessions were embedded in usual care or occurred as separate out-patient appointments. Randomized controlled trials and observational studies were included.

Exclusion criteria

No exclusion criteria were made for length of follow up or for race or gender of patients. Studies in which the patient populations had type one diabetes only or were adolescents or used other methods of behavioral motivation, such as cognitive behavioral therapy, were excluded.

Quality

The GRADE assessment tool was used to evaluate the quality of the studies included in this systematic review. Although each study was a randomized controlled study, each study was downgraded because of limitations in quality with regard to lack of concealment or imprecision due to small sample size. No study was upgraded.

RESULTS

The abstracts of 80 articles were initially retrieved and reviewed via electronic databases. Eighteen articles were assessed more thoroughly with regard to inclusion and exclusion criteria. Finally, two studies met the eligibility criteria. Additionally, one
article, Miller et al, did not meet the criteria but offered thought-provoking comments on patient perceptions of doctor-patient communication and MI and was discussed in the Conclusion. The characteristics of each study, including limitations and risk of bias, are shown on Table 1, Characteristics of Studies.

**Heinrich et al**

The primary outcome of this two year study was the efficacy of MI training of diabetes nurses as measured by surrogate outcomes which included HbA1c, weight, blood pressure and total cholesterol. Using cluster randomization, 18 nurses in two districts in the Netherlands were assigned to an experimental group. Fifteen nurses in two separate districts were assigned to usual care. In total, 36 general practices were included in the study. Nurses in the experimental group attended two five-hour MI counseling sessions conducted by certified MI trainers. The nurses then applied the learned MI counseling techniques during quarterly appointments with their patients. The nurses were evaluated by MI at 3, 6, 9 and 11 months. Fifteen nurses in the usual care group also saw patients quarterly. The patient population was derived from a list of eligible patients suggested by the nurses and who had had diabetes for less than five years, was between the ages of 40 and 70, did not have severe co-morbidities and could speak Dutch. Patient outcomes were measured at 12 and 24 months.

The authors concluded that no advantages could be seen in patients who received MI over patients who received usual care (see Table 2). No significant improvements were seen in HbA1c, weight or blood pressure. P values were not calculated as the authors provided only mean scores for outcomes. The authors question whether the lack of promising results might have been due to the fact that the MI sessions were embedded
into regular quarterly appointments instead of separate MI sessions. Further, the authors propose that the patient population in this study was not overtly unhealthy at baseline so improvements in surrogate outcomes might be less pronounced.¹

Rubak et al

Rubak et al⁴ sought to evaluate how well Danish general practitioners (GPs) trained in MI could improve patient adherence to intensive treatment and medication protocols over the course of one year. GPs were randomized to an intervention group (37 practices/ 64 GPs) and given one and a half days of MI training or a control group (43 practices/76 GPs). GPs in both groups attended a half day course on intensive treatment of type 2 diabetes. Accordingly, 628 patients with an average age of 61 were cluster randomized by their respective GP. Clinical surrogate endpoints of HbA1c, BMI, blood pressure and total cholesterol were measured at 12 months. GPs in both groups were allowed three 45 minute appointments with patients instead of the usual 15 minutes.⁴

The authors found that both groups showed equal improvement in clinical outcomes (see Table 2). “An explanation of lack of difference may be that GPs in the control group may have taken up core elements of MI, and that GPs in the intervention group used less than two out of the three planned MI consultations.⁴” The authors surmise that the lack of difference between the two groups could be due to the training of GPs in intensive treatment of type 2 diabetes.⁴

DISCUSSION

The main theme of motivational interviewing, exploring ambivalence to making lifestyle changes, is a worthy adjunct to the current usual care. MI has shown success in the areas of alcohol addiction.² Therefore, its analogous transition to achieving lifestyle
changes in patients with diabetes would seem a likely adaptation. Unfortunately, as the studies in this review show, improvements in the surrogate clinical outcomes of HbA1c, BMI, blood pressure and total cholesterol have been less robust. MI did not show clear and convincing evidence of improvement from baseline measurements. The Summary of Findings, Table 2, reflects the specific resultant measurements for the surrogate clinical outcomes in each study.

**Patient perceptions**

Patient perceptions of MI play a role in its ability to bring about change. In a study evaluating perceptions of MI, African American women with diabetes and who live in the rural South were shown two videos: one was an excerpt from an MI training DVD presenting a patient-physician conversation in which the physician asks open ended questions and allows the patient to express ambivalence about making changes. The second exchange depicts the physician dominating the conversation and asking close-ended questions.

The women described the communication in the non-MI consultation as poor saying the physician was unyielding. While they made positive comments about the MI consultation, ultimately they felt a more paternalistic approach was “representative of a good consultation and was what they were used to.”

A representative quote was, “He [provider] was asking the patient more questions about this decision, instead of him [provider] telling him.” And, “He [health care provider] [was] not giving the patient much information. He’s supposed to know, he’s the doctor.”
**Failure to adapt MI to diabetes treatment**

One possible reason why MI shows success in alcohol addiction but fails with diabetes could be the all-encompassing nature of diabetes treatment. Whereas treating alcohol addiction is a singular focus, successful diabetes treatment involves a total upheaval of a patient’s current lifestyle. It requires education in correctly using glucose monitoring equipment and, equally important, interpreting glucose levels to make diet changes accordingly. It requires reading food labels and revamping menus. It requires patients to rearrange their day to incorporate physical activity.

**Logistics of incorporating MI in clinical practice**

The application of MI in diabetic treatment remains unclear. For instance, can MI be embedded in the patient’s usual care appointment or are its tenets more poignant when delivered as a separate appointment. Further, training health care professionals in MI and the ability of providers to then effectively and consistently employ MI poses additional barriers to its success. It is important for clinicians to be adequately trained in MI lest their efforts be for naught. But, training is time consuming. The studies evaluated in this review fairly consistently reflect a large time commitment needed for adequate training. On average, healthcare professionals attended at least two full days of initial training with additional monthly or bi-monthly follow up sessions. And, while Rubak et al\(^4\) demonstrated the uptake of the spirit of MI to be successful amongst its study participants, the healthcare professionals in its study were motivated and interested in MI. How will clinics impose training on those less enamored by MIs training commitment?
Further, who is the best professional to convey MI to patients: doctors, PAs, nurses, diabetes educators? Heinrich et al\(^1\) suggests that given the lackluster results of diabetes nurses to apply MI and improve clinical outcomes, perhaps MI should remain the province of trained psychologists.\(^1\) Yet another study, Welch et al,\(^5\) states that psychologists do not have the diabetes training needed to effectively tailor MI to this patient population.

Finally, the cost to train staff in MI counseling is a considerable stumbling block for many clinics especially given the underwhelming results of MI in improving surrogate clinical outcomes. Rubak et al\(^4\) estimated the cost to train four diabetes instructors to be approximately $57,000 over a three year period along with $22,500 for necessary software.

**Limitations**

Both Heinrich et al\(^1\) and Rubak et al\(^4\) showed some degree of limitation relating to either short duration of study, small sample size or poor randomization. However, given the fact that none of the studies could show that MI improved surrogate clinical outcomes, these limitations do not seem to create a false positive effect.

Patients in Heinrich et al\(^1\) were at or near target goals for diabetes which waters down any positive effect MI might have had. Further, the patients did not always see the same nurse at each visit. This could skew results of patient testing and clinicians’ interpretation of the more subjective results such as perception of confidence and self-management. This might also contribute to the inconsistencies amongst nurses’ application of MI protocols.
In Rubak et al\textsuperscript{4} general practitioners in the intervention group attended a one and a half day training session using a manual entitled, “Motivational Interviewing, preparing people to change addictive behavior.”\textsuperscript{4} The origins of MI are rooted in the treatment of drug and alcohol addiction and judging by the title, the manual does not seem particularly geared towards a diabetes setting. Without further description of the specifics of training manual, the manual appears to be a hold-over from early MI training and if true, could hamper the applicability of training providers in the diabetes setting.

Another area of concern in Rubak et al\textsuperscript{4} is the amount of time allowed for appointments. GPs in both groups were allowed three consultations of 45 minutes each per patient.\textsuperscript{42} GP’s in the intervention group were to use this time for motivational interviewing. It is unclear how GPs in the control group spent the additional appointment time. It is possible that the increased individual attention that patients in the control group received positively affected their surrogate outcomes. This muddies the study’s conclusions. Both groups in the study showed improvements in surrogate outcomes. Was the reason due to MI or due to some other intervention used in the control group?

**Recommendations**

The duration of the studies included in this review was quite short. The detrimental lifestyle choices which brought most diabetic patients to the point of needing treatment are well ingrained. Considering the immensity of what is required of diabetic patients to be successful in making lifestyle changes, it is plausible that these changes will not take place in the span of six months, one year or even 24 months. Longer study periods are needed to evaluate whether motivational interviewing will have a positive effect on diabetic patients over the long run.
CONCLUSION

Motivational interviewing (MI) was initially developed to treat alcohol addiction and so its application in the diabetes treatment setting is still a very new approach. But, as with any therapeutic approach which is deeply dependent on patient input and ownership, successful transition and application may not be smooth. Diabetes treatment is comprehensive and requires much dedication on the part of patients explore ambivalence to change. The implementation of MI in the diabetic setting warrants further exploration.
REFERENCES


### TABLE I: Characteristics of Studies

<table>
<thead>
<tr>
<th>Design</th>
<th>Limitations to quality</th>
<th>Inconsistency</th>
<th>Indirectness</th>
<th>Imprecision</th>
<th>Other Considerations</th>
<th>Case</th>
<th>Control</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster randomized controlled trial</td>
<td>Moderate Limitations(^a,b)</td>
<td>No</td>
<td>No indirectness</td>
<td>No imprecision</td>
<td>Patient population already at target goals</td>
<td>18 nurses; variable number of patients</td>
<td>15 nurses; variable number of patients</td>
<td>⊕⊕ΟΟ</td>
</tr>
<tr>
<td>Rubak et al. Effect of “motivational interviewing” on quality of care measures in screen detected type 2 patients: A one-year follow-up of an RCT, ADDITION Denmark. <em>Scandinavian Journal of Primary Health Care</em>. 2011;29:92-98.</td>
<td>No Limitations</td>
<td>No inconsistency</td>
<td>No indirectness</td>
<td>No imprecision</td>
<td>Patients were already at target goals at start of study</td>
<td>37 practices; 64 GPs(^*) 307 patients</td>
<td>43 practices; 76 GPs(^*) 321 patients</td>
<td>⊕⊕ΟΟ</td>
</tr>
</tbody>
</table>

\(^a\) No concealment  
\(^b\) Trial lacks blinding

\(^*\) Certified Diabetes Educator  
\(^\text{**}\) General Practitioner
## TABLE 2: Summary of Findings

<table>
<thead>
<tr>
<th>Study</th>
<th>No of health-care providers Randomized</th>
<th>Age of patients (mean)</th>
<th>HbA1c % (mean)</th>
<th>BMI or Weight</th>
<th>Blood Pressure</th>
<th>Total Cholesterol</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rubak et al</strong></td>
<td>Event: 64 GPs Control: 70 GPs</td>
<td>Event: 6.9 % Baseline</td>
<td>∆ -0.7*</td>
<td>Event: 30.5 Baseline</td>
<td>Event: 140/84 Baseline</td>
<td>Event: 214.5 mg/dL Baseline</td>
</tr>
<tr>
<td></td>
<td>Control: 6.8 % Baseline</td>
<td>Follow up</td>
<td>Follow up**</td>
<td>∆ -0.8*</td>
<td>∆ -4/3.8*</td>
<td>∆ -0.9*</td>
</tr>
<tr>
<td><strong>Heinrich et al</strong></td>
<td>Event: 18 Nurses Control: 15 Nurses</td>
<td>Event: 6.49 % Baseline</td>
<td>0.02 (-0.10-0.14) / 0.09 (-0.05-0.23)</td>
<td>Event: 195 lbs Baseline</td>
<td>Event: 139/82 Baseline</td>
<td>Event: 181 mg/dL Baseline</td>
</tr>
<tr>
<td></td>
<td>59 years old Event: 6.51 % Baseline</td>
<td>Follow up at 12/24 months</td>
<td>0.23)</td>
<td>Follow up**</td>
<td>Systolic: -1.29 (-4.17-1.59)</td>
<td>Event: Δ0.6(-0.09-.22)</td>
</tr>
<tr>
<td></td>
<td>Control: 194 lbs Baseline</td>
<td>Baseline</td>
<td>Follow up**</td>
<td>-0.03 (-0.73-0.79) / -0.33 (-0.57-1.23)</td>
<td>Diastolic: 0.24 (-1.31)</td>
<td>Control: Δ-0.08 (-0.56-0.10)</td>
</tr>
</tbody>
</table>

* p < 0.01 with no statistical significance  
**Follow up at 12 months  
°Event group vs. Control group (95% CI)