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Andrew L. Roberts

Wayne State University School of Medicine, Detroit, fm2130@wayne.edu

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Cover Page Footnote

The author would like to acknowledge Elizabeth Roberts for her unfettered charity.

Inpatient motivational interviewing for adolescent type 1 diabetics with poor glycemic control is ineffective

ANDREW L. ROBERTS, Wayne State University School of Medicine, fm2130@wayne.edu

ABSTRACT A clinical decision report appraising Wang Y-C, Mackenzie M, Nakonezny PA, et al. A randomized controlled trial comparing motivational interviewing in education to structured diabetes education in teens with type 1 diabetes. *Diabetes Care*. 2010;33(8):1741-1743. <https://doi.org/10.2337/dc10-0019>.

Keywords: *Motivational interviewing, type 1 diabetes, adolescent, teenage, pediatric, poor glycemic control*

Clinical Context

Arael Smith (pseudonym) is a 13-year-old African American female with Type 1 Diabetes Mellitus (T1DM), diagnosed 3 years ago, who was admitted to the hospital in diabetic ketoacidosis (DKA) with hemoglobin A1c (HbA1c) of 12.4%. She uses injection pens to administer insulin and was not interested in a pump due to its invasive and visible nature. Initiation of her home insulin regimen brought her sugar quickly under control, and her hospital stay was uncomplicated.

After stabilization, standard diabetes education (SDE) was provided. Ms. Smith was reminded of the need for regular glucose checks, rigorous meal planning, consistent and appropriate insulin administration, and long-term complications of diabetes. Subjective observation suggested she expressed minimal intent for behavior modification. The patient maintained a reticent expression during conversations, only signaling understanding when appropriate. Her parents also expressed concern over her apparent lack of effort to measure portion sizes. Later, she was engaged in a conversation about barriers to change and disclosed no desire to administer insulin in the lunchroom for fear of being seen by friends at school. She was concerned about “how people see me” and not wanting to “look like a freak.”

After her discharge, the healthcare team discussed the struggle of connecting with teenagers. Self-care becomes an independent task, requiring regimented insulin and dieting schedules for which adolescents often have no affinity. Adolescents with chronic health conditions face unique difficulties from their peers, which can be isolating, and they may not feel a strong enough bond with an acquaintance to open their hearts. In discussion, motivational interviewing (MI) was raised as a possible tool to better connect with patients like Ms. Smith.

MI debuted in 1983 as a method of motivating change in alcohol abuse.¹ The basic tenets of MI are facilitating talk of change, avoiding reasons not to change, encouraging a partnership between provider and patient, and cultivating mature empathy for the patient.² No consensus has been reached regarding the clinical recommendations for MI use in T1DM education, making its potential efficacy in Ms. Smith's case a pertinent clinical question.^{3,4}

ANDREW L. ROBERTS is a medical student at Wayne State University School of Medicine.



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Clinical Question

Is inpatient motivational interviewing more effective than standard care in improving long-term glycemic outcomes in adolescents with poorly controlled type 1 diabetes?

Research Article

Wang Y-C, Mackenzie M, Nakonezny PA, et al. A randomized controlled trial comparing motivational interviewing in education to structured diabetes education in teens with type 1 diabetes. *Diabetes Care.* 2010;33(8):1741-1743. <https://doi.org/10.2337/dc-10-0019>.

Related Literature

PubMed was searched for “pediatric motivational interviewing,” “motivational interviewing type 1 diabetes,” “motivational interviewing juvenile diabetes,” “inpatient motivational interviewing type 1 diabetes,” “inpatient motivational interviewing diabetes,” and “inpatient motivational interviewing pediatric diabetes.” The term pediatric was replaced with adolescent and teenager as appropriate. Over 100 results were found. Abstracts were reviewed for relevance. A systematic review and meta-analysis from these results were used for additional relevant citations.^{3,4} The search term ‘(motivational interviewing[all fields] AND (type 1 diabetes[all fields]))’ filtered by randomized control trial (RCT) produced 15 search results. Seven articles were ultimately chosen for review based a combination of population demographic similarity to Ms. Smith, the number of interventions, and size of study.

Wang et al. studied a short MI intervention in adolescents with poorly controlled T1DM through a physician-blinded RCT over a 9-month period.⁵ Forty-four patients between the ages of 12-18 with HbA1c $\geq 9.0\%$ were provided 2 sessions 3-4 months apart, two telephone follow-ups, and a third session if hemoglobin A1c (HbA1c) values remained $\geq 9.0\%$. The inclusion criteria fit Ms. Smith’s demographics well, and the small number of interventions approximates a short hospital stay, which cannot provide recurring MI discussions. In addition to HbA1c levels, psychosocial outcomes, namely depression, quality of life, and diabetes self-care, were also measured. These metrics address psychosocial stressors impacting Ms. Smith.

The Channon group ran a 2-year RCT that enrolled 60 teenagers with T1DM in 1 year of interventions every 6-8 weeks.⁶ In this trial, MI produced and sustained significantly lower HbA1c levels and produced positive psychosocial effects. While they carried out a 1-year follow-up with a similar patient population to the Wang study, the high number of interventions does not suit the hospital setting.

Ellis et al. crafted an intriguing RCT using a clinic-based, computerized, MI intervention involving African American teenagers and their primary caregivers.⁷ Both glycemic control and diabetes care activities improved from baseline when only caregivers were enrolled, but, the computer system (CAIS) used in the study cannot provide reflective questions to approximate human capacity.⁸

Caccavale et al. sought to quantify the relationship between closer adherence to MI interview principles and glycemic control through a single-interview RCT.⁹ They found that deviation from MI toward a more confrontational style correlated with a higher glycemic index. Despite the novel angle, it was not chosen because the study did not have a control, and the intervention efficacy was measured only 3 months after intervention.

The Ismail group isolated poorly controlled diabetic adults in an RCT that tested MI or MI plus cognitive behavioral therapy (CBT) against SDE. This study found significant HbA1c depression only in the group that underwent MI plus CBT. However, it excluded pediatrics from the participant pool and provided more therapy sessions to the intervention arms than control.

The FLEX study group published the results of the Flexible Lifestyles Empowering Change (FLEX) method, a combination of MI and problem-solving skills training (PSST).¹⁰ They found no statistical difference in HbA1c after 18 months of treatment compared with control. On the other hand, psychosocial measures of health such as motivation, problem-solving, and diabetes self-management were significantly improved after treatment. Unfortunately, this study did not align well with an inpatient setting due to the large number of interventions.



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Rosenbek et al. investigated long-term effects of an intensive MI treatment on a large adult cohort of type 1 and type 2 diabetics (n=298) in an RCT format.¹¹ They found no statistical difference between intervention and control HbA1c at 2-year follow-up. MI did benefit perceived diabetes self-care competence. Patients were only interviewed 4-5 times, which approaches the feasibility of a hospital setting, and were followed for 2 years. Despite the large sample size, the population only included adults, and made no distinction between type 1 and type 2 diabetes.

The lack of consensus between multiple RCTs produced a Strength of Recommendation B against in-patient MI sessions, according to the SORT taxonomy.¹²

Critical Appraisal

According to the SORT taxonomy scale,¹² the Wang study offers level 1 evidence for the question at hand. This was a physician-blinded, randomized prospective trial. Patients were not blinded to the treatment due to the nature of the intervention.

Inclusion criteria required age 12-18, diagnosis >1yr, and HbA1c $\geq 9\%$, which fit Ms. Smith's situation. Unfortunately, the criteria also reduced the potential patient pool, hurting the study's power. 54 participants were randomized into the MI group (n=26) or the SDE group (n=28), which produced a balanced set of baseline characteristics. Patient race, sex, and insurance demographics were recorded. HbA1c levels at baseline also reflected effective randomization.

Intention to treat was present since each arm was analyzed separately. However, several problems emerged. Data from 10 patients in the randomized pool (n=54) was not published, likely due to loss of follow up. An explanation should have been provided. Five participants in the control group and six in the intervention were not included in analysis for reasons not disclosed in the manuscript. Additionally, a discrepancy was noted between the number of participants not included in the study; the document text stated 11 while the table recorded 10.

This trial's structure effectively studied the impact of MI sessions directly against control sessions in a 1:1 ratio. Both control and MI groups met twice, or a third time if HbA1c remained $\geq 9\%$ for either standard education or MI sessions, respectively, with two follow-up phone calls between sessions 1 and 2. Treatment and control received an equal-length session in addition to visiting their physician, equalizing patient-provider contact. The sessions were facilitated by diabetes educators who trained in MI for this study. Videotapes of the sessions vetted MI provider proficiency according to MITI 3.0 guidelines.¹³ Of note, this article was published before the MITI 4.0 code was released.¹⁴

Statistical analysis applying least square means was performed for this trial structure, an appropriate choice for accurate analysis of patient data in a two-variate system. Standard error was provided, and the F test was applied to all results to assure no hidden variance was present in the samples. While an omnibus test is helpful in detecting variation between the samples, it does not help determine difference width. This could have been improved by growing the limiting factor—sample size.

The chosen outcome measures provided an adequate understanding of both the quantitative HbA1c and more qualitative psychosocial influences of MI interventions, the later an important consideration in Ms. Smith's case. Patient life satisfaction, lifestyle, and level of worry were all reported in the EDIC-QOL scale in addition to HbA1c.¹⁵ Depression was measured with the Epidemiologic Studies Depression Scale, a standard depression scale.¹⁶ Diabetes self-care used a standard selfcare questionnaire as well.¹⁷ Primary caregiver data would offer an excellent addition to this study.

In this study, two sessions of motivational interviewing were ineffective at lowering HbA1c levels at 6-months compared to SDE. In fact, the control arm HbA1c least squares mean (10.31%) was significantly lower than intervention (11.35%) with medium effect size (Cohen's $d = -0.66$ [0.5-0.8 is considered medium effect]). This unexpected finding begs rejection of the alternate hypothesis in favor of SDE. The authors concluded that education may be equally valuable for adolescent diabetics with poor control as engaging them in reflective, change-oriented conversation. This conclusion is best applied to an inpatient context, not generalized to all interactions, as exemplified by a body of research addressing other contexts.^{9,10,18}

Both MI and standard education failed to produce HbA1c results approximating good glycemic control, indicating other factors, such as psychosocial pressures, play a major role.



Clinical Application

Arael Smith is an adolescent type 1 diabetic presenting in diabetic ketoacidosis with a history of poor glycemic control. She expressed difficulty adhering to a glycemic regimen, citing peer pressure and an internal feeling of alienation. MI was later discussed as an alternate means of enhancing behavior change in patients like herself, but the appraised article provides evidence against the efficacy of MI in hospital settings for patients with T1DM and poor glycemic control, and actually showed improved glycemic outcomes in the SDE group over MI. MI also did not benefit psychosocial factors of health, including depression, life satisfaction, and diabetes self-care activities. SDE alone only produced a minimal HbA1c drop of 0.8%, suggesting that other factors besides talk toward change and SDE impact glycemic control.

Ms. Smith revealed insecurity over peer opinions of her condition. MI may provide tools to help her cope with that fear or find ways to hide her condition, while allowing her to practice self-care diligently. In the hospital setting, however, she would not have benefitted significantly from several MI interview sessions with staff, according to the Wang et al. study. As a patient with long-standing diabetes but without tight glycemic control, conversations addressing her psychosocial pressures might have produced stronger results than either SDE or MI alone.

New Knowledge Related to Clinical Decision Science

Unfortunately, Ms. Smith was discharged before a decision could be made regarding the best approach in counseling her, and it is unknown whether the medical team was successful in its efforts to help her gain diabetic control. However, Ms. Smith's dilemma is a common one, especially in the adolescent patient population, and thus the clinical decision science being described is applicable to a wide variety of patient contexts. As this analysis illustrates, perhaps contrary to expectation, well-intentioned MI has no guarantee of superiority over traditional approaches, especially if MI is delivered short-term in the inpatient setting. This is not to say that MI cannot be effective, but rather that specific patient context must be taken into consideration when determining the best method of counseling.

Clinical Decision Science forces us to strive for decisions that make sense to the patient being treated. Home visits have been used in other settings. Perhaps a "school visit" that maintains Ms. Smith's anonymity would lead to new or creative approaches to helping adolescents with health problems. Understanding the patient experience as a guide to therapy instead of trying to force the patient into a medical model should be considered.

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