Prevention of Metabolic Syndrome from Atypical Antipsychotic Medications

Applying Rogers’ Diffusion of Innovations Model in Clinical Practice

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ABSTRACT

Patients who are taking atypical antipsychotic medications have a high incidence of metabolic complications, including increased weight, waist circumference, blood sugar, lipid levels, and blood pressure. In 2004, the American Diabetic Association and three other associations, including the American Psychiatric Association, developed guidelines to screen for metabolic syndrome, but in practice, adherence to the guidelines varies. This article describes a process to implement the guidelines in a suburban psychiatric day treatment hospital using Rogers’ Diffusion of Innovations model. Measurement of waist circumference was identified as an opportunity to improve the current metabolic screening protocol. Post-intervention evaluation revealed increased adherence to the guidelines (0% pre versus 95% post). Adherence to the guidelines demonstrates the effect of the systematic application of Rogers’ model on acceptance of practice change. Fully implementing the guidelines meets recommendations for the standard of practice and can improve the health and quality of life of patients prescribed atypical antipsychotic medications.

The purpose of this quality improvement project was to identify current practice in a suburban psychiatric day treatment hospital relative to guideline adherence with particular attention to waist circumference monitoring as recommended by the American Diabetes Association, American Psychiatric Association, American Association of Clinical Endocrinologists, and North American Association for the Study of Obesity (ADA/APA, 2004). Metabolic syndrome is on the rise in the United States. Patients diagnosed with major mental illnesses, such as schizophrenia, schizoaffective disorder, and major depression, are at increased risk due to poor eating habits and decreased ability to adequately access primary care resources in the community (Mendelson, 2008). In addition, patients with mental illness have to cope with added symptoms of their illness such as isolation, binge eating, and more sedentary lifestyles, which lead to weight gain. Atypical antipsychotic agents have become the hallmark of treating mental illness in the past decade and have been successful in helping patients with schizophrenia and schizoaffective disorder lead more normal lives with excellent symptom management. However, with this improvement in patients’ psychiatric conditions come risks of developing metabolic syndrome. A strong link between atypical antipsychotic medication use and metabolic syndrome has been established (ADA/APA, 2004; Mendelson, 2008). Guidelines have been designed to help ensure uniform monitoring of patients who are prescribed atypical antipsychotic medications (ADA/APA, 2004; Hasnain et al., 2009). Implementation of these guidelines will lead to early recognition of the signs and symptoms of metabolic syndrome, which will help delay or reverse the effects in patients prescribed atypical antipsychotic agents.

Atypical antipsychotic agent use puts patients at risk for one or more of the correlates that make up metabolic syndrome (Mendelson, 2008). The ADA/APA (2004) consensus statement established guidelines for the screening and follow-up monitoring of patients taking antipsychotic medications. This guideline is designed to guide practitioners in the monitoring of metabolic parameters, including personal/family history, weight, waist circumference, blood pressure, fasting plasma glucose, and fasting lipid profiles. Recommendations include monitoring at baseline; 4, 8, and 12 weeks; quarterly; annually; and every 5 years in patients prescribed antipsychotic medications. Despite the recommendations put forth in the guidelines, there is a wide variation in psychiatric settings in monitoring patients taking atypical antipsychotic medications. Some organizations adhere more closely to some form of metabolic monitoring, whereas others perform little or no monitoring (Khatana, Kane, Taveira, Bauer, & Wu, 2011). Overall, screening and monitoring of metabolic risk factors in psychiatric settings is inadequate at best (Hasnain et al., 2009; Khatana et al., 2011). Goldberg et al. (2007) found that people with mental illness received fewer recommended services and less education about diabetes, compared with those without mental illness. Increased monitoring of weight, body mass index, waist circumference, blood pressure, fasting plasma glucose, and fasting lipid profiles for patients prescribed atypical antipsychotic medications are recommended (Goldberg et al., 2007; Nasrallah et al., 2006). In particular, visceral adiposity has been identified as the underlying root cause leading to the development of hyperlipidemia, insulin resistance, inflammation, and...
increased blood pressure, with overall increased risk of developing cardiovascular disease (Després et al., 2008; Hamdy, Porramatikul, & Al-Ozairi, 2006). Therefore, waist circumference should become a standard risk factor to be screened and followed in routine clinical practice (Després et al., 2008).

LOCAL PROBLEM AND INTENDED IMPROVEMENT

The suburban psychiatric day treatment hospital unit in which this quality improvement project was implemented monitored patients for the following risk factors: personal/family history, weight, blood pressure, fasting plasma glucose, and fasting lipid profile. What was lacking was the monitoring of waist circumference, as recommended in the 2004 ADA/APA guidelines.

Thus, the focus of this quality improvement project was to gain buy-in of waist circumference monitoring, thereby fully implementing the guidelines in practice. Waist circumference measurement has been gaining a tremendous amount of attention in the past decade. Interestingly, many organizations do not monitor this important risk factor. Abdominal fat or visceral fat is composed of adipocytes, or fat cells. Adipocytes play a major role in the development of metabolic syndrome. Adipose tissue is known to secrete a large number of hormones with diverse functions that include the metabolism of free fatty acids, glucose homeostasis, and proteins called adipocytokines that control various metabolic functions (Mathieu, Poirier, Pibarot, Lemieux, & Després, 2009; Esteve, Ricart, & Fernández-Real, 2009).

STUDY QUESTION

The specific question explored in this study was: “Can the ADA/APA guidelines be fully implemented on this psychiatric day treatment unit using Rogers’ Diffusion of Innovations model as a framework?” Rogers’ model was chosen to evaluate the process involved in the adoption of implementing the guidelines in their entirety, including waist circumference.

METHOD

Ethical Issues

Patient information and records, counseling, and group presentations were kept confidential. All data collected were de-identified and analyzed in the aggregate. All patients were given the opportunity to refuse having their waist circumference measured after the procedure was explained in detail.

Setting

This project was conducted in a psychiatric day treatment hospital that is part of a large suburban tertiary care facility. Staff on this unit consist of full-time RNs who provide group counseling, case management, medication monitoring and screening, and emergency intervention. Approximately 20 to 25 patients are treated on a daily basis. Enrolled patients attend 5 days per week and participate in care from 1 to 3 years in duration. The unit is directed by a clinician.
who is a senior RN responsible for the management and coordination of treatment for day treatment hospital patients. The medical director of inpatient psychiatry has overall mental health oversight on the unit and runs the weekly treatment planning group conducted on each patient.

Elements in the environment considered most likely to influence the full implementation of the guidelines into practice involved the acceptance of not only the staff but the patients themselves. Patients in this setting were diagnosed with schizophrenia, schizoaffective disorder, and/or major depression.

Planning the Intervention and Its Evaluation

In implementing the guidelines, a theoretical framework is needed that addresses the need for organizational acceptance and uptake of a new innovation. The new innovation in this case is the complete implementation of the ADA/APA (2004) guidelines, including accepting waist circumference into patient monitoring. Having a consensus statement based on sound clinical research and agreed on by the key disciplines involved in the treatment of psychiatric patients is not enough to ensure implementation in practice. The need for a theoretical model that addresses the social structures, philosophy, and opinions of an organization and its key members is needed if an innovation is to be implemented into practice. Rogers’ (1962) Diffusion of Innovations model outlines the critical components (i.e., five stages) needed for an innovation to be accepted in an organization and integrated into practice and was used to guide this project. The following five stages drive the process of practice change and quality improvement: Knowledge, Persuasion, Decision, Implementation, and Confirmation.

The mechanisms and components involved in implementing and assessing the innovation are broken down in sequential order according to the stages outlined above and represent the design used in this project. The Figure depicts the timeline covered in this intervention from initiation to conclusion.

Knowledge Stage. The preliminary stage involved presentation of the latest and most authoritative information concerning the topic of metabolic syndrome in patients prescribed atypical antipsychotic medications. This is discussed in detail in the Persuasion Stage section.

Persuasion Stage. The persuasion stage is directed at the leadership and staff at all levels with the intent of creating buy-in to the practice change or innovation. Establishing rapport between the project director and the psychiatric day treatment hospital staff working with patients in the clinical setting was crucial. Creating this favorable attitude involved presenting the information in a way that conveyed the idea that the new innovation would add value, legitimacy, or credibility to the organization or practice in a way that included all members in the process. This effort began with the presentation of the innovation to the leadership on the unit—in this case, the director of inpatient clinical psychiatry, the nurse clinician in charge of running the program, and the individual nurses and counselors conducting groups and following a caseload of patients.
Staff were persuaded to accept the guidelines with the following strategies. Staff training covering the ADA/APA-identified risk factors was conducted bimonthly. This training was designed to sensitize the staff to the magnitude of the problem, with a focus on acceptance of the guidelines in practice. This involved six sessions over the entire 18 months of the project. Patient-centered metabolic teaching groups specifically addressing aspects of the ADA/APA guidelines were held on a weekly basis. Individual metabolic-centered counseling was done with patients referred by the staff on a weekly basis. The project director also added measurement of waist circumference to the monitoring of metabolic screening in the electronic medical record. Finally, the perceived advantages of adopting the complete ADA/APA guidelines were outlined.

Enhancing adherence to the ADA/APA guidelines, as described above, focused on educational activities designed to reinforce staff training on metabolic syndrome awareness. Specific interventions included the following: (a) staff education on the link between atypical antipsychotic medication and diabetes mellitus in general; (b) presentation of current evidence linking metabolic syndrome to increased abdominal girth, necessitating adding measurement of waist circumference to the monitoring already in practice; (c) staff education concerning the proper performance of tape measuring of patient’s waist circumference to ensure accuracy and standardization of data collection; (d) collection and sharing of data 1 year after initiation to evaluate the impact of this measure on patients’ overall metabolic profile; and (e) creation of lesson plans and outlines for nursing staff to present in health and wellness groups targeted at obtaining patient understanding and adherence to waist circumference measurement. These lesson plans are based on metabolic teaching done in weekly project director-led groups.

**Decision Stage.** The goal of the decision stage is to engage in activities that lead to a choice to either adopt or reject the innovation. Six focus groups were conducted to evaluate whether staff bought into the innovation or were opposed to it (Figure). The focus groups involved a metabolic topic directly related to implementing the guidelines with presentation of materials, discussion, and evaluation of staff knowledge with a practical application to the unit. This stage involves examining any hidden factors as to why the guidelines were not fully integrated into practice prior to this project. Several factors were identified as potential barriers to full implementation: (a) staff lack of knowledge on the existence of metabolic screening guidelines and the relationship between visceral fat and metabolic syndrome, (b) initial reluctance on the part of the staff to fully implement the guidelines for fear of shifting the focus of the program away from psychiatry and toward a medical model, (c) initial fear that patients would reject measurement of waist circumference with a tape measure due in part to their psychiatric conditions. Initial permission to implement waist circumference measurement was granted by the psychiatric program director at program initiation in October 2010 (Figure).

**Implementation Stage.** Implementation of the guidelines focused on practice change in unit staff. With the decision made to adopt the innovation into practice, there may still be some degree of uncertainty as to the expected consequences of acceptance of the guidelines. Rogers (1962) stated that in an organizational setting, those challenged to implement the innovation are often a different set of people from those making the decision to implement. Keeping this in mind, the project di-

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**TABLE**

<table>
<thead>
<tr>
<th>Waist Circumference Measurement Details</th>
<th>Assessment Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-intervention</td>
</tr>
<tr>
<td>Date of waist circumference measurement</td>
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</tr>
<tr>
<td>Number of patients/Number whose waists were measured</td>
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</tr>
<tr>
<td>Adherence to waist circumference measurement</td>
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</tr>
</tbody>
</table>

*One patient refused waist circumference measurement.

Note. All patients were the part of the same group that started at the beginning of the project, with the addition of new patients who joined during the project period. Eight patients dropped out of the program during the project period.
rector (M.C.P.) developed a data collection tool that met the criteria of the ADA/APA guidelines to serve as a clinical reminder, and the tool was incorporated into the electronic medical record. This intervention increased adherence.

Confirmation Stage. The confirmation stage is represented by a chart evaluation on all patients in the day treatment hospital to evaluate adherence to the guidelines, specifically waist circumference measurements at baseline and at 1 year. Individual charts were evaluated during the data collection period to determine how many patients had their waist circumference measured and data entered into the electronic medical record. The staff received an update, outlining deficiencies in cases where waist measurements, as well as omissions of fasting blood sugar, lipid levels, and weight, failed to be entered into the electronic medical record.

Changes in the patient care delivery process show that nursing staff had made patients aware of the need to maintain good dietary and exercise habits.

In a quality improvement project, the presence of the project director can have an impact on the internal validity of the results. Rogers (1962) identifies the confirmation stage as a step necessary to evaluate whether or not the innovation has taken root over the long term. The unit plans to continue this practice, as was confirmed by the post-intervention focus group (Figure). The electronic medical record update will help enhance adherence.

Data Analysis
Implementation of the ADA/APA guidelines was evaluated by reviewing the electronic medical record to assess whether all the elements of the guideline recommendations (with emphasis on waist circumference measurement) were entered for all patients. This was accomplished using a retrospective chart review and computer-generated patient summary, beginning at baseline and ending at 1 year after initial waist circumference measurement for all patients. In addition, all new patients who entered the day treatment program were followed using the same parameters, with a focus on initial waist circumference measurement.

RESULTS
Success of the Diffusion of Innovations Model
Knowledge Stage. During the knowledge stage, the project director presented the appropriate information on the ADA/APA guidelines during the first focused staff meeting. In addition, the project director used the five steps of Rogers’ (1962) Diffusion of Innovations model from the start of this project through its completion. In all six focus group meetings, all unit staff attended, representing 100% attendance.

Persuasion Stage. The persuasion stage was successfully implemented on the unit from program inception to completion. Pretest-posttest evaluation of staff knowledge on metabolic topics that directly related to this intervention revealed increased understanding of metabolic syndrome. This increased understanding was evidenced in posttests that occurred at the end of each focus group. Continuing education contact hours were offered during four of the six sessions. The project director noted successful completion of the metabolic topics administered, as evidenced by 100% of unit staff passing the posttest and receiving continuing education contact hours.

Patient satisfaction was evidenced by full unit participation in the various metabolic topics presented in the group sessions. Unit nurses reported patient satisfaction with this project in the focus groups, as well as during the normal course of the treatment day. Staff and unit leadership wanted increased metabolic syndrome education with an emphasis on waist circumference as evidenced by (a) inviting the project director to the department’s quality spotlight program, which involved developing and presenting a poster outlining the highlights of this project to approximately 150 facility staff and visitors, and (b) asking the project director to conduct individual metabolic counseling with patients who have requested a personalized metabolic treatment plan. The project director counseled 9 of 19 (47%) patients assigned to the unit during the 18 months of the project.

Decision Stage. The decision stage was successfully navigated the moment the psychiatric and nursing leadership agreed to start gathering waist circumference measurements and provided a list of all values for the project director to review at the end of the second focus group. In addition, focus group support from staff indicated the value of the project.

Implementation Stage. The implementation stage was evaluated by searching the electronic medical
record for evidence of the recording of waist circumference measurements of all unit patients. The results were summarized at the conclusion of the project.

**Confirmation Stage.** The confirmation stage seeks to evaluate whether the innovation is maintained over time. Re-evaluation at 1 year after the conclusion of the quality improvement project revealed 95% adherence to the ADA/APA guidelines. As shown in the Table, 18 of the 19 patients had their waist circumference measured. Staff attempted to measure all 19, which in essence reveals 100% adherence, but one patient refused, hence the 95% adherence rate.

**Challenges**

**Nurse Clinician Buy-In.** This unit is led directly by the nurse clinician who oversees all care and decision making in the day hospital setting. A major challenge in this project was gaining buy-in from the nurse clinician, as any new program or change in routine can be viewed as an intrusion. The nurse clinician expressed concerns that the focus of the program would be shifted to primary care and medical monitoring, rather than psychiatric group and individual therapy, as was currently occurring on the unit. This concern was expressed by the nurse clinician throughout all six focus groups.

**Data Collection.** There were some disparities in the collection of data after 10 months of intervention. During the second quarter, waist circumference measurement dropped to zero in five newly admitted patients (Table). No cues were provided by the project director to measure these patients at any point, except at the initiation of measurement in February 2011. Another three patients were admitted by December, and again their waist circumference was not measured. Lack of adherence in this instance indicated that staff were not following baseline assessment guidelines. Finally, in the post-intervention period, staff attempted to measure all patients with one refusing, resulting in 95% adherence.

From these results, it can be concluded that more cueing by the project director was needed to ensure adherence to the guidelines. The staff found it easy to re-evaluate all patients on a set day and did so at the 1-year mark. This demonstrates staff motivation with project director influence. The difficulty arose when patients were admitted during the year in the interval between the initial measurement and the 1-year re-evaluation.

Staff adherence to the guidelines during this interval was inconsistent, as already observed. Staff nurse input into the waist circumference measurement process was sought by the project director on an informal basis throughout the project. The staff reported interest in obtaining waist circumference at baseline and at 1 year for the entire unit. It appears they were unable to follow through when individual patients were admitted throughout the year. Explanations for this include: (a) possible pro-innovation bias on the part of the staff nurses when they anticipate a unit-wide waist circumference measurement activity each February, (b) failure on the part of the project director to fully emphasize the need to obtain waist circumference for all new patients in the program, (c) lack of direction from unit leadership for staff to collect waist circumference data on all newly admitted patients, and (d) lack of a clinical reminder in the electronic medical record to cue staff when waist circumference is due.

Changes in the patient care delivery process show that nursing staff had made patients aware of the need to maintain good dietary and exercise habits. This is evidenced by staff nurses continuing to conduct weekly group discussions covering metabolic topics, with an emphasis on individual risk factors. Patients were provided with copies of their individual laboratory results, including all metabolic measurements during the course of the year they were in the group setting. This information was shared during health and wellness groups both in the project director-led sessions and the staff-only sessions.
Nursing staff emphasized empowering patients to follow up with their individual primary care practitioners. Numerically, this resulted in 100% of patients being involved in metabolic teaching groups and a significant number of patients who were overweight being referred for metabolic one-to-one counseling with the project director.

DISCUSSION

Complete implementation of the ADA/APA (2004) guidelines in practice on the day treatment hospital unit was successful. Major successes in implementing the guidelines were: (a) inclusion of waist circumference measurement in the electronic medical record, (b) readiness on part of all staff to conduct waist circumference measurement and record in the electronic medical record, (c) staff report of positive patient feedback concerning weekly metabolic group sessions, (d) staff referral of selected patients for individual metabolic counseling, and (e) nurse manager request that this project be presented at the hospital’s quality spotlight poster presentation.

Difficulties in implementing this intervention included initial reluctance on the part of mid-level leadership to record waist circumference in the electronic medical record and to refer patients who are obese to their primary care provider, as per standards for primary care follow up. This reluctance was evident during patient chart reviews, as waist circumference measurement dropped off during the second and third quarters (Table).

This quality improvement project’s main strength was that it presented a systematic approach to implementing an innovation based on the ADA/APA (2004) consensus statement guidelines using Rogers’ (1962) Diffusion of Innovations model, a practical and well-tested approach to helping organizations change practice. The Diffusion of Innovations model has been implemented with success in a variety of health care settings. Scant attention has been given to nursing unit acceptance of innovations in psychiatry. De Civita and Dasgupta (2007) found key components of Rogers’ Diffusion of Innovation model at work in the proposed diabetes management program they examined. These components included perceived advantages, compatibility, and barriers to acceptance, outlined above. Advantages may take the form of improved clinical measures when compared with other facilities or past scores on a particular variable. Improving patient outcomes is a strong motivator for acceptance of a new innovation. Organizations are continually being rated by national, state, and local entities, and measures that help ensure better patient outcomes are likely to be readily incorporated into daily practice. Compatibility with established treatment perspectives is another area that needs development if guidelines are to be accepted and incorporated into practice in outpatient psychiatry.

LIMITATIONS

A major limitation in attempting to change practice using diffusion models is pro-innovation bias (De Civita & Dasgupta, 2007). In pro-innovation bias, the project director can artificially influence the outcome by directing and guiding the staff to collect the data independent of the staff self-initiating. The assumption is that the innovation should be diffused and adopted by all members of a system. In this project, it could be argued that the results were found to be what the project director wanted to see—adoption of the full guidelines in practice. In pro-innovation bias, the nursing staff follow the guidelines merely because they were encouraged to do so by the project director during the study period. This could account for the drop in waist circumference measurement in Quarters 2 and 3, when nursing staff may have forgotten about the guidelines (Table).

Observed gains achieved in this project may weaken over time if, in the absence of the project director, the staff decide not to continue the innovation. The project director should request that the nurse manager or psychiatric director continue to monitor adherence. In addition, a chart review over the next year after project termination would assess whether the staff nurses are following the full guidelines in the absence of the project director.

Efforts made to minimize and adjust for study limitations included focus groups to gain buy-in to the innovation. This was done to help the nursing staff want to accept the innovation based on sound medical and nursing research, as opposed to merely suggesting that adoption of the innovation is a good idea on the face of it. An additional strategy designed to eliminate bias was conducting weekly patient metabolic groups with staff present. If patient responses to the innovation and related education were positive, it was assumed that the staff would be more inclined to accept the innovation. This held true also by the project director-led patient counseling sessions. These weekly sessions were designed to add to the staff buy-in for the innovation. Ironically, the individual metabolic counseling sessions were suggested by the staff nurses, including the nurse clinician, in an effort to help patients with weight loss and better diet choices.

POST-INTERVENTION FEEDBACK

A post-intervention nursing staff focus group was held on the unit with the nurse manager, nurse
educator, staff nurses, nurse clinician, and therapeutic recreational therapist. Positive staff feedback included that the intervention raised patient awareness of the risk factors of poor diet choices, inactivity, and the side effects of atypical antipsychotic medications; and that it empowered patients to understand the significance of metabolic data including waist circumference and the communication of these results to their primary care practitioners for follow up. Staff concerns were that too much emphasis on medical monitoring can detract from the mission of day treatment (i.e., to empower patients to make healthy choices on their own in the future when no longer in day treatment) and lack of uniform primary care support in the community. Patients in day treatment see physicians both attached to and outside of the facility. Some provide adequate collaboration with the day treatment staff, but others provide minimal to no collaboration in the areas of referral and follow up. These concerns were brought to the attention of the project director during the sixth focus group at the conclusion of the project.

Overall, staff believed the intervention was worthy of full implementation in practice now and in the future. Adoption of the ADA/APA consensus statement guidelines has become standard practice for the day treatment hospital.

CONCLUSIONS AND IMPLICATIONS FOR PRACTICE

Often, patients receiving psychiatric care are not being followed by primary care practitioners. Full implementation of the ADA/APA guidelines offers mental health nurses and psychiatrists the opportunity to begin metabolic screening and follow up as part of routine care practice, including a closer working relationship with primary care practitioners.

Application of Rogers’ Diffusion of Innovations model to implement change in a psychiatric day treatment setting designed to screen for a critical component of metabolic syndrome (e.g., visceral adiposity via waist circumference measurement) is needed to provide comprehensive patient care. Psychiatric patients have been found to have a metabolic syndrome prevalence rate of 52%, compared with 23% in the general population (Khatana et al., 2011). The need for applying screening guidelines in a uniform and consistent way in this population is especially urgent, given their higher rate of metabolic risk.

REFERENCES


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