Improving Medical Monitoring of Patients on Antipsychotic Medication

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Abstract

Antipsychotic medications can be essential for managing psychiatric disorders, though adverse effects are associated with significant risks that can reduce life expectancy. Despite existing clinical practice guidelines designed to prevent patient harm, adherence to medical monitoring protocols remains inadequate. This quality improvement project aimed to improve medical monitoring practices for 116 patients on antipsychotic medications at an outpatient mental health clinic, utilizing the Institute for Healthcare Improvement's Plan-Do-Study-Act model. Interventions included the development of a written policy and systematic identification of patients requiring routine monitoring. Although the specific aim of achieving 75% policy compliance was not met, significant improvements were observed across individual parameters and medical monitoring practices overall. The project was limited by the 12-week implementation period and dependence on a specific electronic health record (EHR) system that was subject to change outside the project's control. Recommendations for future efforts were informed by a survey distributed to clinicians, including continued focus on addressing system-level barriers and advocating for practical changes within the EHR to improve sustainability.

Problem Description

Antipsychotic medications are commonly prescribed for a range of psychiatric disorders. Indications include the treatment of schizophrenia spectrum disorders, bipolar disorder, severe or treatment-resistant depression, and irritability associated with autism spectrum disorder (ASD) (Saavedra & Gaynes, 2012). Antipsychotics can be broken down into two classes, first-generation antipsychotics (FGAs) and second-generation antipsychotics (SGAs), both of which are widely used across mental health care settings as they are highly effective in treating debilitating psychiatric symptoms and preventing potentially devastating consequences of untreated psychiatric disorders. It is estimated that 1.7% of adults and 3% of children in the United States are prescribed antipsychotics, with prescription rates trending upwards (Dennis et al., 2020; Libowitz & Numi, 2021).

Significantly reduced life expectancy and increased rates of premature death have been noted in populations chronically treated with antipsychotic medication, and there is evidence that the majority of these deaths are due to preventable disease (De Hert et al., 2020; Liu et al., 2017). Cardiovascular disease has been found to be the leading cause of death for individuals with severe and persistent mental illness (Liu et al., 2017). This can be linked to SGA treatment associated adverse effects including increased appetite, weight gain, and metabolic syndrome (American Diabetes Association et al., 2004; American Psychiatric Association, 2020; Oregon Mental Health Clinical Advisory Group, 2019). These then increase risk for the development of hyperglycemia and insulin resistance, hyperlipidemia, hypertension, and obesity which can significantly impact one's cardiovascular health and may increase likelihood of experiencing a significant or potentially fatal event such as a myocardial infarction or cerebral vascular accident (Huang et al., 2017; Yu et al., 2016; Zivkovic et al., 2019). Although FGAs carry lower cardiometabolic risk, they carry a higher risk for tardive dyskinesia (TD). This affects up to 30% of individuals being treated with antipsychotics and has been found to be correlated with increased risk for mortality in addition to impaired cognition, poor treatment response, increased risk of symptom

relapse, longer hospital stays, and overall lower quality of life (Caroff et al. 2011, 2019; Widschwendter et al., 2019). Despite the benefits offered by antipsychotic medications, there are significant adverse effects that must be considered in clinical decision-making.

If the benefits of starting or maintaining antipsychotic treatment outweigh the risks, regular assessment and monitoring for these adverse effects can reduce or prevent harm. In 2004, several professional organizations, including the American Psychiatric Association (APA) and the American Diabetes Association (ADA), convened to develop a consensus guideline for cardiometabolic monitoring protocol for patients on SGAs (ADA et al., 2004). A similar consensus guideline for monitoring of TD was developed by psychiatric and medical experts based on the available literature at the time (Marder et al., 2004). These consensus guidelines are still endorsed and widely accepted today, remaining consistent with the APA's updated clinical practice guideline for the treatment of patients with schizophrenia (2020). Although many healthcare systems strive to implement these guidelines, research has found that adherence to set parameters needs improvement (Mitchell et al., 2012). Given this deficit, more recent research has focused on interventions for improving adherence to these parameters to improve quality of patient care.

Available Knowledge

National and local guidelines provide parameters for monitoring weight, blood pressure, fasting blood glucose or glycosylated hemoglobin (HbA1c), fasting lipid profile, liver function testing, complete blood counts, prolactin levels, and abnormal involuntary movement scale (AIMS) testing (ADA et al., 2004; APA, 2020; Marder et al., 2004). Although these recommendations are widely supported, guideline adherence has been found to be largely inadequate (Mitchell et al., 2012). It is estimated that one-third of patients on antipsychotic medications are never screened for metabolic risk (Melamed et al., 2019). One systematic review and meta-analysis spanning 11 years and five countries found that

other than blood pressure measurement, baseline screening rates are below 50% for all metabolic monitoring parameters and these tend to decrease at each follow-up interval (Hayden et al., 2020; Mitchell et al., 2012; Wakefield et al., 2020; Walkerly & King, 2020; Uzal et al., 2017). The top patient-perceived barrier to metabolic lab monitoring is that it is not recommended by the clinician (Soda et al., 2021.) Major clinician-perceived barriers to routine metabolic monitoring include insufficient resources, patient refusal and need for patient education, lack of risk awareness on the part of the clinician, and communication deficits (Aouira et al., 2022; Hayden et al., 2020; Soda et al., 2021; Wakefield et al., 2020; Walkerly & King, 2020).

Addressing communication deficits at the organizational level can help bridge the gap between guidelines and medical practice. In clinical settings, it's crucial to have shared expectations for medical monitoring protocol and responding to abnormal findings (Eapen et al., 2013). Clear roles and responsibilities should be established through policy informed by evidence-based guidelines and supplemented by routine auditing to maintain adherence. This may require methods for identifying which patients need routine medical monitoring (Eapen et al., 2013; Melamed et al., 2019). Developing a systematic approach to searching the electronic health record (EHR) and flagging patient charts for further action can improve medical monitoring rates (Nicol et a., 2011; Hinds et al., 2015; Melamed et al., 2019).

Rational

Utilizing the Plan-Do-Study-Act model for improvement from the Institute for Healthcare Improvement, a root cause analysis identified that this clinic does not have a policy for medical monitoring of patients or a protocol for tracking patients on antipsychotic medication (Appendix A). Through the development of a tracking protocol and implementation of a policy, this project aimed to improve communication and identify patients in need of up-to-date medical monitoring. This evidence-

based approach to increasing adherence to medical monitoring parameters is intended to support earlier detection and intervention for adverse effects of antipsychotic medication (ADA et al., 2004; APA, 2020; Marder et al., 2004; Oregon MHCAG, 2019).

Specific Aims

The objective of this project was to increase medical monitoring of patients currently taking antipsychotic medication through the addition of a written policy, identification of patient charts that require routine medical monitoring within the EHR, and modification to the patient note templates in the EHR. Patients in this population group that did not have all appropriate assessments and testing completed with documentation were identified and shared with clinicians. The aim was for 75% of identified patient charts to be compliant with the medical monitoring parameters outlined in the new policy by January 15th 2024.

Context

The implementation site was a mental health clinic providing services in-office and via telehealth to over 300 clients within a metropolitan area in the Pacific Northwest. The clinic specializes in treating individuals with intellectual and developmental disabilities (IDD) with co-occurring mental health symptoms and is a Medicaid provider for individuals enrolled in the state developmental disabilities program. Over 50% of patients have an IDD diagnosis and of these, approximately 26% of clients have a diagnosis of ASD and approximately 23% have a diagnosed intellectual disability. Additionally, approximately 8% of clients have a diagnosed psychotic disorder and 10% a bipolar disorder. Mental health care is provided by three psychiatric mental health nurse practitioners (PMHNP) and one licensed professional counselor (LPC). Support staff is comprised of one office manager.

Interventions

A policy outlining specific medical monitoring parameters for patients taking one or more antipsychotic medications was written based on the referenced consensus guidelines (Appendices C and D). Specific roles and responsibilities related to these procedures were included. Reasons for exception (e.g. risk of harm to patient outweighs clinical benefit) were described and appropriate action to be taken was explained. The written policy was approved by the owner of the clinic, adopted by the implementation site, and distributed to clinicians and support staff.

All patients taking one or more antipsychotic medication were identified via a records search, using the EHR system to run reports on all patients taking specific medications (Appendix B). Each identified chart was then flagged in the EHR through an addition to the patient problem list ("long term current use of antipsychotic medication"). This was tied to the International Classification of Diseases 10th Revision (ICD-10) code Z79.899 (other long term [current] drug therapy). These charts were then audited, the charts missing up-to-date medical monitoring information were identified, and clinicians were notified of these findings. A template for entering AIMS testing directly into clinical encounter notes was developed with EHR software to allow for data to be more easily recorded during patient encounter.

Charts missing up-to-date medical monitoring data were audited 12 weeks post-policy implementation via an EHR generated report of charts that were previously flagged. Changes to compliance were recorded. This information was then used for further assessment of potential barriers to completion of medical monitoring with an aim to develop recommendations for sustainable medical monitoring practices at this clinic in the future.

Study of the interventions

The impact of the intervention was assessed through questionnaires distributed to clinicians after the implementation period. Questionnaires collected qualitative data based on clinician

observation and opinion. Notable trends, factors contributing to intervention success (or lack of), and any unexpected effects of the intervention were analyzed. This information helped to establish correlation between the intervention and observed outcomes and contributed to a better understanding of the greater impact on the microsystem.

Measures

The primary outcome measure for this project is the percentage of patient charts moved from policy non-compliant to compliant over the 12-week implementation period. This measure was chosen to determine if the intervention resulted in a change in the medical monitoring of patients on antipsychotic medication. Compliance was defined by the written policy for medical monitoring of patients taking antipsychotic medication at the implementation site (Appendix D). Process measures for this project include counts of patient charts with medical monitoring data added (Appendix E). This was collected through chart audits at the end of the implementation period.

To assess for data completion, charts for all patients with an active prescription for an antipsychotic medication were reviewed (Appendix B). A search of the EHR for each antipsychotic medication was completed and duplicate results were eliminated. Patients included in the first audit though not seen by a clinician during the 12-week implementation period were excluded. All charts audited after the implementation period were compared to the same charts audited before intervention implementation to serve as an effective measure of completeness and accuracy. There were several balancing measures considered with this project. These measures included an increased burden on support staff, clinicians, and patients or patient families and caregivers. Perceptions of the intervention efficacy and ongoing barriers to implementation were assessed in a questionnaire distributed to clinicians.

Analysis

Qualitative data was collected via questionnaires distributed to clinicians after the implementation period using online survey software. Manual coding was used to identify and analyze themes. Quantitative data was collected via chart auditing before and after the implementation period. Quantitative data was compiled and analyzed using Microsoft Excel software. Descriptive statistics and statistical analysis were used to compare rates of medical monitoring policy compliance pre- and post-interventions. Findings were categorized and reported in table form.

Ethical considerations

Staff at the implementation site were debriefed on this quality improvement project's purpose, and participation was voluntary. The clinical site gave consent to participate in the project as described in the signed letter of support. All data including protected health information (PHI) was handled safely and in compliance with Health Insurance Portability and Accountability Act (HIPPA). This data was accessed by one HIPPA-trained investigator only to obtain information about current level of monitoring for determination of need for intervention. The authors report no conflict of interest.

Results

Prior to the intervention, 136 patient charts were audited. Each chart corresponded to a patient seen by the practice within the past year and with an active prescription for at least one antipsychotic medication. During the 12-week project implementation period, 116 of these patients were seen by a PMHNP at the clinic. These 116 charts were audited post-intervention and compared to the same group of charts audited pre-intervention. These data are included in the results (Appendix F) and were analyzed for statistical significance (Appendix G). It should be noted that AIMS scores were excluded from results due to challenges that will be discussed later.

The percentage of patient charts with all labs completed and documented increased by 16.7% (from 15.6% to 19.0%). However, the percentage of charts with all labs ordered or completed and

documented increased by 83.3% (from 15.6% to 28.4%) Labs ordered during the implementation period are considered compliant for the purpose of this project because 12 weeks is an insufficient amount of time for a provider to see a patient, order labs, have labs completed by the patient, and receive lab results for documentation (many patients are typically seen every three months). Charts missing medical monitoring data with documented clinical reasoning for the exception were considered compliant as per the policy The outcome measure was the percentage of charts meeting all requirements for policy compliance (previously 0%) and this was determined to be 5.2%. Although these numbers fall far below the stated aim of 75%, significant improvements were noted in individual parameters and process measures.

The overall increase in compliance based on individual parameters and process measures was determined to be statistically significant regardless of whether charts with labs ordered but not completed are included (ordered labs excluded: $p=0.025$; ordered labs included: $p=<0.001$). in vital sign documentation was independently significant ($p= 0.041$). The percentage of patient charts with all vital signs recorded increased by 21.5%. The percentage of charts with heart rate recorded increased from 16.4 %to 26.7% (63.1% increase), blood pressure from 15.5% to 26.7% (72.2% increase), and weight increased from 22.4% to 47.4 % (112% increase). Individually, the percentage of charts compliant with complete blood count (CBC) increased from 27.6% to 43.1% (56.2% increase) and liver function tests (LFTs) increased from 27.6% to 38.8% (42.6% increase). Less significant changes were noted in lipid panels (9.4% increase) and HbA1c (9.4% decrease) compliance (Appendix F).

When evaluating individual parameters (Appendix E), the most significant improvement was observed in weight documentation. This may be explained by patient accessibility and awareness (patients may be more likely to have access to a scale than tools used to measure other vital signs and may be more likely to know their most recent weight than most recent heart rate/blood pressure measurements). Similarly, overall vital sign compliance was greater than lab compliance. This may be

explained by patient and provider accessibility (e.g. more accessible measurement equipment in home and clinic, patient burden and logistical barriers to blood draws, reliance on patient reported values versus lab results). The most significant improvement in lab compliance was observed in CBCs ordered and completed. This in part may be due to the Food and Drug Administration's strict CBC monitoring requirements in place for patients taking clozapine.

No appreciable improvement was observed in AIMS testing. During the initial audit, no charts appeared to have AIMS scores documented and there was no designated place in the EHR to locate this data. Clinicians were then not notified about missing AIMS documentation. Furthermore, due to technical difficulties creating the template designed to record AIMS testing, it was not integrated into patient notes until six weeks into the implementation period. For these reasons, AIMS scores were excluded from the results of this project though will remain a part of the clinic's medical monitoring policy.

Discussion

Summary and Interpretation

This quality improvement project appeared to increase medical monitoring of patients currently taking antipsychotic medication through the addition of a written policy and identification of patient charts within the EHR. Although it did not accomplish the specific aim of 75% of identified charts being in compliance with the medical monitoring policy, significant improvements were observed in process measures and overall medical monitoring practices. The survey completed by clinicians post-intervention indicated that they perceived these interventions to be direct contributors to improvement over the 12 weeks. Clinicals additionally identified the sharing initial audit data as an intervention contributing to improvement (Appendix H).

The results of this project are consistent with the existing literature related to this topic. Routine metabolic monitoring for individuals prescribed antipsychotic medication is low in clinical practice despite clinical guidelines and recommendations (Mitchell et al., 2012). Quality improvement strategies such as identification of patients needing monitoring, clinician reminders, organized documentation of results, and routine auditing can effectively increase adherence to guidelines. (Eapen et al., 2013; Hinds et al., 2015; Melamed et al., 2019; Nicol et al., 2011). This can be guided by clear policy outlining expectations and designating responsibilities (Eapen et al., 2013; Hinds et al., 2015; Melamed et al., 2019; Mitchell et al., 2012; Nicol et al., 2011). These improvements are intended to improve the management of adverse medication effects at the project site, as has been demonstrated in the literature (ADA et al., 2004; APA, 2020; Marder et al., 2004; Oregon MHCAG, 2019).

The specific aim for this project may have been unrealistic for a single PDSA cycle over 12 weeks, considering the frequency of patient visits and logistical challenges prolonging the process of obtaining lab results. Additional barriers identified by clinicians include diminished opportunities to collect vital signs with telehealth appointments, behavioral safety challenges for individuals with developmental disabilities that may require that labs be done with a level of sedation that cannot be given safely as an outpatient, and lack of patient follow through on lab draws despite repeat conversations about the necessity of routine monitoring. Clinicians denied increased workload due to this project and no increased cost to the clinic was identified.

Limitations

Generalizability of results is limited by small clinic size, specific patient population, prominent use of telehealth services, and project dependence on a specific EHR system.

Conclusions

The impact of the project was likely limited by the 12-week length of the implementation period. However, dependence on the EHR system significantly limited the potential to further this project with additional PDSA cycles. Upon completion of this project, an EHR update occurred. This update limited the clinical reports function so that reports can no longer be generated to include information for more than seven days at a time. This severely limits functionality of the EHR-based interventions put into place during this project. Before this update, clinicians perceived these improvements as likely to be sustainable over time. After the update, clinicians believed these improvements were unlikely to be sustainable without changes to the EHR system. Future PDSA cycles including AIMS testing may have been suggested if allowed by the EHR. Clinician suggestions include expansion of electronic lab ordering as this may increase lab collection site options, reduce communication barriers, and increase ease of result documentation. The survey distributed to clinicians indicated that recommendations for next steps include continuing to advocate for changes within the EHR system that are practically applicable for clinicians (Appendix H).

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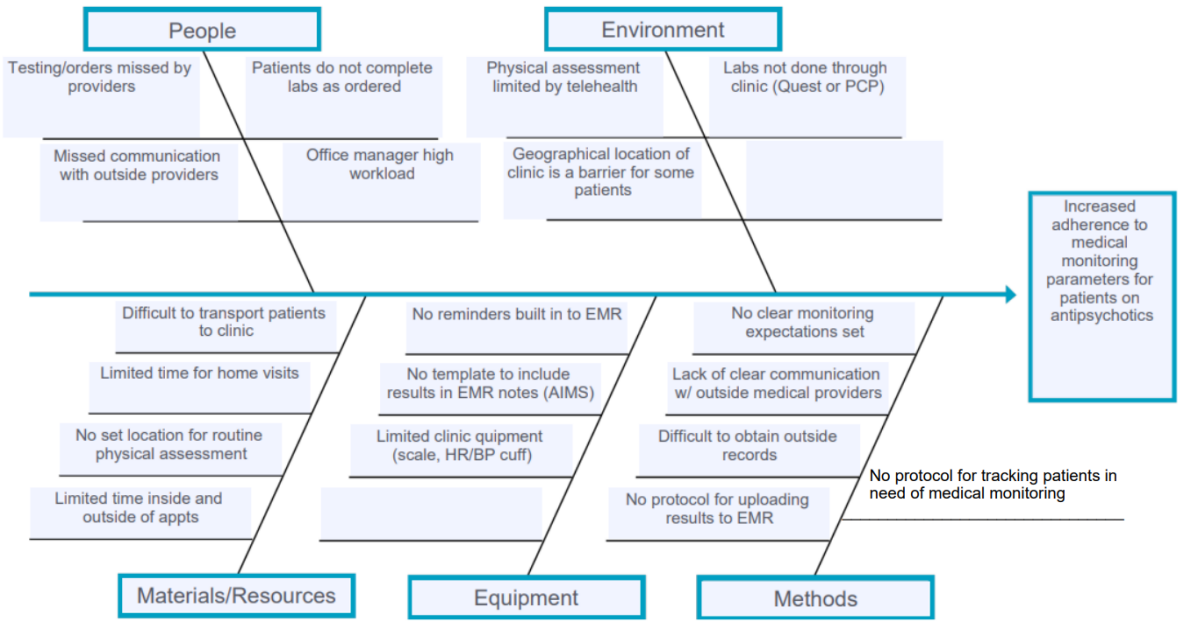
Appendix A: Root cause analysis



Appendix B: Antipsychotic medications included in the EHR search

First-Generation Antipsychotics	Second-Generation or Atypical Antipsychotics
• Chlorpromazine (Thorazine) • Droperidol (Inapsine) • Fluphenazine (Prolixin) • Haloperidol (Haldol) • Loxapine (Loxitane) • Perphenazine (Trilafon) • Pimozide (Orap) • Prochlorperazine • Thiothixene (Navane) • Trifluoperazine (Stelazine)	• Aripiprazole (Abilify) • Asenapine (Saphris) • Brexpiprazole (Rexulti) • Cariprazine (Vrylar) • Clozapine (Clozaril) • Iloperidone (Fanapt) • Lurasidone (Latuda) • Olanzapine (Zyprexa) • Paliperidone (Invega) • Quetiapine (Seroquel) • Risperidone (Risperdal) • Ziprasidone (Geodon)

Appendix C: Clinical policy

Medical Monitoring of Patients on Antipsychotic Medication

Purpose: All patients prescribed antipsychotic medications will be medically monitored for potential adverse effects. Standardized policy provides evidence-based monitoring parameters and describes the roles and responsibilities of clinical personnel.

Applicability: Prescribing clinicians at _____ (Psychiatric Mental Health Nurse Practitioners).

Procedure:

1. Monitoring parameters will include weight, heart rate, blood pressure, hemoglobin A1C (HbA1c) or fasting blood glucose level (BGL), lipid panel, liver function tests (LFTs), complete blood count (CBC), and prolactin level.
2. Baseline measurements: With initiation of an antipsychotic medication, the following baseline measurements will be obtained: height, weight, heart rate, blood pressure, and abnormal involuntary movement scale (AIMS) test.
3. Ongoing monitoring: If possible, this will occur at regular intervals though the duration of treatment with antipsychotic medication
    a. Weight should be measured 2-4 weeks after antipsychotic initiation and then every 3 months for the duration of treatment.
    b. Heart rate and blood pressure should be measured 2-4 weeks after antipsychotic initiation and then every 3 months for the duration of treatment.
    c. HbA1c or fasting BGL should be measured 3 months after antipsychotic initiation and then yearly for the duration of treatment.
    d. Lipid panel should be obtained 3 months after antipsychotic initiation and then yearly for the duration of treatment.
    e. LFTs should be obtained yearly for the duration of treatment with antipsychotic medication.
    f. CBC should be yearly for the duration of treatment with antipsychotic medication.
    g. Prolactin level should be checked as clinically indicated.
    h. AIMS testing should be completed 2-4 weeks after antipsychotic initiation and then every 6 months for the duration of treatment with a first-generation antipsychotic or yearly for the duration of treatment with a second-generation antipsychotic medication.
4. It is the responsibility of the clinician prescribing antipsychotic medication to ensure that appropriate measurements, assessments, and lab work are ordered and completed within the parameters described in Section 2 and Section 3 of this policy.
    a. Weight, heart rate, and blood pressure
        i. Clinicians should measure patient weight, heart rate, and blood pressure at all in-office patient encounters, if possible.
        ii. If patient is exclusively seen via telehealth, the clinician should obtain this information via patient report every three months. Patients may be instructed to collect measurements independently or obtain these through other medical encounters (i.e., primary care provider visits).

b. AIMS
    i. Testing should be completed at in-office clinical encounters if possible.
    ii. Testing may be completed via video conference as necessitated.
c. Laboratory work
    i. Clinicians should order lab results within the parameters defined in Section 2 of this policy. Labs may be ordered through the EHR and completed by patients at designated facilities or obtained from outside medical providers with written consent of the patient. The patient should be provided with clear instructions on where labs are to be completed and when these should be completed by.
    ii. It is the responsibility of the clinician to follow-up with the patient and/or outside medical provider regarding lab work that is not completed or provided to this clinic in a timely manner.

5. It is the responsibility of the clinician prescribing antipsychotic medication to ensure that appropriate measurements, assessments, and lab results are documented in the EHR at the time this data become available.
    a. Most recent weight should be documented in the "Vital Signs" section of the EHR.
    b. AIMS testing documented using the template in the "Labs/Measures" section in the note for the encounter where the testing is performed.
    c. Lab results obtained from LabQuest should be automatically uploaded to the "Lab Results" section of the EHR. Lab results obtained from outside providers should be uploaded into the "Documents" section of the EHR.
6. Prescribing clinicians should review medical monitoring data as it becomes available and take appropriate clinical action as indicated.

Exceptions: It is important to provide patient-centered care and take into consideration that in some cases, medical monitoring procedures may be impractical or not clinically indicated. The benefit of these procedures should be weighed against associated risks. Medical monitoring decisions should be made according to the clinical judgement of the prescriber and exceptions to the policy should be documented in the patient chart.

Appendix D: Summary of consensus guidelines used to guide policy

Guidance provided by the American Diabetes Association, the American Psychiatric Association, the American Association of Clinical Endocrinologists, and the North American Association for the Study of Obesity (2004), the American Psychiatric Association (2020), the Oregon Mental Health Clinical Advisory Group (2019).

Table 1

Consensus Guidelines for Medical Monitoring of Patients on Antipsychotic Medication

	Baseline (prior to initiation)	**2-4 weeks after initiation**	**3 months after initiation**	**Every 3 months**	**Every 6 months**	**Yearly**	**As clinically indicated**
Weight	X	X		X			
BP/HR	X	X		X			
HbA1c (or fasting BGL)				X (after initiation)		X	
Lipid panel				X (after initiation)		X	
LFTs						X	
Prolactin							X
CBC						X	
AIMS	X	X			X (FGA)	X (SGA)	

Table 1 summarizes the consensus guidelines used in this project to develop a policy for medical monitoring of patients on antipsychotic medication at the implementation site. This is not inclusive of all existing clinical practice guidelines relevant to this topic. (Abbreviations: BP= blood pressure; HR= heart rate; HbA1c= glycosylated hemoglobin; BGL= blood glucose level; LFT= liver function test; CBC= complete blood count; AIMS= abnormal involuntary movement scale; FGA= first-generation antipsychotic; SGA= second-generation antipsychotic.)

Note on BMI: Although BMI is a commonly utilized measure in the guidelines, the body of evidence questioning its utility has grown in the years since many of these guidelines were published. It has become widely accepted that there are significant limitations of BMI as a diagnostic tool. BMI cannot distinguish

between fat mass and lean muscle mass and furthermore, does not reflect body fat distribution (visceral adipose tissue is more specifically associated with metabolic risks) (Nimptsch et al., 2019). Additionally, BMI is primarily based on data collected from white populations and does not account for differences across BMI ethnicity, gender, and age (American Medical Association, 2023; Nimptsch et al., 2019). In 2023, the American Medical Association adopted a policy that recognizes issues with using BMI as a measurement and supports alternative methods for diagnosing obesity (American Medical Association, 2023).

Appendix E: Process measures

Medical monitoring data documented post-interventions:

- Assessment data
    - Heart rate, blood pressure, weight
    - AIMS testing
- Laboratory Work
    - Lab orders
    - Lab result documentation
    - Lab orders not completed or documented
- Documentation of exception to the policy (acknowledgment and clinical reasoning for incomplete medical monitoring).

Appendix F: Results

Table 2

Charts Compliant with Medical Monitoring Policy Before and After Project Implementation

	Pre-Intervention	Post-intervention (labs completed)	Post-intervention (labs completed + labs ordered)
HR	19 (16.4%)	31 (26.7%)	
BP	18 (15.5%)	31 (26.7%)	
Weight	26 (22.4%)	55 (47.4%)	
VS complete	14 (12.1%)	17 (14.7%)	
CBC	32 (27.6%)	40 (34.5%)	50 (43.1%)
LFT	32 (27.6%)	35 (30.1%)	45 (38.8%)
HbA1C	35 (30.2%)	32 (27.6%)	44 (37.9%)
Lipid	32 (27.6%)	33(28.4%)	45 (38.8%)
All labs	18 (15.6%)	22 (19.0%)	33 (28.4%)

Table 2 displays the number and percentage of charts compliant with each medical monitoring parameter before and after project implementation. The number and percentage of charts with labs completed is displayed in addition to those with labs ordered or completed after project implementation.

Table 3

Percent Change in Medical Monitoring Compliance from Before to After Project Implementation

		Percent change from pre-intervention to post-intervention	
		Post-intervention (labs completed)	Post-intervention (labs completed + labs ordered)
HR		63.1	
BP		72.2	
Weight		111.5	
VS complete		21.5	
CBC		25	56.2
LFT		9.4	40.6

HbA1C		-9.4	25.7
Lipid		3.1	40.6
All labs		18.2	83.3

Table 3 displays the percentage change in number of charts compliant with each medical monitoring parameter from before to after the project implementation phase. The number and percentage of charts with labs completed is displayed in addition to those with labs ordered or completed after project implementation.

Figure 1

Number of Charts Compliant with Medical Monitoring Parameters Before and After Project Implementation

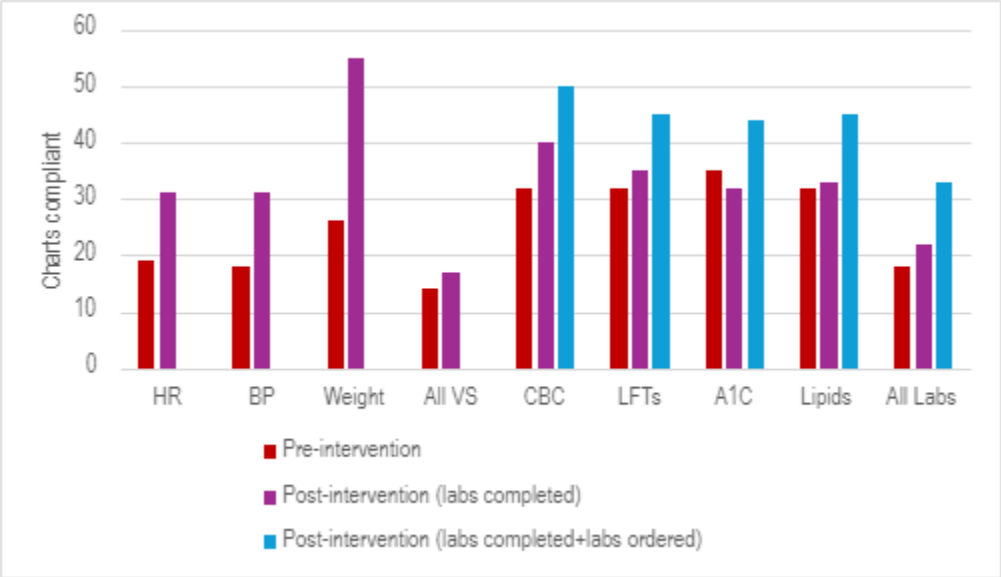


Figure one displays the number of charts compliant with each medical monitoring parameter before and after project implementation. The number charts with labs completed is displayed in addition to those with labs ordered or completed after project implementation.

Appendix G: Statistical analysis

A right-tailed paired t-test was used to determine the statistical significance of medical monitoring improvements observed post-intervention. The p-values were calculated for each process and outcome measure using before and after the implementation phase of this quality improvement project. The resulting p-values are listed below:

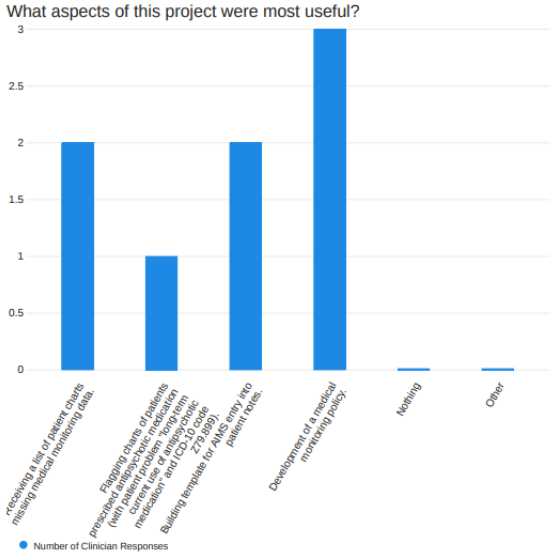
- All vital signs completed: $p=0.041$*
- Overall increase in medical monitoring (labs completed): $p=0.025$*
- Overall increase in medical monitoring (labs ordered or completed): $p<0.001$*

*Statistically significant with significance level> 0.05.

Appendix H: Clinician survey results

DNP Quality Improvement Project Feedback

What aspects of this project were most useful?



Are there any challenges or barriers to routine medical monitoring that you observed?

Comments:

Some clients are unable to get labs unless sedated which makes the typical monitoring recommendations harder to achieve.

With our patient population, there are a few barriers to obtaining routine labs. One of the most common challenges is behavioral safety in folks with developmental disabilities, which sometimes requires that labs be done with a level of sedation that cannot be given safely as an outpatient. I also find that some people, despite repeat conversations about the necessity of routine labwork, do not follow through with getting blood draws, which can result in labs not being done on time annually.

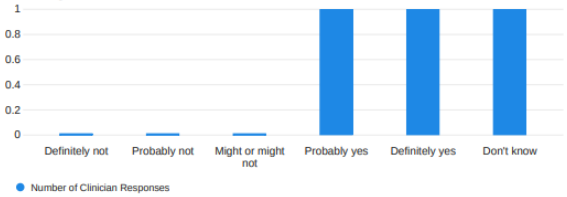
Autistic individuals refusing medical monitoring

Did you experience an increased burden/workload as a result of this project?

Comments:

It was helpful to have a list! And the AIMs template is fantastic.

BEFORE the `EHR update (limiting patient reports to 7-day window), did you feel improvements made during this project would be sustainable in the long-term?



Do you feel improvements made during this project will be sustainable in the long-term AFTER the EHR update (limiting patient reports to 7-day window)?

Do you have any suggestions for improving medical monitoring practices at this clinic in the future?

Do you have any suggestions for improving medical monitoring practices at this clinic in the future?

It would be great to have an automatic reminder integrated into the system.

Continuing to advocate for changes within the EHR system that are practically applicable for clinicians will be necessary. We have a system that works well on the billing side of things, but is clunky and poorly integrated on the clinical side, which slows down processes that could aid in medical monitoring. I would like to see expansion of e-lab ordering, as many clients do not wish to use Quest facilities, which requires orders to then be faxed and results to be faxed back, which is at best slower and at worst leads to orders/results not making it where they need to be.

Any additional comments or feedback regarding this project:

Thank you!

Thanks for taking on a project that is actually clinically relevant. I am really sorry (and frustrated) that our EHR changed the way reports can be run to limit the ability of your project to be as useful as it could have been and hope they will fix this major oversight in their software "update."

Appendix I: Letter of support from clinical agency

Letter of Support from Clinical Agency

Date:
07/17/2023

Dear Molly Turner,

This letter confirms that I, [redacted](PMHNP), allow Molly Turner (OHSU Doctor of Nursing Practice Student) access to complete his/her DNP Final Project at our clinical site. The project will take place from approximately 07/01/2023 to 05/04/2024.

This letter summarizes the core elements of the project proposal, already reviewed by the DNP Project Preceptor and clinical liaison (if applicable):

- **Project Site(s):** [redacted]
- **Project Plan: Use the following guidance to describe your project in a brief paragraph.**
  - Identified Clinical Problem: *Problem description: Antipsychotic medication causes adverse side effects that decrease quality of life and contribute to premature death. Evidence-based guidelines are established and accepted though adherence is generally inadequate. Barriers include communication deficits.*
  - Rationale: *Policy is one recommendation for improving communication deficits. There is no policy at this clinic. This may increase adherence and therefore early detection and intervention for adverse effects of antipsychotic medication.*
  - Specific Aims: *The objective of this project is to write and implement a policy for the medical monitoring of patients currently taking antipsychotic medication. By January 2024, 75% of all patients in this population group at this clinic will have had all appropriate assessments and testing completed. Clinicians can then take the next steps towards intervention as indicated by results. Information gathered from systems and processes utilized over the course of the project will be analyzed to make recommendations for sustainable medical monitoring practices aligned with the policy that is introduced.*
  - Methods/Interventions/Measures: *Prior to the intervention, all patients taking one or more antipsychotic medications will be identified and these charts will be audited to determine which patients are missing documentation of up-to-date assessment and testing results in the electronic health record (EHR). Additional qualitative data on current medical monitoring practices will be collected through a pre-assessment survey distributed to clinicians. A policy based on existing consensus guidelines for the medical monitoring of patients on antipsychotic medication will be written and implemented at the clinic. Secondary interventions may include creating templates for the entry of assessment data and testing results directly into clinical encounter notes, depending on the capabilities of the current EHR system. A post-intervention audit will be completed to identify patients that are still due for assessment and testing or are missing this information in the EHR. A post-assessment survey will be distributed to collect qualitative data on the perceived utility of the implemented policy as well as suggestions for further improvement.*
  - Data Management: *All data will be collected from the EHR and will be de-identified prior to project use.*
  - Site(s) Support: *The study site will provide access to the EHR, allot time to meet and discuss topics relevant to the project, and allow for questionnaire distribution to participating clinicians. The study site will evaluate written policy for approval and implementation.*
  - Other: *NA*

During the project implementation and evaluation, *Molly Turner* will provide regular updates and communicate any necessary changes to the DNP Project Preceptor.

Our organization looks forward to working with this student to complete their DNP project. If we have any concerns related to this project, we will contact *Molly Turner* and *Tara O'Connor* (student's DNP Project Chairperson).

Regards,

[redacted]