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Enhancing Metabolic Risk Surveillance in Patients Receiving Antipsychotics: A Clinical Audit of Integrated Medical and Diagnostic Care Pathways

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Introduction

Antipsychotic drugs are essential for the treatment of serious mental illnesses, such as schizophrenia, bipolar disorder, and other related psychotic diseases. These medicines have markedly improved symptom management, diminished relapse rates, and elevated functional outcomes in affected persons (1). Nonetheless, their utilisation has been associated to many adverse effects, with metabolic problems being especially alarming due to their enduring influence on mortality and morbidity (2).

Antipsychotic treatment is linked to weight gain, dyslipidaemia, insulin resistance, and a higher risk of type 2 diabetes mellitus (3,4). These metabolic abnormalities significantly exacerbate the cardiovascular burden seen in individuals with severe mental illness. Extensive epidemiological studies have indicated that individuals with schizophrenia experience a markedly diminished life expectancy relative to the general population, with cardiovascular disease identified as a primary contributor to early mortality (5,6). In addition, a substantial portion of this increased mortality is linked to alterable physical health factors rather than the psychiatric disorder itself (7).There are many ways in which antipsychotic drugs affect metabolism. Pharmacological actions, such as the inhibition of histaminergic, serotonergic, and dopaminergic receptors, significantly contribute to appetite dysregulation and weight gain (8). Furthermore, behavioural and lifestyle factors, including inadequate diet, diminished physical activity, and elevated smoking rates, significantly heighten cardiometabolic risk in this demographic (9). The interplay of these biological and environmental factors leads to a significant increase in prevalence of metabolic syndrome in individuals undergoing antipsychotic treatment (10).

Clinical guidelines from organisations like NICE advocate regular and systematic monitoring of metabolic markers in patients using antipsychotics. (11). It is advisable to check body weight or body mass index (BMI), blood glucose or glycated haemoglobin (HbA1c), lipid profile, blood pressure, and smoking status. These approaches are intended to promote the early identification of metabolic disturbances and allow for prompt management to prevent long-term consequences (12).

Despite the recommendations, adherence to routine monitoring of metabolic parameters in clinical practice remains inconsistent. A number of studies have reported inadequate adherence to recommended monitoring norms (13,14). The ongoing discrepancy between evidence-based recommendations and real-world clinical practice is underscored by these gaps. At the organisational level, the fragmentation of care between psychiatric and general medical services may result in ambiguity regarding the responsibility for physical health monitoring (16). Psychiatrists may prioritise mental health symptoms, whereas primary care or medical teams may not be consistently involved in ongoing care (17). Time constraints, the absence of organised documentation systems, and insufficient awareness of rules exacerbate unsatisfactory practice (18).

In recent years, there has been a growing awareness of the necessity for a more cohesive strategy in the care of physical health among individuals with severe mental illness. Multidisciplinary care models prioritise collaboration among psychiatry, general medicine, and allied health services to address both mental and physical health requirements (19). These methods have been found to make it easier to find and treat metabolic conditions, as well as to enhance patient outcomes overall (20).

Alongside laboratory monitoring, there is increasing interest in the contribution of diagnostic imaging to the evaluation of a metabolic disorder. Conditions like non-alcoholic fatty liver disease (NAFLD), which is strongly linked to obesity and insulin resistance, are becoming more common in people who are using antipsychotic medications for a long time (21). Abdominal ultrasonography is a commonly accessible and non-invasive technique that may recognise hepatic steatosis and indicate early organ-level involvement (22). Integrating these diagnostic

technologies into clinical pathways could improve the early detection of high-risk individuals.

Nonetheless, the degree to which radiological examinations are included into standard metabolic monitoring is still unknown. Imaging is not typically required by according to guidelines, and its application is frequently dictated by individual clinician preference rather than established methods (23). Consequently, chances for early identification of organ specific problems may be overlooked, especially in settings where interdisciplinary collaboration is limited.

Clinical audits offer a systematic approach to assess existing practices against established benchmarks and pinpoint opportunities for improvement. Audits are different from typical research in that they focus on improving quality by checking compliance, making changes, and then checking the results again (24). Audits can help find gaps in treatment, point out system-level problems, and suggest targeted actions to enhance practice when it comes to metabolic monitoring.

Also, adding a multidisciplinary setting to view to the design of an audit makes it possible to evaluate care pathways more thoroughly. Audits can give us information about how well different specialities work together by looking at both how well monitoring guidelines are followed and how integrated medical and diagnostic services are. This is especially important when it comes to managing metabolic risk, since good care needs to involve several different areas.

The current clinical audit was conducted to assess adherence to recommended metabolic monitoring standards among patients receiving antipsychotic medication in a tertiary care setting. The audit sought to evaluate standard monitoring practices and investigate the use of diagnostic imaging and referrals to general medical care for individuals with recognised metabolic risk factors. The audit's objective was to assess current performance and provide input to ongoing quality improvement initiatives in the management of metabolic risk among patients undergoing antipsychotic therapy.

Methods

Study Design and Setting

This study was performed as a retrospective clinical audit over a six-month duration within psychiatric services associated with tertiary care centers in Solan district, Himachal Pradesh. The audit encompassed both outpatient clinics and inpatient units, facilitating a thorough assessment of standard clinical practices across various levels of care.These centers offer specialised mental health treatments to a diverse urban and semi-urban population and operate within a multidisciplinary framework that includes psychiatry, general medicine, and diagnostic services such as radiology. This scenario facilitated the evaluation of both standard metabolic monitoring and the integration of medical and diagnostic pathways in clinical care.

The study was structured as a clinical audit instead of primary research. It analysed existing healthcare practices against predetermined criteria, executed targeted interventions, and evaluated enhancements through a re-audit cycle, in accordance with recognised quality improvement procedures.

Data Collection Procedures

Data were collected retrospectively from electronic and paper-based medical records using a structured data collection proforma. The proforma was designed to ensure consistency and completeness across all variables.

The following data were extracted:

Demographic Variables

- Age
- Sex

Clinical Variables

- Psychiatric diagnosis
- Type of antipsychotic medication
- Duration of treatment

Metabolic Monitoring Parameters

- Documentation of BMI or weight
- HbA1c or fasting glucose
- Lipid profile
- Blood pressure
- Smoking status

Multidisciplinary Indicators

- Presence of metabolic risk factors
- Utilisation of abdominal ultrasonography
- Referral to general medicine services

Data were recorded based on documented evidence in the clinical record. Where a parameter was not documented, it was considered not performed.

Handling of Missing Data

The standard audit methodology was followed, and missing data were interpreted as the absence of documentation. This method is indicative of real-world clinical practice, in which the failure to document a parameter is regarded as the same as the failure to complete it.

The potential for underestimation of true clinical activity as a consequence of incomplete documentation was recognised and taken into account in the interpretation of the results.

Intervention Strategy
Following examination of baseline audit findings, targeted interventions were carried out over a 2-month period to address identified gaps in practice.
These consisted of:

- Clinician education: Sessions aimed to increase awareness of metabolic hazards associated with antipsychotic medicines and strengthen guideline-based monitoring techniques.
- Standardised monitoring tools: Checklists were standardised to allow systematic recording of metabolic parameters during clinical visits.
- Enhanced care pathways: Suggestions were provided to improve collaboration between psychiatric services, general medicine and diagnostic services, including clearer referral procedures.
- These therapies were delivered in both outpatient and inpatient settings.

Re-Audit Cycle
Re-audit was performed after implementation of interventions, with the same inclusion criteria, audit standards and data collection methodology. This ensured comparability between baseline findings and those following intervention.
The re-audit provided an opportunity to evaluate improvements in compliance and appraise the efficacy of treatments employed.

Data Analysis
Data were analysed using descriptive statistical methods. Compliance with each audit standard was determined by calculating the proportion of patients who met the specified criterion and expressing the result as a percentage.
The study was designed as a quality improvement project, not formal hypothesis testing.
Confidence intervals were not routinely established but the size of the observed changes was utilised to determine clinical significance.

Ethical Considerations
The study was performed as a clinical audit and quality improvement project in compliance with institutional policy. Ethical approval was not required. Where applicable, the audit was registered in the institutional audit framework.All data were anonymised before analysis to safeguard patient confidentiality.

Results
During the baseline audit period, a total of 82 patients met the inclusion criteria, whereas 76 patients were included in the re-audit phase following the implementation of targeted treatments. The study population comprised a wide range of individuals on antipsychotic medication in outpatient and inpatient psychiatric settings.
The demographic and clinical features of the patients were similar between the two audit cycles and hence the observed variations in outcome were unlikely to be explained by differences in population characteristics.

Patient characteristics
The mean age of patients in the baseline cohort was 38.6 years (SD ±12.4) compared with 39.1 years (SD ±11.8) in the re-audit group. There was a male preponderance in both cohorts. The most frequent diagnosis was schizophrenia spectrum disorders, then bipolar disorder and other psychiatric diseases. Most patients were treated with second-generation (atypical) antipsychotics.

Variable	Baseline (n=82)	Re-Audit (n=76)
Mean Age (years)	38.6 ± 12.4	39.1 ± 11.8
Male (%)	56.0	54.0
Schizophrenia (%)	62.0	60.0
Bipolar Disorder (%)	24.0	26.0
Other Diagnoses (%)	14.0	14.0
Atypical Antipsychotic Use (%)	78.0	81.0

Table 1. Demographic and Clinical Characteristics

Baseline Compliance with Metabolic Monitoring
Baseline compliance to metabolic monitoring parameters was inadequate for all measures. Blood pressure and BMI were well documented compared to other parameters. Lipid monitoring and smoking status documentation had the least compliance rates.
This suggests considerable deficits in regular monitoring, especially for indicators requiring laboratory tests or evaluation of lifestyle.

Parameter	Compliance (%)	Patients Assessed (n)
BMI / Weight	64.6	53

HbA1c / Glucose	57.3	47
Lipid Profile	46.3	38
Blood Pressure	69.5	57
Smoking Status	41.5	34

Table 2. Baseline Compliance with Monitoring Standards

Re-Audit Compliance Following Intervention

After targeted interventions, compliance improved for all assessed measures. Improvements were noted not just in frequently measured variables such as blood pressure, but also in laboratory-based measures, suggesting better physician awareness and improved adherence to monitoring standards.

There was considerable improvement in monitoring of lipid profile and recording of smoking status as well.

Parameter	Baseline (%)	Re-Audit (%)	Absolute Improvement (%)
BMI / Weight	64.6	86.8	+22.2
HbA1c / Glucose	57.3	81.6	+24.3
Lipid Profile	46.3	74.0	+27.7
Blood Pressure	69.5	88.2	+18.7
Smoking Status	41.5	68.4	+26.9

Table 3. Comparison of Compliance Before and After Intervention

Metabolic Risk and Multidisciplinary Care

In the baseline cohort, 38 patients (46.3%) were having ≥1 metabolic risk factors. In the re-audit cohort, 35 patients (46.0%) were identified with criteria for metabolic risk, demonstrating a similar risk profile between the two groups.

There was little use of diagnostic imaging at baseline in the risk patients. Only an extremely small proportion had abdominal ultrasonography, indicating underuse of diagnostic approaches. Similarly, referral to general medical services for further diagnosis and management of metabolic abnormalities was poor.

Parameter	Baseline (n=82)	Re-Audit (n=76)
Patients with Metabolic Risk (%)	46.3 (38)	46.0 (35)
Abdominal USG in At-Risk Patients (%)	23.7	51.4
Medicine Referral (%)	34.2	62.9

Table 5. Change in Multidisciplinary Care Indicators

Overall Findings

In summary, the audit determined that adherence to metabolic monitoring standards was inadequate at baseline but improved significantly after implementation of targeted interventions. All indicators showed improvements, with improvements in laboratory-based monitoring and reporting of lifestyle factors being most apparent.

In addition to improvements in basic monitoring criteria, the audit found improved integration of multidisciplinary treatment pathways. More use of diagnostic imaging and more referral to general medical services suggests better coordination and a more holistic approach to management.

These findings suggest that relatively basic interventions such as clinician education and coordinated monitoring systems can lead to considerable increases in both guideline adherence and integration of care.

Discussion

This clinical audit showed severe deficiencies in the metabolic monitoring of patients on antipsychotic medication notwithstanding NICE guidance. Compliance with monitoring requirements was sub-optimal for all parameters, particularly laboratory based assessments and documentation of lifestyle factors. These results are consistent with earlier studies showing that adherence to metabolic monitoring standards in ordinary psychiatric treatment remains inconsistent.

The inadequacies reported are likely to be multifaceted. Care may be fragmented between mental and general medical providers and there may be uncertainty about who is responsible for monitoring physical health. Moreover, time pressures, conflicting clinical goals, and lack of formal monitoring mechanisms may impede adherence to guideline-based treatment. Documentation methods also play a significant role since lack of recorded data may be a reflection of either non-performance or inadequate recording of clinical activities.

A fundamental aspect of this audit is the interdisciplinary perspective, beyond standard metabolic monitoring, to assess integration of

medical and diagnostic treatment pathways. Baseline assessment demonstrated minimal usage of abdominal ultrasonography in individuals with detected metabolic risk factors and low referral to general medical services. These findings indicate that metabolic risk may not be consistently addressed in a comprehensive care framework and opportunities for early detection and intervention may be lost.

The targeted interventions were introduced and there was a clear improvement in compliance on all the indicators that were examined. The observed increases in monitoring of glycaemic status, lipid profile and smoking status show higher knowledge of clinicians and better adherence to prescribed norms. Importantly, these benefits were obtained with relatively modest interventions such as clinical education, standardised checklists and clarity of treatment pathways. This supports the notion that system-level interventions might induce important improvements in clinical practice with less resources.

The audit showed better integration of multidisciplinary treatment in addition to the core monitoring improvements. The rising use of abdominal ultrasonography in at-risk patients reflects the growing appreciation of the potential importance of diagnostic imaging in the detection of early organ level signs of metabolic dysfunction such as hepatic steatosis. Imaging is not prescribed by guideline-based criteria; yet, limited usage in high-risk patients may provide useful clinical information and lead more complete examination.

Similarly, the increase in referrals to general medicine services is an indication of greater cooperation between psychiatric and medical teams. Management of metabolic abnormalities sometimes requires input from various specialities and better referral practices are likely to aid rapid identification and treatment of disorders such as diabetes and dyslipidaemia. The findings underline the need of integrated care approaches in addressing the complex health requirements of individuals on antipsychotic medication.

Clinically speaking, there are major implications for enhanced metabolic monitoring. Early detection of metabolic derangement allows for timely intervention including lifestyle modification, pharmacologic therapy and closer follow up. Systematic monitoring is an essential component of comprehensive care given the high incidence of cardiometabolic risk factors in this population.

The sample size is sufficient for audit purposes but may restrict in-depth analysis of subgroup differences. Also, while gains were seen post-intervention, the sustainability of such changes over a longer time period was not investigated. Further monitoring and repeat audit cycles would be necessary to verify that improvements are maintained.

Future study should focus on incorporation of metabolic monitoring into normal clinical workflows with the use of electronic prompts, established protocols and defined responsibilities across specialities. Better quality of care is expected to be achieved through increased collaboration across psychiatric, medical and diagnostic services. Future study may also explore the significance of diagnostic imaging in detecting early metabolic issues and its potential incorporation into clinical guidelines.

In summary, this audit underscores the persistent deficiencies in metabolic monitoring among patients undergoing antipsychotic treatment. However, it also illustrates that targeted interventions can result in substantial enhancements in the integration of multidisciplinary care and adherence to monitoring standards. These results underscore the significance of structured, collaborative strategies in enhancing the physical health of this vulnerable demographic.

Conclusion

The clinical audit shows that metabolic monitoring of patients on antipsychotic treatment is still imperfect in routine clinical care, despite existing guidelines from NICE. The baseline results demonstrated significant gaps in critical monitoring parameters, particularly in laboratory-based assessments and the documentation of lifestyle factors. These limitations underscore persistent difficulty in translating guideline-based recommendations into consistent clinical practice.

Crucially, the audit results suggest that focused, low-cost initiatives can make a real difference. Clinician education, systematic monitoring tools and clearer care pathways were introduced and led to improved compliance with all metrics evaluated. These gains were evident in both routine physical health monitoring and larger elements of care, such as referral to general medicine services and use of diagnostic imaging in patients with known metabolic risk factors.

One of the major strengths of this audit is the incorporation of a multidisciplinary framework. The study examines the integration of psychiatric, medical, and diagnostic services to assess the value of coordinated care in managing complicated physical health needs. Enhanced coordination among specialities appears to be of utmost importance to improve diagnosis and management of metabolic problems.

The therapeutic implications of enhanced metabolic monitoring are of great importance for patient outcome. Early detection of anomalies permits timely intervention which may lessen the long-term burden of cardiovascular and metabolic disease in this vulnerable population.

In conclusion, this audit emphasises the necessity for systematic and integrated approaches to metabolic risk management in patients on antipsychotic treatment. Continued focus on multidisciplinary teamwork and re-auditing on a regular basis is vital to maintain improvements and optimise quality of treatment.

Limitations

However, in spite of these strengths there are certain limitations to be addressed. The audit is retrospective and relies on the accuracy and completeness of clinical record, which may not reflect genuine clinical activity. Thus, documentation might be used as a proxy of clinical practice and introduce bias. Moreover, the audit was undertaken in tertiary care institutions in Solan and the findings may not be entirely generalisable to other healthcare contexts with varied resource availability or organisational structures.

Future Directions

Future work should focus on the systematic, system-level adjustments needed to sustain and grow the improvements found in this audit. The use of electronic health records, automated reminders and standardised templates to include metabolic monitoring into routine clinical workflows could improve uniformity and reduce reliance on individual clinicians' practices. Inclusion of prompts aligned with NICE recommendations may further increase adherence to monitoring criteria.

Another important goal is to build on the cross-disciplinary collaboration. Establishing a clear division of work between psychiatric services, general medicine, and diagnostic teams helps improve care coordination. Development of integrated care pathways with specific referral criteria and shared management protocols may help timely identification and management of metabolic disorders.

The role of diagnostic imaging needs further study. Prospective studies could also be used to assess the clinical value and cost-effectiveness of adding modalities such as abdominal ultrasonography to the routine examination of high-risk patients. Clear guidelines for the use of imaging may help to standardise practice and avoid unnecessary studies.

Longitudinal follow-up studies are necessary to assess the sustainability of the improvements seen in this audit and their impact on long-term patient outcome, such as a decrease in cardiovascular risk. It is important to undertake regular audit cycles to facilitate continuous quality improvement.

Finally, future efforts should target patient-centered interventions including shared decision-making and education on lifestyle modification to improve the overall effectiveness of metabolic risk management measures and complement clinical monitoring.

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