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Identifying Barriers to Implementing Guidelines for Monitoring Metabolic Syndrome in Patients
Prescribed Second-generation Antipsychotics in Incarcerated Populations

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IDENTIFYING BARRIERS TO MONITORING METABOLIC SYNDROME IN INCARCERATED POPULATIONS

Abstract

Individuals with serious mental illness (SMI) have increased rates of cardiovascular disease (CVD) and mortality. Also, the evidence indicates that second-generation antipsychotics (SGAs, a conventional treatment) increase the risk of metabolic syndrome (MetS) often leading to weight gain, cardiovascular disease (CVD) and type 2 diabetes (DM 2). U. S. correctional institutions, faced with increased rates of mental illness in its population, are confronted with the need to assure adequate monitoring for its patients treated with SGAs. This paper reviews guidelines for monitoring incarcerated patients to ensure early intervention that can improve clinical outcomes. Characteristics of the incarcerated population and institution-related barriers to implementing guidelines are identified along with strategies for improved monitoring and issues for further study.

Keywords

Second generation antipsychotics, metabolic syndrome, mental illness in U. S. jails and prisons, barriers to care

IDENTIFYING BARRIERS TO MONITORING METABOLIC SYNDROME IN INCARCERATED POPULATIONS

Introduction

American incarceration rates are among the highest in the world, and approximately 16 to 20 percent of those incarcerated are diagnosed as seriously mentally ill (SMI) (Aufderheide, 2014, Treatment Advocacy Center, 2014). Since their introduction in the 1990's, because of improved tolerability in comparison to first-generation antipsychotics, second-generation antipsychotics (SGAs) are the standard treatment for several psychiatric disorders (Morrato, Newcomer, Kamat, Baser, Harnett, and Cuffel, 2009). However, evidence supports that patients treated with SGAs have an increased risk of metabolic dysregulation leading to increased vulnerability to type 2 diabetes, dyslipidemia, hypertension, and obesity. A consensus statement from the American Diabetic Association (Morrato, Newcomer, et al., 2009) recognizes the need to monitor patients on SGAs for metabolic syndrome (MetS) using recommended monitoring guidelines. Yet, these guidelines are not routinely followed in the general population (Riordan, Antonini, and Murphy, 2011). Study of adherence to the guidelines in correctional institutions is not available, and it is unlikely that monitoring in correctional institutions is different than in the community. Correctional facilities provide treatment to a large mentally ill population, and it is important that they establish policy and monitor adherence to recommended guidelines.

In a post-deinstitutionalization mental health system, determinants such as inadequate access to treatment, social isolation, lack of support systems, poverty, and stigma affect the poorest and sickest psychiatric patients and often lead to homelessness, substance abuse, and incarceration (Sheth, 2009). These patients face increased rates of morbidity and risk of mortality because they are disproportionately affected by respiratory illnesses, obesity, diabetes, substance abuse, sexually transmitted diseases, and cardiovascular disease (Casey, 2005). The possibility of developing metabolic disorders is amplified when treated with SGAs (Casey, 2005; American Diabetic Association, 2014; Waterreus, & Laugharne, 2009).

Studies specific to the prevalence and monitoring of MetS in incarcerated populations prescribed SGAs are lacking. However, given recommended guidelines, best practice guidelines based on the unique characteristics of incarcerated population can be determined. Laboratory testing to track metabolic abnormalities cannot be underestimated, and adherence to critical follow-up is an indispensable step in the clinical management of patients prescribed SGAs. An examination of this topic must include identification of barriers to adequate care and possible solutions to address this problem in incarcerated populations.

Purpose

The aim of this paper is to review the current best-evidence guidelines for monitoring for metabolic syndrome in patients prescribed second-generation antipsychotics. Evidence on barriers to the implementation of guidelines for monitoring MetS in patients prescribed SGAs in incarcerated populations will be summarized, including problems with implementation, patient follow-up and systemic issues.

IDENTIFYING BARRIERS TO MONITORING METABOLIC SYNDROME IN INCARCERATED POPULATIONS

Methods

A search was conducted using search terms specific to two areas: Guidelines for monitoring MetS in patients prescribed SGAs and barriers for implementation of guidelines in incarcerated populations. Literature was searched from published books, medical, nursing and public health journals from the period 2000 through 2016, utilizing databases and search engines, including CINAHL, Cochrane Library, Medline, PubMed, Scopus, and Google Scholar. The reference lists of specific articles screened were used, as were links suggested when searching articles. Organizational resources were used specific to each aim and described below. Systematic reviews and meta-analytic reviews were analyzed using PRISMA Guidelines (Moher, Liberati, Altman and the PRISMA Group, 2009). Publications written in English language and from the period 2000 through 2016 were selected for further study.

Guidelines for Monitoring for Metabolic Syndrome in Patients Prescribed SGAs

A search of the literature was conducted using the following search terms: Metabolic syndrome, dyslipidemia, cardiovascular disease; second-generation antipsychotics; atypical antipsychotics; clinical management; guidelines for monitoring; laboratory testing; psychiatric or mentally ill patients. Search terms were combined with AND or OR to specify pertinent results. Resources of organizations were reviewed including the American Diabetic Association, the American Heart Association, and National Alliance on Mental Illness. Search results were included if they focused on current best evidence for metabolic syndrome monitoring in psychiatric patients on SGAs.

Initially, 164 articles were considered for content suitability, of these, 15 duplicate articles were removed, 63 were excluded because they focused on metabolic syndrome in the absence of SGA treatment, or emphasis was on first-generation antipsychotics. Also excluded were studies based on metabolic syndrome in children and adolescents because this review involves adult, mostly male, subjects. Eleven articles were excluded based on duplication of subject content, and same authors on multiple articles with similar content. Finally, 75 articles were selected for definition of metabolic syndrome, and suggested guidelines and management of patients on SGAs. Of the 75, 31 presented guidelines for monitoring metabolic syndrome, of which 6 were included to define and offer criteria for diagnosis of metabolic syndrome. Another 44 focused on the metabolic impact of SGAs, and 11 were included in the review of suggested guidelines for monitoring.

Barriers to Guideline Implementation in the Incarcerated Population

A search of the literature was conducted using the following search terms: Mental illness; psychiatric patients; incarceration; jails; prisons; correctional; forensic settings; inmates; treatment; standards of care; mental health care; barriers to care. Search terms were combined with AND or OR to specify pertinent results. Organizational resources were reviewed, including the Agency for Healthcare Research and Quality (AHRQ), The National Commission on Correctional Healthcare (NCCHC), the Department of Justice, and various U. S. correctional websites. Search results were included if they focused on the medical and mental health care of

IDENTIFYING BARRIERS TO MONITORING METABOLIC SYNDROME IN INCARCERATED POPULATIONS

adult offenders in U. S. jails and prisons. A total of 20 articles were identified that addressed barriers to care, and 11 were included in review of barriers to implementing guidelines for care in incarcerated populations. Duplicate articles, articles based in settings outside the U. S., and articles prior to 2000 were excluded from consideration.

Results

Diagnosing Metabolic Syndrome

The American Heart Association (AHA), International Diabetes Federation (IDF), the World Health Organization (WHO), the European Group for Study on Insulin Resistance (EGIR), the National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III), the American Association of Clinical Endocrinologists (AACE) and the National Heart, Lung and Blood Institute (NHLBI) offer definitions of MetS. However, while opinions vary on an exact diagnosis, one common theme is that MetS is a serious, life-threatening condition that must be identified and treated.

In recognition of the significance of MetS, a conference to study the “scientific issues related to the definition of metabolic syndrome” was organized by the National Heart, Lung and Blood Institute (NHLBI), in collaboration with the American Heart Association (AHA) because the National Cholesterol Education Program’s Adult Treatment Panel III (ATP III) provided criteria for metabolic syndrome that varied from that of other organizations (Grundy, Brewer, Cleeman, Smith, and Lenfant, 2004). For the purpose of this paper, the most commonly used and clinically relevant definition of MetS, provided by the American Heart Association (AHA), and the National Heart, Lung and Blood Institute (NHLBI) was used. MetS is a group of risk factors that increases the risk of abdominal obesity, cardiovascular disease (CVD), and vulnerability to DM 2 (Grundy, Daniels, Donato, et al., AHA/NHLBI, 2005: 2735-2752). According to the American Heart Association (AHA), a definitive diagnosis of MetS is made in the presence of a combination of specific factors; the presence of at least three of the following risk factors is necessary to meet criteria for a clinical diagnosis of MetS (Grundy, S. M., 2005).

- Fasting glucose ≥ 100 mg/dL.
- Low levels of high-density lipoprotein (HDL): Men <40 mg/dL; Women <50 mg/dL.
- High levels of triglycerides ≥ 150 mg/mg/dL.
- Central (abdominal) obesity measured by waist circumference: Men: > 40 inches (102cm); Women: 35 inches (88cm).
- Hypertension (elevated blood pressure): ≥ 130 millimeters of mercury (mmHg) systolic blood pressure or ≥ 85 mm Hg diastolic blood pressure ($\geq 130/85$ mmHg).

Risk of Metabolic Syndrome with Second Generation Antipsychotics (SGAs)

Those diagnosed with a serious mental illness have an increased risk of cardio-metabolic risks and premature mortality; consistent, on-going monitoring in this group is mandatory (Cohn and Sernyak, 2006). According to Cohn, & Sernyak (2006), one aim of screening and monitoring is the early identification of metabolic changes to implement preventative action.

IDENTIFYING BARRIERS TO MONITORING METABOLIC SYNDROME IN INCARCERATED POPULATIONS

Each SGA has a specific metabolic risk profile, with Zyprexa and Clozaril deemed to have the highest metabolic impact (Table 1). However, while some agents are believed to have a lower glycemic impact, the U. S. Food & Drug Administration (FDA) in 2009, the FDA required manufacturers of *all* SGAs to include a black box warning in its packaging about the increased risk of developing hyperglycemia and diabetes (FDA, 2009; Riordan, Antonini, and Murphy, 2011)). According to Riordan, et al., (2011), in 2004, the FDA also recommended that manufacturers of SGAs notify providers of the need for glucose testing to monitor patients started on SGAs, particularly those with a diagnosis of diabetes, at risk for diabetes, or experiencing symptoms of hyperglycemia.

Metabolic Syndrome in the Seriously Mentally Ill (SMI) Population

Those with mental illness typically have excessive prevalence of morbidity and increased mortality related to chronic diseases, predominantly substance abuse, obesity, infectious diseases, diabetes and cardiovascular disease (Casey, 2005; Balf, Stewart, Whitehead & Baker, 2008). Metabolic changes, including hyperglycemia, diabetes, hyperlipidemia and weight gain, increase the risk of premature morbidity and mortality in SMI patients prescribed SGAs.

The multi-phase Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE) Project sponsored by the National Institute of Mental Health was conducted to determine the long-term effects and usefulness of antipsychotic medications in patients with schizophrenia (Stroup, McEvoy, Swartz, Byerly, Glick, Canive, McGee, Simpson, Stevens, and Lieberman, 2003). The study involved SGAs (olanzapine, quetiapine, risperidone, clozapine, and ziprasidone) and the first-generation antipsychotics (FGAs) (perphenazine and fluphenazine decanoate). The data from CATIE and other studies indicate that patients diagnosed with schizophrenia have higher rates of MetS when compared to the general population and justifies clinical decisions for regular monitoring (Lieberman et al., 2005; Mitchell, and Dinan, 2010; Ryan, Collins, and Thakore, 2003).

A retrospective study found infrequent metabolic monitoring of Medicaid patients on SGAs despite warnings from the Food and Drug Administration (FDA) in 2003 and 2004. The FDA warned of cases where life-threatening hyperglycemia lead to ketoacidosis, coma, and death (Morrato, Druss, Hartung, Valuck, Allen, Campagna & Newcomer, 2010). Because of the metabolic risks associated with SGAs, the ADA together with the American Psychiatric Association (APA) published a consensus report providing a specific protocol for monitoring patients on SGAs (ADA/APA, 2004; Morrato, et al., 2010).

To ensure adequate monitoring for MetS, the consensus report from the American Diabetic Association and American Psychiatric Association (2004) recommends assessments of personal/family history, weight gain/waist circumference (BMI), blood pressure (BP), hyperglycemia/DM 2, and lipid profile/hyperlipidemia at baseline, 4 weeks, 8 weeks, 12 weeks, quarterly, annually and all others at 5 years; more frequent monitoring is recommended if clinically significant results are identified (Table 3).

Lifestyle Intervention

IDENTIFYING BARRIERS TO MONITORING METABOLIC SYNDROME IN INCARCERATED POPULATIONS

Lifestyle assessment involves evaluation of behaviors such as exercise, diet, smoking, alcohol and substance use. The AHA and other organizations have emphasized the importance of therapeutic lifestyle changes as first-line therapy in the management of MetS with focus on obesity and weight reduction. A combination of lifestyle changes and antihypertensive agents are recommended for patients with MetS who have developed hypertension. Lifestyle changes and hypoglycemic agents are recommended for those patients who have developed DM 2 to address keeping hemoglobin A1c levels within target guidelines (Grundy, Brewer, Cleeman, et al., 2004). According to the ADA/APA (2004) consensus development conference on antipsychotic drugs, obesity and diabetes, because of associated health risks, ongoing management of patients prescribed SGAs might require more frequent testing and monitoring where clinically indicated.

Health Care in Correctional Settings

In standards developed by a task force on correctional health services (American Public Health Association, 2003), policies for managing prisoners with psychiatric diagnoses prescribed psychotropic medications, must include laboratory monitoring where indicated in accordance with generally accepted pharmacological principles and contemporary standards in the community. Ongoing periodic evaluation of medication effectiveness and presence of side effects must be performed in all cases and be consistent with national community standards of care (APHA, 2003).

The American Psychiatric Association (APA) has published revised guidelines on psychiatric services in correctional facilities (2016). A position statement issued by the APA recommends that SGAs, except Clozapine, be made available, where appropriate, as first-line treatment throughout the system, including jails, prisons, and youth services facilities. The APA also advised, “thoughtful management of psychoactive medication in correctional settings” with concerns for side-effect management.

According to the Group for the Advancement of Psychiatry (APA, 2016) for psychiatric providers in the criminal justice system, “Treatment within the context of jails and prisons can be fraught with barriers to quality care, and providers within the system must be committed to maintaining and providing recognized standards of care and to advocacy for this vulnerable population” (p. 87). This statement highlights the advocacy role of mental health staff in correctional settings in the effort to effect change.

Barriers to Care in Correctional Institutions

The literature indicates that a lack of monitoring of patients on SGAs for metabolic dysregulation can lead to increased morbidity and mortality (Morrato et al., 2010; Nasrallah, et al., 2006). In spite of evidence-based guidelines for monitoring these patients, and warnings from the FDA in 2003, and 2004, the FDA identified continued infrequent metabolic monitoring of Medicaid patients (Morrato, et al., 2010). A search for specific studies related to monitoring patients in U. S. correctional institutions, considered to be the largest provider of mental health services in the U. S., yielded no results. A literature search, however, yielded data to support inadequate

IDENTIFYING BARRIERS TO MONITORING METABOLIC SYNDROME IN INCARCERATED POPULATIONS

delivery of mental health services in most correctional institutions, and given the unique characteristics of mentally ill incarcerated populations, compliance to guidelines for monitoring patients prescribed SGAs is important. In any discussion on the delivery of mental health services in correctional institutions, barriers that influence the gaps in care must be examined. Barriers identified include, issues of dual loyalty, security, correctional culture, staffing and job-related stress, capabilities of the electronic medical records system, social determinants of health, the stigma of mental health, unclear guidelines and responsibility for monitoring, and low education levels among inmates (Table 4). These barriers can influence the standard of care to correctional patients, including metabolic monitoring for patients prescribed SGAs.

Dual Loyalty.

Qualified health care professionals in correctional institutions are bound by the ethical principles of their profession in their delivery of patient care. Health care professionals must ensure that the delivery of care is consistent with professional standards; at no time must care provided to inmate patients appear to be punitive. The National Commission on Correctional Health Care (2014) published official standards of care with the goal of improving the quality of care in U. S. jails “consistent with national clinical guidelines.” However, one of the most significant barriers faced by health care providers in correctional institutions is the issue of “dual loyalty.” Dual loyalty refers to the ethical dilemma faced by medical staff providing services in correctional institutions. There is often “tension” between what is considered ethical medical care versus the obligations to correctional rules and culture which are not necessarily well aligned (Metzner, and Fellner, 2010; Pont, Stöver, and Wolff, 2013).

For example, dual loyalty may be an issue when punitive segregation or solitary confinement is used to punish infractions or control challenging inmates but the adverse effects of solitary confinement can lead to decompensation in inmates diagnosed with serious mental illness (Metzner, and Fellner, 2010). Mental health services in segregation units are often limited to medication and “rounding” by a clinician, and other therapeutic interventions are usually unavailable for inmates in segregation (Metzner, and Fellner, 2010).

Security issues and correctional culture

Security-restricted inmate movement, punitive segregation (Metzner and Fellner, 2010), and security related jail/prison lock-downs affect how care is delivered and are barriers specific to the correctional milieu. Inmate transfer affects providers’ ability to monitor adequately; transfers before laboratory tests are performed or before intervention can be completed is noteworthy. Inmates may be transferred between facilities, between jurisdictions, or released to the community (Edwards, 2005).

Education

Health literacy is required for patients to make informed decisions about care, whether in the community or incarcerated. Inmate patients need education about the benefits and risks associated with treatment, the necessity of monitoring for metabolic dysregulation in patients treated with SGAs, including laboratory testing as an essential monitoring tool. Research has shown that health literacy skills lead to positive health outcomes, and that inadequate health literacy is associated with increased mortality (IOM, 2009). According to the IOM, African

IDENTIFYING BARRIERS TO MONITORING METABOLIC SYNDROME IN INCARCERATED POPULATIONS

Americans and Hispanics are overrepresented in the lowest levels of literacy proficiency, and this runs parallel with high school dropout rates; notably, African Americans and Latinos are disproportionately represented in the correctional population (Wilpner, Woolhandler, et al., 2009).

Responsibility for monitoring - Psychiatry vs. Medical

The literature suggests that there is confusion on whether medical staff or psychiatric staff must monitor for MetS in patients on SGAs. Clearly assigned responsibility for monitoring with an integrated approach to care can help improve health outcomes (Cohn and Sernyak, 2006; McCulloch, 2013).

Staffing

The profit motive is one factor that might influence staffing in correctional facilities (Daniel, 2007). Inadequate correctional staff can impact safety, inmate movement and the transport of inmate patients to scheduled monitoring appointments. Inadequate medical staff can affect the level of care provided to patients. Over booking providers and the effort to see all patients scheduled for mental health appointments can take precedence over steps like chart review that can reveal the need for required laboratory monitoring. Professional-role stress, staff burnout, absenteeism, staff apathy, and negative staff attitudes toward inmate patients are also identified barriers in the delivery of patient care (Edwards, 2005; Thurston-Snoha, and Mora, 2011; Lambert, et.al, 2015).

Electronic medical records

The technical capabilities of electronic medical records and programs used in correctional institutions can become a barrier to care when the system is fragmented and does not integrate medical, behavioral health and laboratory testing. For example, if systems lack the ability to flag the charts of patients requiring laboratory testing, routine monitoring requirements may not be met (Madden, Lakoma, Rusinak, Lu, and Soumerai, 2016).

Social determinants of health

Factors identified by organizations like the WHO are known to affect the health of individuals and communities. Income and social status, access to education, physical environment, social supports, genetics, health services and gender affect the lives of individuals. For vulnerable populations who cycle through the correctional setting, psychosocial factors like insufficient social supports and low education levels are factors that influence their functioning. Notably, low education levels are “linked with poor health and more stress” (AHRQ/Zimmerman, Woolf, and Haley, 2015).

Stigma

The stigma associated with mental health is well documented and can affect staff attitudes toward the mentally ill inmate, as well as the inmate’s avoidance of being labeled; both can affect compliance with required tests and monitoring (Lawrence and Kisley, 2010).

IDENTIFYING BARRIERS TO MONITORING METABOLIC SYNDROME IN INCARCERATED POPULATIONS

Leadership

There is a legal and ethical basis for providing adequate health care to incarcerated populations. *Necessary health care* for prisoners is a significant standard of care proposed by the ABA (2011). Results of a nationwide survey on the health and health care of U.S. prisoners concluded that many inmates with “serious chronic physical illnesses fail to receive care while incarcerated” (Wilper et al, 2009). Inmates face restrictive barriers to care and to ensure that they receive basic patient-centered care; a strong and committed leadership is needed (NCCCHC, 2004).

Discussion

Fontanaros, et al., (2013) identifies that seriously mentally ill inmates are more likely to be homeless, less likely to have employment, and face more difficulty accessing mental health and other necessary services in the community than those without mental illness. Statistics suggest that approximately 50% of incarcerated populations have existing mental health conditions, addiction issues, as well as chronic diseases like hepatitis C, sexually transmitted diseases, hypertension, and DM 2 (Rich, Chandler, et al., 2014). The authors also reported “fewer prisoners receive post-admission medical and diagnostic blood tests.” However, given the existence of clinically significant comorbidities in this population, monitoring of mentally ill inmates treated with SGAs is important. Monthly blood pressure monitoring, more frequent and consistent blood tests, consistent weight monitoring and patient education is proposed for the management of the inmate population prescribed SGAs. Intervention with agents to address hyperglycemia/DM 2, hyperlipidemia, and hypertension is suggested, where appropriate.

No literature related to monitoring metabolic syndrome in mentally ill inmates on SGAs was identified, but based on unique characteristics of incarcerated populations, enough clinical evidence exists as a basis for determining how best to monitor them. Any recommendation for the metabolic management of inmates on SGAs must consider the well-documented fact that patients with serious mental illness are at increased risk for CVD, and DM 2.

The APHA (2003) Standards for Health Services in Correctional Institutions states that all prisoners have the right to a comprehensive range of psychiatric and mental health services and should include treatment modalities and services commonly used within mental health treatment settings in the community. So, why is compliance with monitoring guidelines an issue? Barriers inherently unique to healthcare and some specific to correctional settings have been identified, and influence how services are provided to inmates. Some barriers might be challenging to resolve, however, many can be addressed. Improved patient education, and improved provider education are solutions to related barriers. A strong administration can address staffing issues and provide technologic resources that can alleviate associated barriers. This review recognizes the challenges associated with correctional health care requiring providers to make a greater effort to monitor, despite these issues and in spite of electronic limitations; patient monitoring must not be compromised. Chart review and informing receiving facilities of metabolic-related issues are essential steps that must be completed.

IDENTIFYING BARRIERS TO MONITORING METABOLIC SYNDROME IN INCARCERATED POPULATIONS

Implications for Practice

The evidence suggests an improvement in the quality and delivery of patient-centered care where interdisciplinary collaboration between providers exists (RWJF, 2010; IOM 2001). Given the complexity of correctional health care, sustainable improvement might depend on a collective resolve to improve collaboration between providers in the system.

The large population of inmates with psychiatric disorders that are maintained on second-generation antipsychotics must be monitored for metabolic changes. It is important that organizational protocols for monitoring patients adhere to best practice guidelines. If gaps in monitoring exist, it is important that efforts be made to reduce these deficits (Khatana, Kane, Taveira, Bauer, & Wu, 2011). Guidelines disseminated by the American Diabetes Association and other seminal organizations specifically recommend laboratory testing to track metabolic status.

Lifestyle changes recommended for combating the effects of metabolic change present unique challenges for incarcerated individuals. In correctional settings, there are inherent limitations by virtue of being incarcerated. Inmates lack autonomy and have limited control over dietary choices, opportunities to exercise, as well as conditions conducive to healthy choices such as adequate sleep. Therefore, in these settings, laboratory testing is a critical tool for monitoring metabolic status in patients prescribed SGAs.

Correctional facilities must have clear guidelines for monitoring patients on SGAs, with a well-defined treatment protocol where necessary. Barriers to care must be addressed and a multidisciplinary approach utilized for the intervention, treatment, and prevention of metabolic disorders in patients of SGA agents.

Implications for Correctional Health Care

In *Estelle v. Gamble*, 97 S. Ct. 285 (1976) the court concluded that failure to provide adequate medical care violates a prisoner's right to adequate care guaranteed by the Eighth Amendment to the constitution (Prisoners Rights, 1977). According to Eber (2009), if officials have an awareness of the risk of "substantial harm" but fail to act, it constitutes a violation of the Eighth Amendment and may be interpreted as cruel and unusual punishment. Clinical administration and quality improvement teams must take action on barriers that impede providing care consistent with national guidelines. Organizations must encourage a culture of collaboration and effective communication and a willingness to address the issues at hand (O'Daniel, & Rosenstein, 2008).

Qualified health care professionals in correctional institutions are bound by the ethical principles of their profession in their delivery of patient care. Health care professionals must ensure that the delivery of care is consistent with professional standards; at no time must care provided to inmate patients appear to be punitive. The National Commission on Correctional Health Care (2014) published official standards of care with the goal of improving the quality of care in U. S. jails "consistent with national clinical guidelines." When considered from a population health perspective, improvement in correctional health care is urgent. The NCCHC

IDENTIFYING BARRIERS TO MONITORING METABOLIC SYNDROME IN INCARCERATED POPULATIONS

(2011) postulated that in the correctional setting, the patient “is at the core of professional practice” and nurses and other professionals must adhere to the ethical principles of respect for persons, beneficence, nonmaleficence, justice, veracity and fidelity.

Recidivism is a challenge, and for those with serious mentally ill inmates, increased rates of incarcerations have been noted (Baillargeon, Binswanger, Penn, Williams, and Murray, 2009). For those with mental illness, more effort is needed by key stakeholders to move this population to diversion programs such as mental health and drug courts (Daniel, 2007). Efforts to disrupt recidivism in the mentally ill requires improved discharge planning services in order to connect inmates to quality mental health services in the community (Baillargeon, Binswanger, Penn, Williams, & Murray, 2009). Examples include intensive community treatment programs such as Forensic Assertive Community Treatment (FACT) [pg. 6], meant to improve treatment and target mentally ill recidivists (Fontanaros et al., 2013), and Assisted Out Treatment (AOT) which is intended to provide court-ordered, community-based outpatient to SMI individuals (SAMHSA, 2016).

The risk of death in those with diabetes is 50% higher than those who do not have diabetes and complications of diabetes can include blindness, renal failure, heart disease, stroke, and amputation of toes, feet or legs. Approximately 29.1 million people in the U. S. have diabetes with an approximate cost of \$245 billion for medical expenses, lost work, and wages (CDC, 2014). Therefore, it is vital that systems for integration of laboratory results, medical, and behavioral health treatment plans be developed to assure that quality and costs are well managed.

Implications for Future Research

Additional research is needed across U. S. correctional institutions on the monitoring of patients on SGAs, adherence to monitoring guidelines, and protocol for intervention if a metabolic disturbance is identified. Given the specific needs of inmate populations, a different set of guidelines might be warranted, but more research is needed in this area. U. S. correctional institutions have been called de facto mental health institutions because of the high rates of mentally ill persons in its population; noted for multiple comorbid health conditions, homelessness and substance use disorders (Casey, 2005; McNeil, Binder, and Robinson, 2005). Correctional barriers to care, and social determinants such as poor health literacy, inadequate access to care, and lack of adherence to treatment in the community are among the determinants that plague this population demanding more aggressive management to improve health outcomes. Correctional staff must be educated on its obligation to provide basic health care to this population, including culturally competent patient teaching to address health literacy issues. Discharge planning services, as previously suggested, must be expanded to enhance access to mental health services in the community.

Limitations

Guidelines promulgated by the AHA, and other organizations provide criteria for monitoring patients on SGAs at risk for metabolic syndrome. However, the unique characteristics of incarcerated populations in U. S. have not been studied, and based on factors previously

IDENTIFYING BARRIERS TO MONITORING METABOLIC SYNDROME IN INCARCERATED POPULATIONS

discussed, might require a more rigorous set of rules for management. Access to data on monitoring protocols in jails, and prisons across the U. S. remain limited and even where available, records on *actual* practice are not readily available. The data suggest that even where protocols exist, adherence might be sporadic, and the lack of transparency in U. S. correctional institutions limits study and the chance of improving practice.

The lack of published data on monitoring inmates maintained on SGAs for metabolic changes limits the scope of this review and makes it difficult to issue a definitive conclusion. More research is required to assess monitoring or the effectiveness of monitoring in various types of correctional institutions. Correctional institutions across the U. S. are not part of a uniform system but includes: Federal prisons, state prisons, city jails, county jails, juvenile detention centers, and privately run prisons. Each system has its rules, regulations, policy and procedures that interfere with the ability to evaluate issues systematically.

Conclusion

Given the considerable number of mentally ill individuals in correctional populations who are treated with SGAs, monitoring for MetS is critical. Existing evidence notes inadequate monitoring, but for this population, monitoring is imperative and providers must reach beyond silos and other barriers to monitor patients. Identification of comorbid conditions in the mentally ill, including substance use disorder, increases the risk for cardiovascular disease and diabetes, so early identification and treatment of metabolic changes or MetS can lead to improved clinical outcomes; clinical guidelines cannot be disregarded.

IDENTIFYING BARRIERS TO MONITORING METABOLIC SYNDROME IN
INCARCERATED POPULATIONS

Declaration of Conflicting Interests

No conflict of interest exists with respect to this project.

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IDENTIFYING BARRIERS TO MONITORING METABOLIC SYNDROME IN INCARCERATED POPULATIONS

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IDENTIFYING BARRIERS TO MONITORING METABOLIC SYNDROME IN INCARCERATED POPULATIONS

Table 1: SGAs and approximate metabolic impact*

Generic Name	Brand name	Weight gain	Hyperlipidemia	Type 2 diabetes
Clozapine	Clozaril	High	High	High
Olanzapine	Zyprexa	High	High	High
Quetiapine	Seroquel	Moderate	Moderate	Moderate
Risperidone	Risperdal	Moderate	Moderate	Low/Moderate
lloperidone	Fanapt	Moderate	Low	Low
Asenapine Maleate	Saphris	Low/Moderate	Low	Low
Aripiprazole	Abilify	Low	Low	Low
Lurasidone	Latuda	Low	Low	Low
Ziprasidone	Geodon	Low	Low	Low
Paliperidone	Invega	Low	Low/None	Low

Adapted from: ADA/APA Consensus Development (2004); FDA Safety Information for Patients and Providers; Church, Hamer, and Ulbrich (2010); Gothefors, Adolfsson, Attvall, et al. (2010). Balf, Stewart, Whitehead, and Baker, 2008.
 *FDA (2005) ordered black box warning for risk of hyperglycemia and diabetes be included in all SGA packaging

IDENTIFYING BARRIERS TO MONITORING METABOLIC SYNDROME IN
INCARCERATED POPULATIONS

Table 2: Monitoring for Metabolic Syndrome in Patients on SGA Agents*

Consensus Guidelines* developed with ADA, APA, AACE & NAASO, 2004						
Tests/ Assessments	Baseline	Week 4	Week 8	Week 12	Then, Every 3 months thereafter	Annually
Personal/family History	X					X
Weight (BMI)	X	X	X	X	X	X
Waist Circumference	X					X
Blood pressure	X					X
Fasting Blood Glucose (or A1C)	X			X		X
Fasting Lipid profile	X			X		X
Lifestyle Assessment	X			X		X

Source: ADA/APA, 2004. Consensus Development Conference on Antipsychotic Drugs and Obesity and Diabetes

* **More frequent monitoring where clinically indicated**

IDENTIFYING BARRIERS TO MONITORING METABOLIC SYNDROME IN INCARCERATED POPULATIONS

Table 3: Summary of barriers to care in correctional institutions

Author/Study Study Design	Barriers Identified	Details
AHRQ/ Zimmerman, Woolf, and Haley, 2015. Community-based participatory research study; IOM, 2009	Social Determinants on Health, includes Education	Low education levels are linked to poor health and increased stress and affects how individuals understand, perceive and respond to health education, including technical medical jargon; homelessness; low income and social status; inadequate access to care
	Insufficient social supports	Examines the influence of psychosocial factors and educational disparities and how these issues are linked to personal health behavior and outcomes
Cohn and Sernyak, 2006 Review	Responsibility: Psychiatrist vs. medical providers	Unclear guidelines for who is responsible for patient monitoring that can lead to gaps in monitoring
Daniel, 2007 Editorial	Profit motive/costs:	The profit motive for private correctional management organizations may drive inadequate levels of staffing and can affect the delivery of services, as can the need to manage costs when services are managed by a governmental administration
Edwards, 2005 “In Brief” Article	Correctional culture	Access; culture; costs; staffing; security lockdowns; transfers; Inmate issues: safety, level of understanding influenced by patients’ understanding - dynamics of jail/prison culture that interrupts the continuity of patient care, leading to disparities in patient monitoring
Gonzalez, and Connell, 2014 Peer reviewed article	Fiscal issues	Budgetary constraints; fiscal funding decline and its overall effect on how services are offered. Safety issues: mentally ill inmates at risk for violence are deemed threatening and may not be escorted to the clinic for follow-up appoints or monitoring
Lawrence and Kisley, 2010 Review	Stigma of mental illness	Stigma of mental illness: The negative perception of mental illness and its pervasive, damaging influence across systems including healthcare can affect staff attitude in how care is provided; some inmates might seek to avoid being labeled as having a mental illness
Madden, Lakoma, Rusinak, Lu, and Soumerai, 2016 Research and applications	Limitations of the electronic health record system (EHR)	Missing clinical data in electronic health record system (EHR) Large EHR might be fragmented or missing clinical data - might be common in mental health care and raises concerns about the integrity of available data
National Commission on Correctional Health Care, 2004 Report to Congress	Administration	Inadequate leadership; limited resources, and restrictive correctional barriers are significant and can be difficult to overcome in jails and prisons
Metzner, & Fellner,	Dual loyalty	Dual loyalty: Medical providers in correctional

IDENTIFYING BARRIERS TO MONITORING METABOLIC SYNDROME IN
INCARCERATED POPULATIONS

<p>2010, Journal article; Pont, Stover, and Wolff, 2013 Peer reviewed article</p>		<p>settings face an ethical dilemma between obligations to inmate care vs. the correctional system – these are not always well aligned</p>
<p>Thurston-Snoha, and Mora, 2011, Study; Lambert, Barton-Bellessa, and Hogan, 2015.</p>	<p>Professional-role stress</p>	<p>Professional-role stress, burnout, absenteeism, and even suicide: Examines the role of job-related stress in correctional staff and its role in deficient care</p>