PROMOTION OF THE ABNORMAL INVOLUNTARY MOVEMENT SCALE IN A PSYCHIATRIC HOSPITAL

by

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DEDICATION

This manuscript is dedicated to my husband, David, as well as our incredible boys, Zahari and Josiah. I also dedicate this manuscript to my father and mother, Vital and Julie, as well as my sister and brother, Diane and Arnaud. Last, but not least, I dedicate this manuscript my amazing extended family and wonderful friends.

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ABSTRACT

Background: Antipsychotic medications are associated with the incidence of tardive dyskinesia and the Abnormal Involuntary Movement Scale (AIMS) is tool used to assess for the condition. A needs assessment indicated that in a psychiatric hospital, overall compliance with conducting the AIMS in patients who were admitted on antipsychotic medications was only 16%. Moreover, none of those assessment were done by registered nurses despite being responsible to do so per company policy.

Objective: The purpose of this study was to increase the number of AIMS completed by registered nurses on patient who are admitted on antipsychotic medications.

Design: A quantitative study was completed to (1) increase knowledge pertaining to the AIMS through education; and (2) increase the number of AIMS completed by registered nurses.

Setting: Inpatient psychiatric hospital in Central Arizona, August 21, 2018 to October 3, 2018.

Participants: 18 registered nurses participated in two educational forums.

Measurements: Pre-tests and post-tests were distributed during the education forms to determine the registered nurses' understanding of the material and the results were collected and evaluated in Excel and SPSS to conduct a two-tailed paired t-test. Retrospective chart reviews were count the number of AIMS completed by registered nurses after the interventions.

Results: Registered nurses' participation in assessing newly admitted patient who were prescribed antipsychotic medications increased from 0% to 35%.

Conclusion: The implemented strategies proved to be effective. However, additional strategies to further increase compliance were identified.

INTRODUCTION

In the United States, mental illness occurs in all age groups, races, and socioeconomic statuses. The National Institute of Mental Health (NIMH, 2017) recognizes two categories of mental illness: any mental illness (AMI) and serious mental illness (SMI). Individuals who suffer from AMI have a mental, behavioral, and/or emotional disorder that results in mild to severe impairment while those considered SMI have one or more major life activity that is limited due to the illness (NIMH, 2017). In 2016, approximately 44.7 million adults received treatment for any mental illness while 10.4 million adults received treatment for a serious mental illness (NIMH, 2017).

The latest Diagnostic and Statistical Manual of Mental Disorder (DSM-5) was published in 2013 to offer the most recent, scientifically-based, standard way of classifying mental disorders (Macaluso, Flynn, & Preskorn, 2017). Schizophrenia, bipolar mania, psychotic depression are examples of disorders that are well defined in the DSM-5. These disorders have common symptoms related to psychosis which involves the presence of delusions, hallucinations, and disorganized thinking due to excessive dopamine and require pharmacological interventions. It is imperative to recognize and treat individuals with these symptoms as it is estimated that 90% of people who commit suicide experience mental illness, and those with a more severe course of illness have an increased suicide risk (Melle & Barrett, 2014; NAMI, 2018). Treatment of psychotic disorder requires the use of potent medications classified as antipsychotic medications. In 2013, 1.6% adults filled one or more antipsychotic medication (Moore, 2016). Although highly effective, the use of antipsychotic medications is linked to a chronic condition named tardive dyskinesia.

Background Knowledge

The management of mental illnesses with psychotic features often requires the use of antipsychotic medications. These medications may be used alone or in conjunction with other treatment modalities such as psychotherapy. First-generation antipsychotics (FGAs), or typical antipsychotics, were introduced in the 1950s which revolutionized the way mental disorders such as schizophrenia were treated (Lieberman, 1996). FGAs were found to alleviate psychotic symptoms but Dr. Faurbye (1964) observed a pattern of undesirable side effects among patients taking these medications. In 1964, Dr. Faurbye introduced the term 'tardive dyskinesia' to describe the involuntary, repetitive movements observed in patients who had been taking FGAs (Macaluso et al., 2017). Researchers believe that this phenomenon occurs because of the properties of dopamine receptor blocking agents found in antipsychotic medications (Citrome, 2017). The increased awareness of the debilitating side effects of FGAs led to the development of second-generation antipsychotics (SGAs), or atypical antipsychotics, in the 1980s (Macaluso et al., 2017). SGAs are partial dopamine antagonists.

Although SGAs proved to generally have a better side effect profile, these medications still do carry a risk of causing tardive dyskinesia. Tardive dyskinesia can affect various parts of the body and the clinical presentation can vary from one patient to another. Typically, involuntary movement is observed in the mouth, tongue, face, limbs, head, neck, and torso (Huang et al., 2017). However, some patients experience gastrointestinal tardive dyskinesia that results in nausea, vomiting and stomach discomfort (Huang et al., 2017). Carbon et al (2017) sought to evaluate the prevalence of tardive dyskinesia among patients taking antipsychotic medications. In their study, the authors found that 32.4% of the patients being treated with FGAs

were diagnosed with tardive dyskinesia while 13.1% of patients who were treated with SGAs were diagnosed with tardive dyskinesia (Carbon, Hsieh, Kane & Citrome, 2017). Nonetheless, the use of FGAs, SGAs or both is often warranted in the treatment of serious mental illnesses.

To be diagnosed with antipsychotic-induced tardive dyskinesia, symptoms must persist for at least one month while on an antipsychotic medication and require exposure to the contributing medication for at least three months (Vasan & Padhy, 2017). Symptoms of tardive dyskinesia can begin within weeks of starting an antipsychotic medication and go unnoticed due to the slow nature of the onset of disorder. Therefore, early recognition of symptoms of tardive dyskinesia via the use of the AIMS assessment is a key component in minimizing the long-term consequences associated with the disorder. In fact, studies have shown that the first tardive dyskinesia symptoms rarely persist when symptoms are detected early and the medication is discontinued (Freeman, 2016). If the cessation of antipsychotic medications is not plausible, steps can be taken to either change medications within the same class or co-administer an agent that targets those unwanted symptoms.

To recognize the symptoms of tardive dyskinesia, the use of the Abnormal Involuntary Movement Scale (AIMS) has been reinforced in many clinical settings. The AIMS assessment was originally developed by the National Institute of Mental Health as a research tool but is now used in clinical settings per company policy as it proved to be effective in identifying the abnormal, involuntary movements associated with tardive dyskinesia (Correll, Kane, & Citrome, 2017). The AIMS tool is composed of a total of 12 items of which, 10 items are rated on a 5-point anchored scale and 2 items are given a yes or no answer. The first 10 items are scored

based on the presence and severity of the symptoms involving the face, mouth, extremities, and trunk and the last 2 items assess the patient's dentation.

Adhering to practices that minimize the harm of antipsychotic medications such as using the AIMS to detect and address early symptoms of tardive dyskinesia is critical now more than ever. Healthcare officials continue to work on breaking the stigma attached to mental health illnesses to promote help-seeking behaviors among those who would otherwise be suffering in silence (Slavin, Schindler, & Chibnall, 2014). As individuals seek mental health services and are prescribed pharmacological agents such as antipsychotic medications, the possibility of developing tardive dyskinesia remains a valid concern. It has been estimated that tardive dyskinesia affects at least 500,000 people in the United States (Cloud, Zutshi & Factor, 2014). Approximately 60 to 70 percent of the cases are mild, with about 3 percent being extremely severe (MHA, 2018). Severe cases may involve problems such as difficulty swallowing, speech interference, disfigured facial features, and breathing trouble (MHA, 2018). Therefore, employing evidenced based assessment tools such as the AIMS is essential to detect and address early symptoms of tardive dyskinesia and support a healthy healing environment.

Local Problem

Inpatient clinical practice guidelines highlight the importance of completing the AIMS assessment upon admitting a patient taking antipsychotics and before the start of a new antipsychotic medication (Pearson, 2012). A psychiatric hospital in Central Arizona adopted these guidelines and included them within the hospital's policy. Equipped with this knowledge, a needs assessment was conducted in this hospital to assess the practice patterns related to the AIMS. This hospital utilizes paper-based medical records and therefore, collaborative measures

were requested from the pharmacist and medical records personnel . First, the pharmacist computed a list of patients who were admitted between November 1st, 2017 and January 31st, 2018 and were prescribed scheduled antipsychotic medications. The list was then forwarded to medical records personnel who retrieved all the applicable charts which were then reviewed.

The results of the needs assessment indicated that no AIMS were conducted by registered nurses and that all AIMS were conducted by providers. In addition, it was determined that of the 51 patients who were admitted on antipsychotic medications, only 16% (n=7) of them were assessed using the AIMS upon admission. Out of all 333 patients who were prescribed antipsychotic medications during their hospital stay, as many as 45% (n=150) of them were never assessed using the AIMS tool.

It was previously noted when the AIMS should be conducted per company policy and registered nurses and providers have been charged with this responsibility. To support this policy, every newly hired registered nurse receives training on the AIMS and this training is part of their yearly competency. However, the needs assessment indicated that only 16% of patients who were admitted on an antipsychotic medication were assessed using the AIMS scale upon admission. It is evident that adherence to clinical practice guidelines and hospital policy is less than optimal among registered nurses.

Patients are admitted in this hospital on every shift, including the night shift. Once admitted, the registered nurse has 8 hours to complete the initial nursing assessment while the provider has 24 hours to complete the initial psychiatric evaluation. When a patient is admitted on an antipsychotic medication, it is likely that the patient will be due for a dose of medication before being seen by the provider. When the nurse and the provider both fail the assess the

patient using the AIMS upon admission, the opportunity to establish a baseline status is missed. Should the patient become symptomatic during the hospital stay, it should be evident the proper procedures were followed to promote the early detection and treatment of involuntary movements that may be indicative of tardive dyskinesia.

Purpose

The purpose of this quality improvement initiative was to promote the utilization of the AIMS among registered nurses which will support the early detection and treatment of tardive dyskinesia. As aforementioned, the needs assessment indicated that no AIMS assessments were conducted by registered nurses. In patients who are newly admitted and have been prescribed antipsychotic medications, it is the responsibility of providers and registered nurses to ensure that a baseline AIMS score has been recorded before the first dose is administered. Other opportunities to conduct the AIMS include upon the start of a new antipsychotic medication or before the patient receives a new dose. However, the focus of this project is to promote the use of the AIMS upon admission in patients who have been prescribed antipsychotic medications from admission. The aim of this project is to conduct an educational forum to increase the registered nurses' awareness of the current practices pertaining the AIMS. During the forum, findings of the needs assessment were shared, the importance of conducting the AIMS as it relates to the patients that are being treated were discussed, and the role of the registered nurse regarding the AIMS per company policy was highlighted. In addition, a laminated notice was placed in every medication administration record and in a designated area where admission packets were located. This served to remind the registered nurses to conduct the AIMS upon the admission in patients who have been prescribed antipsychotic medications. Supporters of this initiative included a

house supervisor and registered nurse. This registered nurse was experienced in working both inpatient and outpatient and had extensive experience in quality and risk management.

Study Question

Among psychiatric registered nurses, could the use of an educational forum and reminders promote the utilization of the Abnormal Involuntary Movement Scale upon admission of patients who have been prescribed antipsychotic medications to support the early detection and treatment of tardive dyskinesia?

THEORETICAL FRAMEWORK AND SYNTHESIS OF EVIDENCE

Models, theories, and frameworks are conceptual approaches utilized to inform planning and implementation of change. These approaches are carefully compared, and the best approach is selected based on its ability to address all the elements of the intended change. The purpose of this quality improvement initiative was to promote the utilization of the AIMS among registered nurses in a hospital located in Central Arizona. The aim of the project resulted in the conduction of an educational forum and the formulation of a reminder to conduct the AIMS upon the admission of patients who have been prescribed antipsychotic medications. To guide this process, the Promoting Action on Research Implementation in Health Services (PARiHS) framework was believed to align with the purpose of this project.

Theoretical Framework

Twenty years ago, the PARiHS framework was introduced in the United Kingdom by Dr. Alison Kitson, Dr. Gill Harvey, and Dr. Brendan McCormack (National Collaborating Centre for Methods and Tools, 2011). These working clinicians recognized the various challenges faced in the clinical setting and therefore recognized the role of evidence-based practice in the delivery of

healthcare services (Kitson et al., 2008). More specifically, the clinicians recognized that innovation in healthcare occurs when incorporating evidence and practice guidelines in the clinical setting and introducing new concepts (Kitson et al., 2008). Therefore, they hypothesized that the successful implementation of research into practice is a function of three elements: evidence, context, and facilitation (Kitsons et al., 2008).

The first element is evidence, which is the material that is presented to support the need to make a change. Evidence is available in the form of formal research findings, clinical expertise from healthcare professionals, and patient reports (Ward, Baloh, Xi & Stewart, 2017). The second element, context, depicts the tangible resources and infrastructure where the change will occur (Ward et al., 2017). This element will vary from organization to another based on several factors including the proposed change, the services being provided, and availability of resources. The third element is the process of facilitation. This element examines the techniques or processes used by a person or a team to successfully change the attitudes, skills, or behaviors within an organization to improve the likelihood of a change occurring (Kitson, Harvey & McCormack, 1998).

The original PARHiS framework is referred to as Phase 1. The framework underwent significant refinements since it was first introduced in 1988 (Stetler, Damschroder, Helfrich & Hagedorn, 2011). Each revision was carefully made to echo the evolution of practice in the clinical setting. The revisions presented thoughtful reflections based on the clinicians' observations, the clinician's subjective experiences while utilizing the framework, and the concurrent healthcare climate (Ward et al., 2017). Thus, Phase 2 was presented in 2001 and Phase 3 was introduced shortly thereafter in 2003 (Ward et al., 2017).

Changes made in Phase 2 reflected the need to appraise research and implement evidence-based practice. Despite the availability of knowledge, a delay in implementing this information into the clinical setting was noted. This was particularly true in the 1990s and the clinicians sought to better understand this phenomenon. Therefore, they reframed the PARIHS framework accordingly to include areas of focus which were designed to promote the adoption of new concepts in the clinical setting. In their efforts, the clinicians focused on answering the following two main research questions: (1) Do concepts of evidence, context and facilitation constitute the key elements of a framework for getting research into practice?; and (2) What factors do practitioners identify as the most important in enabling implementation of evidence into practice? (Stetler et al., 2011). Their re-evaluation confirmed that the three elements, evidence, context, and facilitation, remained key components to move evidence into practice, but also noted the need to refine the elements of context and facilitation (Stetler et al., 2011). Therefore, an emphasis was placed on carefully analyzing the practice patterns and perceptions of current practitioners and highlighted the impact of resource availability and political climate in promoting change (Stetler et al., 2011).

Phase 3 was introduced in 2003 after the model was critiqued for not portraying how the effectiveness of the model was being evaluated (Stetler et al., 2011). In response to this analysis, the clinicians sought to answer the following research question: Is it possible to develop a diagnostic and evaluative tool to measure the successful implementation of innovative ideas into practice using the PARiHS framework? (Kitson et al., 2008). Thus, an evaluation process was developed and was comprised of three phases: the pre-test diagnostic phase, the facilitation process, and the post-test evaluation (Kitson et al., 2008).

To support the utilization of the AIMS by registered nurses in the clinical setting, the PARHiS framework was deemed appropriate to use in guiding the process for a number of reasons. First, it clearly defined the three key elements that play a part in the successful implementation of change: evidence, context, facilitation. In relation to the purpose of this project, evidence exists in the form of information gathered through research. Since its introduction, the AIMS tool has been studied and vigorously tested to determine its effectiveness. To this day, it remains one of the most utilized tools to detect involuntary movements associated with tardive dyskinesia (Gharabawi et al., 2005). This tool has allowed healthcare professionals to detect early symptoms which would prompt prescribers to take the necessary actions to minimize the likelihood of permanent damage. Registered nurses are aware that all medications are chemical compounds that carry risks of causing side effects. When administering antipsychotic medications to patients, it is necessary to acknowledge the evidence linking the use of these medications to tardive dyskinesia. Lastly, this link has been so robust that the AIMS is within the hospital's policy and has charged registered nurses and providers with the responsibility of ensuring that it is conducted accordingly. However, the needs assessment indicated that some registered nurses reported not being familiar with their role in conducting the AIMS per company policy.

The element of context pertains to examining the resources, leadership, and culture of the environment where the change is to occur. In terms of resources, every registered nurse demonstrates competency in conducting the AIMS upon hiring and as a part of the yearly nursing competency. Additionally, the form is readily available at every nurse's station and yet, findings from the needs assessment indicated that some nurses did not know where the form was

located. In examining the culture, the hospital admits patients on every shift and registered nurses have just 8 hours to conduct the initial nursing assessment in addition to caring for their other assigned patients. In such situations, time constraints may occur which requires one to operate based on the importance of the required tasks. In examining leadership, it is unknown whether internal auditors have identified this issue and established ways to address it. The hospital has been operating for less than 5 years and has seen several changes in leadership and yet, stands still in supporting the provision of the best possible care to patients. It appears that several factors within the element of context are contributing to registered nurses not conducting the AIMS.

The element of facilitation involves allocating the individuals and resources that will facilitate the process of change. Supporters of this project include a house supervisor and registered nurse. Change will be facilitated by conducting an educational forum which will include: sharing the results from the needs assessment, highlighting the registered nurse's role pertaining to the AIMS per company policy, and introducing the notice that will be placed in every medication administration record and where the admission packets are located to remind registered nurse to conduct the AIMS in patient who are admitted on antipsychotic medications.

Synthesis of Evidence

Research provides a substantial amount of evidence pertaining to tardive dyskinesia and the AIMS. A synthesis of evidence was conducted to analyze the prevalence of tardive dyskinesia among patients taking antipsychotic medications and to evaluate the frequency and usefulness of the AIMS assessment on its ability to detect abnormal movements related to tardive dyskinesia. The databases utilized in finding this evidence included PsychINFO,

PsychARTICLES, PubMED, ClinicalKey, and Cumulative Index to Nursing and Allied Health Literature (CINAHL).

Total number of articles identified varied based upon the database used, key search terms, and inclusion/restricted criteria. Key search terms included, but were not limited to, Abnormal Involuntary Movement Scale, AIMS, tardive dyskinesia, movement disorder, drug-induced movement disorder, tardive movement syndrome, first-generation antipsychotic, second-generation antipsychotic, antipsychotic agents, neuroleptic agents, and psychotic disorders. Inclusion criteria included publication date from 2010, peer reviewed, adult and geriatric subjects, human subjects, article available in the English language and in full-text format. One article dated from 2005 was also included due to its relevance to the project. See Appendix A for a summary of supporting of evidence.

The articles found pertaining to the AIMS and tardive dyskinesia were of varying levels of evidence. Most of the literature included were randomized controlled studies, cohort studies, case-control studies, and expert opinions. Unfortunately, no recent systemic reviews were found to offer valuable information related to the AIMS that would be deemed as supporting evidence for this DNP project. A noted variation were the terms utilized to describe the main concepts.

Concepts

Key concepts to understand throughout this project are: antipsychotic medications, tardive dyskinesia, and the AIMS. Antipsychotic medications are primarily used in patients with a mental health illness that has resulted in psychosis, a state of mind in which one loses contact with reality and experiences delusions, hallucinations, or both (NIMH, 2016). Delusions are false, fixed beliefs and hallucinations are mainly auditory or visual and involve hearing or seeing

things that others cannot hear or see (NIMH, 2016). Antipsychotic medications can also be referred to as neuroleptics.

The term "tardive dyskinesia" is used to describe the involuntary, repetitive movements observed in patients treated with antipsychotics and other medications known to cause such symptoms (Macaluso et al., 2017). These movements can also be referred to as extrapyramidal symptoms, or EPS. Tardive dyskinesia is mainly caused by FGAs and SGAs, however, certain antidepressants, lithium and some antiemetic medications can also cause this side effect (Vasan & Padhy, 2017). These involuntary movements can occur within months of taking antipsychotic medications or may not occur for years after being on antipsychotics. A diagnosis of antipsychotic-induced tardive dyskinesia is made after the symptoms have persisted for at least one month and require exposure to the contributing medication for at least three months (Vasan & Padhy, 2017).

The AIMS is an assessment tool utilized to assess for involuntary movements associated with tardive dyskinesia. This tool can be utilized by registered nurses, providers, and other trained professionals. It is a non-invasive procedure that requires the assessor to determine the severity of symptoms observed in a patient by using a point-scale and asking the patient true/false questions.

Strengths

Prevalence of Tardive Dyskinesia

Several studies were found supporting the assumption that tardive dyskinesia remains a clinically significant issue to address in adults receiving antipsychotic agents. The creation of second-generation antipsychotics was hoped to drastically lower the occurrence of tardive

dyskinesia due to the medication's ability to bind more loosely to the dopamine D2 receptor (Seeman, 2002). However, second-generation antipsychotics continue to carry a significant risk of causing tardive dyskinesia in addition to other side effects that relate to their use. McEvoy et al. (2014), Kinon et al. (2012) and Munhoz et al. (2017) all compared the prevalence of tardive dyskinesia in patients taking FGAs or SGAs. In their studies, McEvoy et al. (2014) compared the prevalence of tardive dyskinesia in 145 patients receiving paliperidone palmitate to 145 patients receiving haloperidol decanoate. Kinon et al. (2012) compared 129 patients receiving olanzapine to 62 patients receiving haloperidol. Munhoz et al. (2017) compared 95 patients receiving typical antipsychotics (most commonly haloperidol, levomepromazine, chlorpromazine) to 23 patients receiving atypical antipsychotics (commonly olanzapine and risperidone). All three studies utilized the AIMS assessment and noted that the overall AIMS scores were lower among the groups receiving SGAs.

Chan et al. (2018) evaluated the occurrence of tardive dyskinesia using a different approach. Instead of assessing the prevalence of the condition in two separate groups, the authors used one group of participants and transitioned them from one antipsychotic to another. Chan et al. (2018) studied the response of 25 patients who were tapered off a FGA and started on aripiprazole, a SGA. The authors used a number of assessment scales, including the AIMS assessment, to evaluate the patient's symptoms before and after the transition. The authors noted that after the patients were switched to aripiprazole, AIMS scores declined by more than 50% which was indicative of an improvement in tardive dyskinesia symptoms.

In a separate study, Desai et al. (2017) recruited 706 patients who were receiving any type of antipsychotics. The authors recognized that there are other movement disorders that can

occur as a result of taking antipsychotic, with tardive dyskinesia being one of the most debilitating. Among the recruited participants, 40 of them were found to meet the criteria for tardive dyskinesia. Interestingly, it was noted that the condition was more prominent in those who were taking FGAs. In another study, Huang et al. (2017) found that in the patients who were diagnosed with tardive dyskinesia, the degree of abnormal movements was more severe, and the condition was more debilitating when more than one area was involved.

Reliability and Validity of the AIMS

The AIMS tool was found to be a commonly studied and utilized among those who sought to evaluate the presence and severity of abnormal movements indicative of tardive dyskinesia. Reliability is concerned with the accuracy of the actual tool whilst validity is concerned with the extent to which the tool measures what it intends to measure (Shea, McEwan, Strand & Ogloff, 2018). Magulac et al (1999) found an inter-rater reliability (intraclass correlation = 0.69) in a sample of 390 participants who were evaluated by 11 graduate level students. Another study evaluated the reliability of the scores of each anatomical region assessed on the AIMS as well as the overall scores and found all interclass correlations to be significant at $p < .001$ level and ranged from a low .50 (trunk) to a high of 0.79 (total score) (Lane et al., 1999).

Studies have been conducted to evaluate the validity of AIMS against other tools like the Extrapyramidal Symptoms Ratings Scale (ESRS). The ESRS was developed to assess four types of drug-induced movement disorders: Parkinsonism, akathisia, dystonia, and tardive dyskinesia (Chouinard & Margolese, 2005). In a study by Gharabawi et al. (2005), 374 patients with schizophrenia or schizoaffective disorder were assessed for symptoms of tardive dyskinesia

using the AIMS and the ESRS Clinical Global Impression-Severity of Dyskinesia (ESRS CGI-SD), which is specific in targeting symptoms associated with tardive dyskinesia. The results indicated a strong association on corresponding item ratings when “mild” symptoms was defined as AIMS score of 2 and ESRS 2 or 3, and “moderate or greater” symptoms was defined as AIMS score ≥ 3 and ESRS ≥ 4 (Gharabawi et al. 2005).Using these criteria, there was 96.0% (359/374) agreement between AIMS- and ESRS-defined tardive dyskinesia cases (Gharabawi et al. 2005). In addition, it was determined that an ESRS CGI-SD score ≥ 4 (95% CI: 3.61, 4.76) was associated with ≥ 95% probability of AIMS-defined tardive dyskinesia (Gharabawi et al. 2005). Based on these results, it was concluded that the ESRS CGI-SD was the best single predictor of AIMS defined tardive dyskinesia meaning that the tools are in high agreement (Gharabawi et al., 2005).

Pouclet-Courtemanche et al. (2016) discussed the validity of the AIMS by testing it against the ESRS, in a double-blind study evaluating the severity of tardive dyskinesia symptoms using in 19 patients who underwent deep brain stimulations to help with severe symptoms. All patients were evaluated using both tools and when pre- and post-procedure data was compared. The results indicated a similar percentage in symptom improvement as evidenced by a decrease of 58% using the ESRS and decrease of 50% using AIMS at 6 months post treatment and decrease of decrease of 60% using ESRS and decrease of 63% using AIMS 12 months post-treatment (Pouclet-Courtemanche et al., 2016). Essentially, the AIMS and ESRS were found to be in high agreement.

Limitations

Sample Size and Publication Period

A noted limitation among the literature reviewed included the utilization of relatively small sample sizes and a limited number of recent, robust, and relevant research. It was found that most studies had a total number of 300 total participants or less who were divided into control and experimental groups. Internal validity is increased by having large sample sizes to allow meaningful statistical analysis, or by examining similar small studies and conducting a systemic review.

Inconsistencies Among Studies

The most significant discrepancy among the literature reviewed was the question of whether the use of SGAs was indeed associated with a lower rate of tardive dyskinesia. Two studies were found concluding that the relative prevalence of tardive dyskinesia in patients taking FGAs and SGAs did not statistically differ. In their studies, Woods et al. (2010) studied 352 patients who were receiving FGAs, SGAs, or a combination of the two. On the other hand, Kinon et al. (2015) studied 150 patients who were specifically taking olanzapine, a commonly used SGA, and 143 patients who were taking a FGA. In both studies, the AIMS assessment was utilized in measuring the presence and severity of tardive dyskinesia and scores indicted an insignificant difference among the compared groups. Woods et al. (2015) believed that an explanation for such findings can be due to a failure in specifically focusing on assessing and identifying tardive dyskinesia which can lead to a disproportionally low detection of the condition in patients taking SGAs. Hirsch et al. (2017) added that corelating the use of SGAs to adverse events may be complicated when being used off use-label for conditions outside of

psychiatric and mental health illnesses. Luckily, the off-label use of SGAs has declined from 45% in 2006 to 30% in 2012 to support evidence-based practice (Driessen, Baik & Zhang, 2016).

Gaps

The most significant gap in literature related to research discussing the adherence to AIMS assessment per policy or clinical best practice guidelines. Registered nurses, providers, and other trained healthcare professionals are all capable of utilizing this tool and yet, there is no research evaluating the frequency of which it is done. Another gap in literature include research assessing the congruency of AIMS scores conducted by health care professionals in different specialties. Primary care providers commonly prescribe antipsychotic medications to patients with serious mental illnesses in their attempt to provide holistic care to patients with comorbid medical conditions (Kiraly, Gunning & Leiser, 2008). Not only can a discrepancy in scoring occur between a primary care provider and a psychiatric provider, a study has shown inconsistencies in AIMS scoring between a movement disorders neurologist and a referring physician from a community clinic (Rigby et al., 2012). In their study, the authors evaluated the charts of 106 patients and noted significant discrepancies among AIMS scores given to characterize the abnormal movements (Rigby et al., 2012). Implications of these findings in the clinical setting include the need to provide all professionals who are trained to conduct the AIMS the necessary refresher training and supporting resources to promote the correct identification and characterization of abnormal movements in a concise manner. When symptoms of tardive dyskinesia are identified early, the prompt actions can be implemented by discontinuing the causative medication, making a change in dosage, or adding a therapeutic agent to minimize or eliminate permanent neurologic damage (Waln & Jankovic, 2013).

Evidence-Based Tardive Dyskinesia Treatment

The utilization of antipsychotic agents is often mandated in the treatment of patients who suffer from severe mental health illnesses. Despite the increase use of SGAs who have shown to cause less movement related side effects and the availability of the AIMS to promote the early detection of abnormal movements that may be indicative of tardive dyskinesia, the occurrence of tardive dyskinesia remains a problem in the clinical setting. This led to an increase in research evaluating modalities to combat symptoms of tardive dyskinesia. As previously noted, the use of deep brain stimulation was studied by Pouclet-Courtemanche et al. (2016). Less invasive methods that have been studied to address tardive dyskinesia include the use of diphenhydramine and other pharmacological agents. However, invasive procedures such as deep brain stimulation are not suitable for every patient and the use of medications such as diphenhydramine is not indicated for tardive dyskinesia per the U.S. Federal and Drug Administration (FDA). In 2017, the extensive research resulted in the FDA announcing valbenazine as the first FDA-approved medication used in the treatment of tardive dyskinesia (Correll et al., 2017; Kane et al., 2017). To assess the effectiveness of the medication, Correll et al. (2017) and Kane et al. (2017) used valbenazine in patients with tardive dyskinesia who volunteered to be a part of their studies. In both studies, the AIMS assessment was utilized in measuring the symptoms of tardive dyskinesia before and after the start of valbenazine. Collectively, Correll et al. (2017) and Kane et al. (2017) compared the AIMS scores of 225 patients who received a placebo to 198 patients who received valbenazine and collectively, a notable ≥50% improvement in AIMS scores was calculated. As an added measure, Kane et al. (2017) sought to determine what would occur with the valbenazine-treated patients once the treatment was withdrawn. Four weeks after valbenazine

was withdrawn, the authors noted that symptoms of tardive dyskinesia were returning and reverting towards baseline (Kane et al., 2017). These findings confirmed the effectiveness of valbenazine and showed that symptoms of tardive dyskinesia as evidenced by the AIMS tool decreased with the use of medication, and that the symptoms returned towards baseline once the medication was discontinued.

Conclusion on the Synthesis of Evidence

Patients taking both FGAs and SGAs remain at risk of developing tardive dyskinesia. It appears that although most literature has found that SGAs carry a lower risk than FGAs in causing tardive dyskinesia, some studies found that the prevalence of the condition was the same among their participants (Chan et al., 2018; Desai et al, 2017; Kinon et al., 2015; McEvoy et al., 2014; Munhoz et al., 2017; Woods et al., 2010). Despite this incongruency, the fact remains that the development of tardive dyskinesia among patients taking antipsychotic medications remains a significant concern that can be disfiguring to the effected patients and the results can be life threatening (Casey & Rabins, 1978; Xie, 2015). In addition to having sufficient evidence correlating the use of antipsychotic medications to tardive dyskinesia, the use of the AIMS assessment was proved to be reliable and valid in detecting symptoms related to the disorder, even when compared to other tools such as the ESRS (Gharabawi et al., 2005; Lane et al., 1999; Magulac et al, 1999; Pouclet-Courtemanche et al., 2016). Lastly, this synthesis of evidence revealed that the significance of the problem promoted the use of research to generate valbenazine as the first FDA-approved medication marketed to treat tardive dyskinesia (Correll et al., 2017; Kane et al., 2017).

METHODS

Design

The purpose of this DNP project is to promote the utilization of the Abnormal Involuntary Movement Scale among registered nurses which supports the early detection and treatment of tardive dyskinesia. As previously described, the PARiHS theory identified three elements to promote change: evidence, context, and facilitation. While keeping these elements in mind, the Plan-Do-Study-Act (PDSA) cycle within the Institute for Healthcare Improvement model was deemed to be an appropriate method to guide this project (IHI, 2018). In the first phase, the Planning phase, a needs assessment was completed to determine the current practices related to the AIMS by conducting a retrospective chart review for a period of three months. The results of the needs assessment indicated that no AIMS were conducted by registered nurses, only 16% of patients who were admitted on antipsychotic medications were assessed using the AIMS upon admission, and as many as 45% of the total number of patients who received antipsychotic medications during their hospital stay were never assessed using the AIMS tool. Additionally, it was gathered that some registered nurses were not familiar with the registered nurse's role regarding the AIMS per company policy and others did not know where the AIMS form was located. The planning process continued in the Do Phase as strategies to promote the utilization of the AIMS were assessed and during the second phase, those strategies were implemented. It was recognized that the hospital where the project was conducted utilized paper-based medical records and the initial idea was to include the AIMS form in all admission packets. The admission packet contains mandatory forms that must be completed on every newly admitted patient such as the new admission nursing assessment, pharmacy profile, and laboratory

requisition. However, only a fraction of patients who are admitted to this hospital are prescribed antipsychotic medications upon admission or will be on such medications during their hospital stay. Therefore, it was determined that adding the AIMS form to every admission packet would result in waste as most forms would not be utilized. A better solution was determined to be creating a laminated reminder for registered nurses to prompt them to conduct the AIMS assessment upon the admission of every patient who has been prescribed an antipsychotic medication (see Appendix C). This reminder was placed in front of every medication administration record as well as where new patient admission packets are stored. To the back of the reminder was a list of commonly prescribed antipsychotic medications to serve as a reference to registered nurses who may not be familiar with the many antipsychotic medications (see Appendix D). Finally, an educational forum for registered nurse took place at the hospital to share the findings of the needs assessment, discuss the importance of conducting the AIMS as it relates to the patients that are being treated, highlight the registered nurse's role regarding the AIMS per company policy, and share the proposed plan involving the reminders to conduct the AIMS (see Appendix E). The educational forums took place in the training room at the hospital at 0730 and 1430 during the monthly registered nurses' meetings, to accommodate to as many nurses as possible. The information was presented on PowerPoint slides and the participants' understanding of the presented information was evaluated with the use of pre-tests and post-tests. The same information was shared in both sessions. After each educational session was completed, feedback from the participants was welcomed.

The third step of the PDSA cycle, the Study Phase, involved evaluating what changes occurred as a direct result of the implemented strategies. Six weeks after the educational forum

takes place and the use of the reminders was initiated, a one-month retrospective chart review was conducted to determine if there is an increase in the number of AIMS assessments done by registered nurses. The last step, the Acting phase, involves analyzing all collected data to propose further recommendations. One looks beyond the effectiveness of the implemented strategies to inform future PDSA cycles. One also analyzes other factors such as the suitability of the timing and duration of the educational forums as well as the delivery method and structure. In addition, one assesses the usefulness of the reminders and determines if other techniques could further increase the involvement of registered nurses.

Setting

The setting of this project was an inpatient psychiatric hospital (< 100 beds) in Central Arizona. On any given month, the hospital provides care to approximatively 350 patients. This setting was chosen in part due to having both mental health and substance abuse programs which is an asset to any community where residents need such specialized services. In addition, the hospital has been operating for less than five years and embraces all opportunities to reinforce the utilization of evidence-based practice. The key supports who facilitated this project included a house supervisor and a registered nurse with a background in quality and risk management.

Resources

Resources that were essential to the success of this project included the results collected during the chart reviews, the content of the educational forum, the pre-test and post-test results from the participants, the training room where the educational forum took place, light refreshments were served during the educational forum, and two $75 Visa gift cards were

awarded to two registered nurses who attended the educational forum. Permission to conduct the project was granted by the director of nursing.

Participants

Registered nurses involved in direct patient care and work full-time, part-time and per diem were the targeted participants for this project. However, the participation of the supporters of this project, a house supervisor and registered nurse, was critical as they are the key supporters of this project. Individuals who were not in the nursing department and wished to participate in the educational forum were also welcomed. Participants for the education forum which took place were on August 21, 2018 were recruited by email and via an advertising flyer (see Appendix F and Appendix G). The email was sent three weeks before the event and a reminder was sent out one week prior to the event. The advertising flyer was posted on the announcement board in all four staff lounges three weeks prior to the event. Details on the invitation included the purpose of the project, the time involved, the date, time, and location of the meetings. To support the purpose of this project, the goal was to recruit a minimum of 30 registered nurses.

Data Collection

The pre-test and post-test method was utilized to analyze the participants' understanding of the information presented during the educational forum (see Appendix H and Appendix I). This method allowed the collection of baseline data which was then compared to post-intervention data (Huang, Qin & Follmann, 2008). In preparing the test questions, it was important to ensure that the test questions coincided with the material covered during the educational forums and that the pre- and post-tests were able to demonstrate the participants' progress (Valente & MacKinnon, 2018). The pre-test was distributed to the participants before

starting the educational forum and served as a mean to evaluate their baseline knowledge before the education. As part of the pre-test questionnaire, information pertaining to the participants' demographics was requested to provide an aggregate picture of the participants. Upon the completion of the educational forum, a post-test was distributed and included questions which were similar to those in the pre-test. However, participants were not informed that the same questions were on both tests to as to discourage the likelihood that the participants solemnly focusing on the information pertaining to the test questions. The questions on both tests were generalized and yet meaningful to capture an adequate set of data. The tests were presented in a paper format and anonymous, as the participants were not asked to identify themselves by name. Each pre-test had a corresponding post-test that were identified by the same ID number. This facilitated the analysis of each participant's progress.

Six weeks after the educational forum took place and the use of reminders was implemented, a second retrospective chart review was conducted using a similar method to the one used to complete the needs assessment, which identified the problem. Pharmacy was asked to generate a list of patients who were prescribed antipsychotic medications during their hospital stay and the same list was subsequently forwarded to medical records personnel who pulled the applicable chart. These charts were then reviewed to decipher the charts of patients who prescribed antipsychotic medications upon admission and determine if they assessed using the AIMS upon admission.

Plans for Data Analysis

Test scores were analyzed using Excel and SPSS, a software platform which offers advanced statistical analysis. Pre- and post-test scores were paired using ID numbers and

recorded on an Excel spreadsheet, to facilitate a simple visualization of the participants' individual results. The scores were furthermore analyzed by utilizing SPSS to perform a two-tailed T-test on the observed scores. Although the goal of this project was to increase the utilization of the AIMS among registered nurses, the purpose of the educational forums was to increase knowledge among all participants. Therefore, test results of all participants were included in the data analysis process.

The findings from the second retrospective chart review were also analyzed using Excel. A list of patients was computed by the pharmacy and the applicable charts were pulled by medical records personnel. Each chart was reviewed to determine if the patient: (1) was admitted on antipsychotic medications, and (2) if a registered nurse completed the AIMS upon admission. Quantitative data was collected and organized on an Excel spreadsheet. No protected health information was collected in the process, as charts were simply numerated on the Excel spreadsheet. Two pie charts were created: one identifying the total number of patients who were admitted on antipsychotic medications and how many of those patients had the AIMS done upon admission, and the other evaluating whether the AIMS done upon admission was completed by a registered nurse or provider. This will allow one to analyze the data in percentage form.

Ethical Considerations

The Belmont Report was published in 1978 and written by the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research (HHS, 2010). In the report, the Commission identified the basic ethical principles that should guide the conduct of biomedical and behavioral research involving human subjects and developed guiding principles to assure that such research is conducted in accordance with those principles (HHS, 2010).

Although this is a quality improvement project that does not involve human research, abiding to ethical standards is mandatory. The three principles identified by the Commission are: respect for persons, beneficence, and justice (HHS, 2010).

Respect for Persons

In demonstrating respect for persons, two moral requirements were met: participants were treated autonomously and those with a diminished autonomy were entitled to protection (HHS, 2010). This principle was of immense importance throughout the whole project. First, participants were recruited by email and flyers and were notified via these mediums that participation in any parts of the project was voluntary, and no consequences occurred as result of not participating or being unable to attend the educational forums. During the educational forums, participants were also informed that registered nurses were required to complete the AIMS on newly admitted patients who prescribed antipsychotic medications upon admission and that reminders were placed in the MAR to remind them to do so. Participants were also informed that participating in the process was still voluntary.

As part of the educational forums, a pre-test and post-test was administered to determine if the information provided during the sessions was understood by the participants and the purpose of the tests was explicitly noted at the top of each test. Assistance was provided to any participant who needed help completing the test and if participant's answers became visible to the project coordinator during the process, the answers remained confidential. Since attending the educational forums was voluntary, participants were also not be obligated to complete the tests. The results of the pre-tests and post-tests were analyzed in private and when not in use,

they were stored in a locked file cabinet in a locked office with limited access. Upon the completion of the project, all tests were shredded.

While conducting the retrospective chart reviews, the principle of respect for others was applied during the process. While gathering data for the needs assessment and to evaluate the results of the project, only pertinent patient charts were reviewed. A list of patients who were prescribed antipsychotic medications was created by the pharmacist and the charts of these patients were retrieved by medical records personnel. The charts of the patients were reviewed in a private room in the facility, the room remained locked at all times, and the charts were never left unattended. Data was recorded on an Excel spreadsheet on a computer that is password-protected and only accessible to the writer. This computer remained with the writer and when not in use, was locked in a file cabinet in a locked office with limited access. No protected health information was utilized in data collection.

Beneficence

Beneficence addresses the obligation to protect the well-being of participants by doing no harm and maximizing any potential benefit (HHS, 2010). This is a quality improvement project and research will not be conducted on human subjects. Nonetheless, participants were asked to complete a pre-test and post-test to evaluate their understanding of the material presented during the educational forums. No potential harm was identified from this voluntary participation. Potential benefits from this project were determined to be an increased knowledge about the AIMS, an increase in the utilization of the AIMS to detect and address signs of tardive dyskinesia and increase in compliance per company policy.

Justice

Justice highlights the need for equitable distribution of the benefits and burdens of research on humans (HHS, 2010). In recruiting the participants, an email was be sent out and a flyer was be posted in the staff lounges. Although the purpose of the project is to increase the utilization of the AIMS among registered nurses, all interested parties were welcomed to participate. To promote understanding, the information provided during the educational forums was presented utilizing terminology that is appropriate for the expected participants.

Institutional Review Boards

Under the U. S. Food and Drug Administration (FDA) regulations, an Institutional Review Boards (IRB) is an appropriately constituted group that has been formally designated to review and monitor biomedical research involving human subjects (FDA, 2018). In accordance with FDA regulations, an IRB has the authority to approve, require modifications in (to secure approval), or disapprove research (FDA, 2018). This group review serves a significant role in the protection of the rights and welfare of human research subjects (FDA, 2018). This DNP project was submitted to the IRB through the University of Arizona College of Nursing who determined that it was not human subjects research and thus, did not require oversight by the University of Arizona. See Appendix B for the IRB approval.

RESULTS

Descriptions of the Sample

The list of active registered nurses was retrieved from the facility's house supervisor. In total, 57 registered nurses were emailed an invitation to participate in the educational forum. In addition, the flyer invitation was posted on the communication boards in all four of the staff

lounges. Of the registered nurses who were emailed, a total number of 18 registered nurses participated in the educational forums for an overall response rate of 32%.

The pre-test which was distributed during the educational forums contained questions evaluating the participant's demographics and results indicated that all participants voluntarily responded to demographic questions. Though the educational form was open to any interested party, all the participants were registered nurses. The majority of participants had a Bachelor's degree, most had two to five years of experience in their current position and two to five years of experience in psychiatry. Some registered nurses may have more years of experience as a registered nurse than in psychiatry. This occurs, for instance, when the participant has worked in other fields as a registered nurse but has only worked in psychiatry for less than one year. Results also indicated that most participants were employed full time and worked either 7am to 7pm shift or 7pm to 7am. See Table 1 for a detailed list of characteristics of the sample.

TABLE 1. *Demographic characteristics of sample participating in educational forums (n=18).*

Characteristic	Frequency	Percentage
Department		
Nursing	18	100 %
Pharmacy	0	0 %
Administrative	0	0 %
Years of Experience in Current Position		
< 1	0	0 %
2-5	10	56 %
6-8	4	22 %
9-14	4	22 %
15-20	0	0 %
21-25	0	0 %
>26	0	0 %

TABLE 1. – *Continued*

Characteristic	Frequency	Percentage
Years of Experience in Psychiatry		
< 1	4	22 %
2-5	10	56 %
6-8	0	0 %
9-14	4	22 %
15-20	0	0 %
21-25	0	0 %
>26	0	0 %
Employment Status		
Full-time	10	56 %
Part-time	6	33 %
Per-diem	2	11 %
Shift Working		
7am - 3pm	4	23 %
3pm - 11pm	2	11 %
7am - 7pm	6	33 %
7pm - 7am	6	33 %
Highest Level of Education		
Associate	4	22 %
Bachelor	14	78 %
Master	0	0 %
Doctorate	0	0 %
PhD	0	0 %

Understanding of the Educational Forums

Two educational forums took place on the same day, but at different times to accommodate the varying schedules of nurses. In total, 18 participants attended the educational forums and all of them volunteered to complete the pre-test and post-test. All participants answered all questions and took about 5 minutes to complete each test. After the post-test, answers to each question were revealed and the PowerPoint presentation was used as a reference. Although questions regarding the tests were encouraged, participants did not voice any and thus,

no questions needed clarification. Table 2 bellow illustrates the individual test scores as recorded in Excel. There were 10 questions on each test and each question was worth one point. Scores on the pre-test ranged from 50% to 100%, with an average score of 76.1%. Scores on the post-test ranged from 80% to 100%, with an average score of 96.7%

TABLE 2. *Test scores: Individual test scores.*

Participant ID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Pre-Test Score	70	60	60	90	100	70	60	90
Post-Test Score	100	100	90	100	100	100	80	100

Participant ID	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Pre-Test Score	70	60	70	100	100	70	60	90	60	90
Post-Test Score	100	100	90	100	90	100	100	90	100	100

Test scores were further analyzed using SPSS. Prior to statistical inference of the observed data, it suffices to check a few assumptions. From the data, there exist two variables (pre-test scores and post-test scores) of which are paired with respective participants and are of continuous measure. Moreover, the paired measures are independent of each other. That is, the scores of one individual do not influence the scores of another individual. The scatterplot (Figure 1) of pre-test scores versus post-test scores shows there is no evidence of outliers. Points above or to the right of the dotted line are participants who scored higher on the post-test than on the pre-test. Points on the dotted line are participants whose post-test and pre-test scores are the same. Participants below or to the right of the dotted line scored lower on the post-test than on the pre-test.

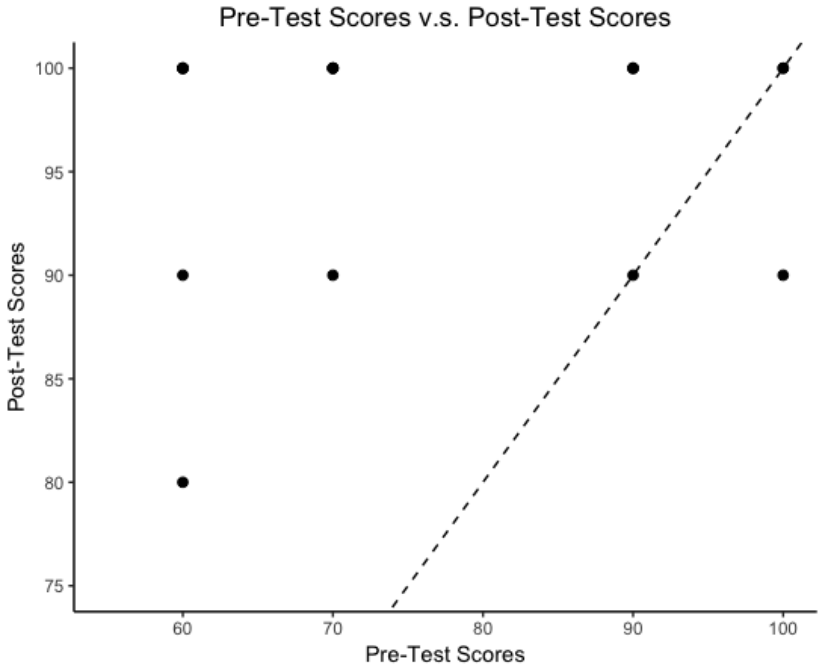

FIGURE 1. Scatterplot of pre-test scores against post-test scores.

Lastly, it suffices to check whether the difference of post-test scores and pre-test scores are normally distributed. Figure 2 illustrates that the density of the difference between test score measures does not approximately represent a normal distribution, however the Q-Q Plot indicates otherwise as the points do not deviate far from the diagonal line and remain inside the 95% confidence bands. Plot A visually compares the sample density (solid line) to the theoretical normal density (dotted line). Plot B is a Q-Q Plot that shows how far the difference of test measures deviate from that of a normal distribution. Due to having a sample size less than 30, a Shapiro-Wilk Test is performed in order to conclude whether or not the difference between test score measures follows a normal distribution. The Shapiro-Wilk Test yields a p-value = 0.061 which is slightly greater than the significance level α = 0.05 and thus the null hypothesis that the difference of post-test scores and pre-test scores come from a normal distribution has failed to be rejected (W = 0.901, p = 0.061).

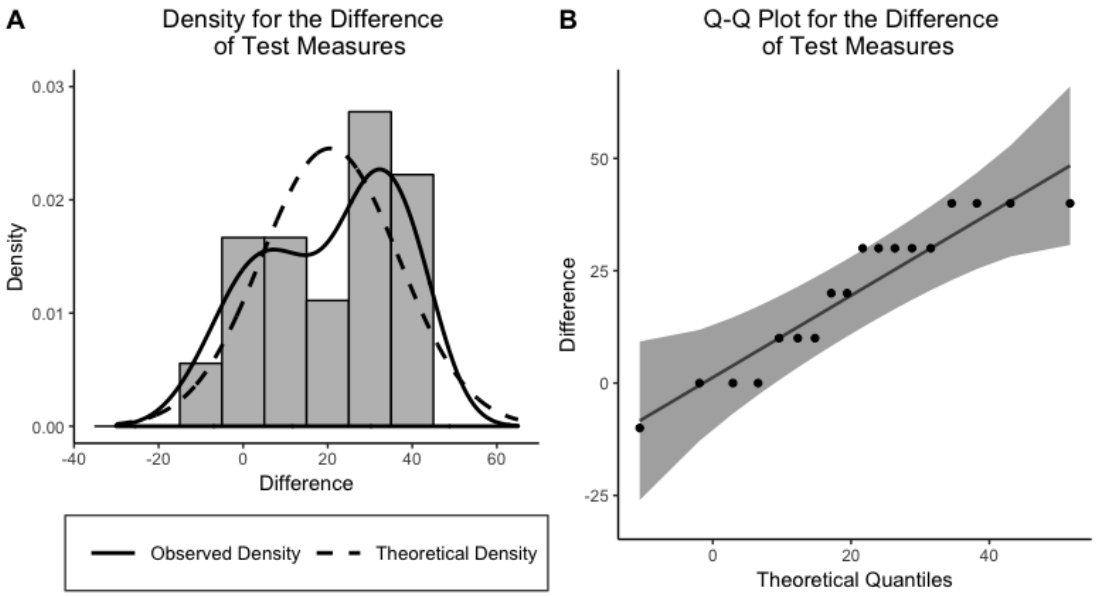

FIGURE 2. Density and Q-Q plot for the difference of post-test scores and pre-test scores.

Provided that all assumptions have been met, it was decided to perform a two-tailed paired T-test on the observed pre-test and post-test scores, see Table 3. In comparing the paired samples, the noted mean score before attending the educational forum was about 76.1% and after it was 96.7%. Also, the number of participants who took the test before attending the educational forum was the same number of participants who took the test after indicating no missing cases. In calculating the difference of post-test scores and pre-test scores, the mean difference in scores was 20.6% (on average the participants improved by 20.6 percentage points) and the standard deviation was approximately 16.26 percentage points. A two-tailed paired-sample T-test tests the null hypothesis that the true difference in means is equal to zero against the alternative hypothesis that the true difference in means is not equal to zero. Since the p-value = $5.16e^{-5}$ is less than the significance level $\alpha = 0.05$, the null hypothesis is rejected and hence there is sufficient evidence to conclude that the true difference in means is not equal to zero. That is,

there is strong evidence of a mean increase in participants' tests scores after taking the required course, ($t_{17,\ 0.975}$ = 5.36, p = $5.16e^{-5}$). However, it is important to note that the p-value previously reported actually represents the probability of observing results as extreme (or more) as observed, if the null hypothesis is true. In context, if the true mean difference in test scores were equal in the defined population, there is a 0.00516% chance of obtaining this result. The effect size, Cohen's *d*, is calculated to measure the magnitude of the difference in test scores and to briefly address the practical significance of the result. The effect size was *d* = 1.264, corresponding to a large effect. This means that the pre-test and post-test score means differ by 1.264 standard deviations and also, that if the pre-test and post-test score means do not differ by 1.264 standard deviations, the difference is of little to no value even despite having statistical significance.

TABLE 3. *Two-tailed paired sample t-test for the difference of post- and pre-mean test scores.*

		Std.	Std. Error	95% C.I.				
	Mean	**Deviation**	**Mean**	**Lower**	**Upper**	**T**	**df**	**p-value**
Difference (Post-Test – Pre-Test)	20.556	16.260	3.832	12.469	28.6441	5.364	17	$5.16e^{-5}$

*Note: C.I. = Confidence Interval, df = degrees of freedom

Second Retrospective Chart Review

Six weeks after the educational forums took place and the use of reminders was implemented, a second retrospective chart review was conducted analyzing the frequency of which the AIMS was completed by registered nurses when patients were admitted on antipsychotic medications. The chart review process was similar to the process used during the needs assessment at the start of this project. First, a list of patients who were admitted between August 21, 2018 and October 3, 2018 and prescribed scheduled antipsychotic medications during

their hospital stay was obtained from pharmacy. Figures 1 and 2 below illustrate the algorithm and the results of the second retrospective chart review. The list, which contained the names of 112 patients, was subsequently forwarded to medical records personnel who were asked to pull the corresponding charts. The charts were reviewed, and it was determined that of the 112 patients who were prescribed antipsychotic medications during their stay, 69 patients were admitted on antipsychotic medications. A further analysis indicated that among the 69 patients who were admitted on antipsychotic medications, 24 were assessed using the AIMS by a registered nurse upon admission.

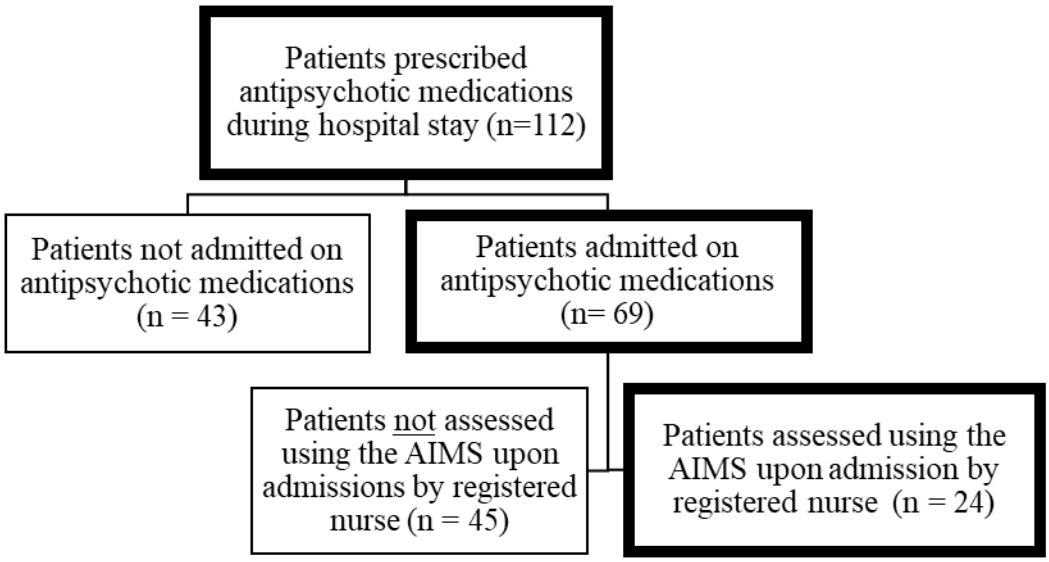

FIGURE 3. Algorithm of results of second retrospective chart review.

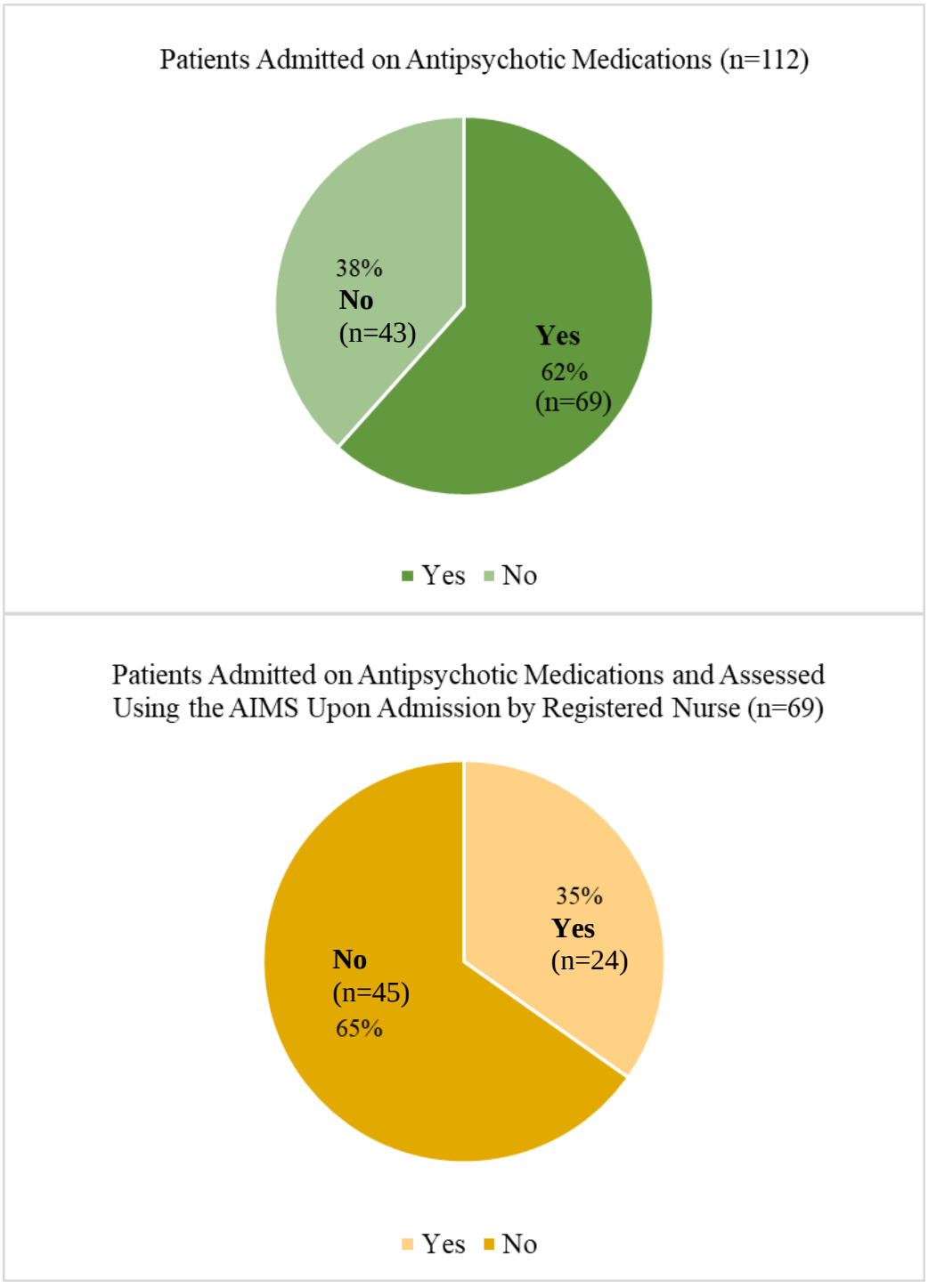

FIGURE 4. Results of second retrospective chart review.

DISCUSSION

The goal of this quality improvement project was to promote the utilization of the AIMS among registered nurses. More specifically, registered nurses were encouraged to complete the AIMS on newly admitted patients who were prescribed antipsychotic medications upon admission. As previously mentioned, the needs assessment indicated the 0% of patients admitted on antipsychotic medications were assessed by registered nurses using the AIMS, despite registered nurses receiving training on AIMS upon hire and the AIMS being a part of their yearly competency. Mean test scores during the education forum increased 20.6% after the education forum and compliance with completing the AIMS on newly admitted patients who were prescribed antipsychotic medications increased from 0% to 35%. Drivers of success included recognizing the problem and implementing strategies that directly addressed the problem.

The first step in solving a problem is to recognize there is a problem (Aein, 2018). Registered nurses face challenges related to managing extremely busy shifts and must prioritize tasks when time is scarce (Chan, Jones & Wong, 2012). Given that completing the AIMS is only required on patients who are admitted on antipsychotic medications and not on every admitted patient, the task can be overlooked when there is not a reminder to do so. The needs assessment drew attention to the gap in practice, of which was shared with the registered nurses and its significant was highlighted in the company policy. Once the problem and significance are recognized, solutions can be proposed. Creating solutions can be hard and registered nurses can be hesitant to accept change for a number of reasons including lack of appreciation for the need to change, lack of resources to execute change, or considering the change as less priority (Salam & Alghamdi, 2016). The principles of the PARHiS framework and the Plan-Do-Study-Act

(PDSA) cycle were key component to support this quality improvement project. The three elements of the PARHiS framework, evidence, context, and facilitation, suitably depicted key components to support the success of the project (Kitsons et al., 2008). Evidence was presented in the form of the literature supporting the use of the AIMS and the needs assessment which indicated that the registered nurses were not complaint with company policy in completing the AIMS. The element of context highlighted nurses training and competency check offs were not enough to support adherence to company policy and that it was unknown if internal auditors were aware that the problem existed prior to this project. Lastly, the element of facilitation addressed ways of supporting the AIMS by increasing knowledge via education forums and supporting compliance with the use of reminders and providing a list of commonly prescribed medications. Assessing each element separately can support recognizing the roots of the problem and therefore, create feasible solutions.

The design of the project followed the PDSA cycle, which tests a change by developing a plan to test the change (Plan), carrying out the test (Do), observing and learning from the consequences (Study), and determining what modifications should be made to the test (Act) (IHI, 2018). Given that this is a cycle, the process can be repeated as many times as required to continuously support quality patient care. Once the modifications are recognized in the Act phase, the cycle is repeated starting from the Planning phase. In relation to this project, the ultimate goal is for every newly admitted patient who has been prescribed an antipsychotic medication upon admission to be assessed using the AIMS upon admission. Therefore, if the provider does not assess the patient upon admission, the registered nurse should complete the task 100% of the time before the patient receives any antipsychotic medications.

In analyzing the strategies implemented to promote compliance in completing the AIMS, the educational forums were appropriate methods to increase knowledge among registered nurses and present information to address the gaps in practice. Other considered methods included creating a recorded PowerPoint presentation and e-mailing it to registered nurses to allow them to view it at their convenience. Given that participation in the project was voluntary, registered nurses could have overlooked the presentation. Although the delivery of education online such as via a PowerPoint presentation delivery is an effective way to teach, the in-person method was believed to be more appropriate due to being more interactive and engaging (Porter, Pitterle & Hayney, 2014). In addition, live education is superior to recorded education when evaluating the ability to address questions and concerns regarding the education immediately after the presentation.

Another point of discussion is the demographic data collected on the pre-tests during the education forums. The data indicated that most participants had two to five years of experience of nursing and two to five years of experience in psychiatry. Given that there is so much to know in nursing and let alone in psychiatry, this may help understand why some nurses were not familiar with he AIMS. Although nurses are exposed to the AIMS upon hire and during yearly competency evaluation, repeated exposure to the AIMS would support familiarity, acceptability, and knowledge (Choi & Kim, 2016). Unlike other organizations, the hospital where the project was conducted did not elect to mandate the AIMS to be conducted on every admitted patient. Instead, only patients who are admitted on antipsychotic medications are required to be assessed using the AIMS upon admission. Registered nurses who work in facilities where the AIMS is

routinely conducted on every newly admitted patient, whether admitted on antipsychotic medications or not, have more experience using the tool (Hiber, 2012).

Study Strengths

The purpose of this quality improvement project is to promote the utilization of the AIMS among registered nurses and this study achieves this purpose. The initial retrospective chart review indicated that 0% of patients admitted on antipsychotic medications were assessed using the AIMS by a registered nurse. After education and implementation of the measures, the number increased to 35%. These results were initially shared with house supervisor and subsequently during a monthly nurses' meeting. Another strength is that 18 registered nurses participated in the education forum among the 57 registered nurses who were invited, making it a response rate of 32%. This remains a good response rate as studies with low response rates, even as low as 20% can yield accurate results (Morton, Bandara, Robinson & Carr, 2012). In addition, the pre and post-tests which were distributed during the educational forums to analyze the participants' understanding of the presented information indicated an improvement as evidenced by mean scores of 76.1% and 96.7%, respectively. The questions on the tests were also selected on the basis of their importance and aimed at drawing attention to important concepts for registered nurses to remember in their future practice.

Study Limitations

The major limitation of this quality improvement project was the inability to conduct the educational forum on two different days. The two educational sessions were conducted on the day of the monthly nurses' meeting. Accommodating to the monthly meetings is often hard for the registered nurses as they must accommodate their work schedule and other responsibilities.

Given that normal census to the meeting was usually low, it was determined that it would be best to take advantage of this already established time and conduct the educational forums at that time. That way, registered nurses are not obligated to attend two meetings in one month. However, it may have been beneficial to conduct two additional education forums the next month. In this way, registered nurses who were unable to attend the initial meeting may have had the opportunity to do so. However, the second retrospective chart review was conducted just six weeks after the initial educational forum, which would have been just two weeks after a second set of educational sessions. Studies have found that during the first two weeks immediately following new learning, participants revert to previous behaviors (Schilling & Appegate, 2012). Given the restraints surrounding the time available to complete the DNP project, the benefits of a second educational session may not have been evident by the time the retrospective chart review was completed.

Another limitation that was encountered was the inability to accurately identify how many registered nurses completed the AIMS during the second retrospective chart review. The chart review indicated that out of 69 patients who were admitted on antipsychotic medications, 24 were assessed using the AIMS. However, it was not possible to accurately determine how many registered nurses completed those AIMSs. After completing the AIMS, the examiner is asked to sign and date the form. Unfortunately, signatures were not legible enough to clearly identify the registered nurses who signed the forms. The ability to recognize the participants' signatures would have helped identify the number of registered nurses whose practice was changed as a result of the educational forum, reminders to complete the AIMS, or a combination of the two.

Recommendations for Practice

The last phase of the PDSA cycle is the Acting phase, in which all information is analyzed to propose further recommendations for practice. In general, the implemented methods were effective in promoting the use of the AIMS among registered nurses, given that their participation in assessing newly admitted patient who were prescribed antipsychotic medications increased from 0% to 35%. However, additional techniques can be implemented in order to increase their participation even more.

As discussed in the limitations, both educational forums took place on the same day due to restraints surrounding available time to complete the DNP project. To strengthen the dissemination of information, it would be beneficial to reinforce key points of the education forum in monthly nurses' meetings to support continuous efforts of ensuring that the AIMS is completed accordingly per company policy. Discussing the AIMS during monthly meetings would also serve as an opportunity to share ideas, questions, and concerns about the AIMS which can impact the care being provided to patients.

Moving forward, it is necessary to recognize that completing the AIMS is not only required in patients who are admitted on antipsychotic medications. Per company policy, the AIMS is to also be completed when the dosage of the same antipsychotic medication is changed, when a new antipsychotic medication is ordered during hospitalization, and when one suspects that the patient may exhibiting symptoms of tardive dyskinesia. To support compliance to this policy, one must realize although the hospital uses paper medical records, registered nurses and psychiatric providers use different methods to complete their notes and assessments. Registered nurses chart on paper while psychiatric providers chart electronically that are printed out and

placed in the patients' physical chart within a day or two. Therefore, when providers complete the AIMS upon admission or at any other time electronically, registered nurses do not have immediate access to that information. In order to avoid omission or duplicate assessments, two suggestions may be considered. The first suggestion is for both registered nurses and providers to use the same methods of charting which means, either solely use paper charting or electronic charting. This method enables access to current and complete information about each patient at the point of care. The second suggestion is to employ a method for the providers to inform the registered nurses whether the AIMS has been completed by the provider or if it needs to be completed by the registered nurse. For instance, when providers' order an antipsychotic medication upon admission, change the dosage of an existing medication, or start a new medication, the provider also includes in that order whether or not the AIMS needs to be completed by the registered nurse. This would ensure that the patient has a baseline score in place prior to receiving the medication.

Overall compliance with completing the AIMS per company policy should be closely monitored by internal auditors but involving nursing staff in the process can create a positive impact. Nelson (2015) evaluated the effects of nursing staff participation in chart audits and concluded that active participation in chart audit conducted by the nursing staff improved knowledge of the requirements for clinical documentation and motivated the nursing staff to become an active component of quality improvement and quality patient care (Nelson, 2015). The organization can adapt this strategy by assigning one or more registered nurse to conduct quarterly one-month retrospective chart reviews to assess compliance with completing the AIMS by registered nurses. Routine monitoring could also provide useful data in the form of trends to

better understand and address the barriers to completing the AIMS. For instance, if non-compliance is particularly high among registered nurses who work a particular shift, appropriate remediation and support would be created to target their needs and support compliance.

Conclusion

The AIMS is a highly accepted tool to assess patients taking antipsychotic medications for symptoms of tardive dyskinesia. Despite the company policy of a psychiatric hospital to complete the AIMS, a needs assessment indicated that compliance was less than optimal among registered nurses. To address the problem, two educational forums were held to increase registered nurses' awareness of the current practice. In addition, reminders to complete the AIMS were placed in MARs and where new admission packets are located and a list of commonly prescribed antipsychotic medications was also placed in MARs. Following these interventions, a second chart review was conducted which indicated that the rate at which the AIMS was completed by registered nurses in newly admitted patients who were prescribed antipsychotic medications improved. It is hopeful that as AIMS were completed, registered nurses also detected involuntary movements that may be indicative of tardive dyskinesia which ultimately improved patient outcomes. .

APPENDIX A:

SYNTHESIS OF EVIDENCE

Author/Article	Qualitative/ Quantitative. Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings
Woods et al. (2010). Incidence of tardive dyskinesia with atypical and conventional antipsychotic medications: Prospective cohort study.	Quantitative Research question: What is the prevalence of tardive dyskinesia with the use of atypical versus typical conventional antipsychotics using methods similar to those from a previous prospective cohort study at the same site in the 1980s?	n/a	Closed cohort study	Typical antipsychotic only: n=80 Atypical antipsychotic only: n=22 Combined typical and atypical antipsychotic: n=48 Total sample: n=352	AIMS assessment was utilized to measure the presence and severity of TD symptoms.	A similar study was conducted at the same site in the 1980s. When comparing the previous findings to the new ones, the authors concluded that despite the increased use atypical antipsychotics at the clinic, the incidence and prevalence of tardive dyskinesia remained relatively unchanged.
Kinon et al. (2015). Incidence of tardive dyskinesia in older adult participants treated with olanzapine or conventional antipsychotics.	Quantitative Research question: What is the risk of persistent tardive dyskinesia in participants with acute psychosis or agitation aged 55 years or older who were treated with olanzapine versus a typical antipsychotic?	n/a	Randomized controlled study	Olanzapine: n=150 Typical antipsychotic: n=143 Total sample: n= 293	AIMS assessment was utilized to measure the presence and severity of TD symptoms.	The cumulative incidence of persistent TD was low and the risk of persistent TD did not differ significantly among predominantly older adult participants having dementia with acute psychosis or agitation treated with olanzapine or a typical antipsychotic.
Pouclet-Courtemanche et al. (2016). Long-term	Quantitative Research question: Can the use of the ESRT, AIMS,	n/a	Double-blind study	Participants who underwent deep brain stimulation: n= 19	ERST, AIMS, cognitive assessment and psychiatric evaluation were used to measure the	When comparing the congruency of the movement scale, at 12 months, a decrease of 58% of TD symptoms

Author/Article	Qualitative/ Quantitative. Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings
efficacy and tolerability of bilateral pallidal stimulation to treat tardive dyskinesia.	cognitive evaluation and a psychiatric assessment confirm the efficacy and safety of deep brain stimulation of the internal part of the globus pallidus in improving severe tardive dyskinesia?				severity of TD symptoms.	was noticed using the ESRS and 50% using the AIMS. Long term, a decrease of 60%of TD symptoms using the ESRS was noticed and 63% using the AIMS. The calculated difference in improved symptoms was 8% or less which supports their congruency.
Chan et al. (2018). Switching antipsychotic treatment to aripiprazole in psychotic participants with neuroleptic-induced tardive dyskinesia: a 24-week follow-up study.	Quantitative Can switching antipsychotic treatment from to first- to second- generation antipsychotic improve TD symptoms?	n/a	Open label prospective cohort study	Participants who were discontinued on a typical antipsychotic and started and maintained on aripiprazole: n= 25	The PANSS and CGI-S were used to measure the severity of psychotic symptoms. The AIMS was used to measure the symptoms of TD. The SAS was used to measure the neuroleptic-induced parkinsonism. The BAS was used to measure akathisia.	Switching to the from a first-generation antipsychotic to the second-generation antipsychotic aripiprazole reduced TD symptoms. AIMS scores improved by more than 50%.

Author/Article	Qualitative/ Quantitative. Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings
Desai et al. (2017). Prevalence and pattern of antipsychotic inducted movement disorders in a tertiary care teaching hospital in India – A cross-sectional study	Quantitative Research question: What is the prevalence and pattern of movement disorders among participants taking antipsychotic medications in a general hospital in India?	n/a	Cross-sectional study	706 participants who received at least one antipsychotic medication were included in the study. Participants received with one or more typical or atypical antipsychotic, or a combination of the two. Participants who were found to have movement disorder: n=40	The Modified-Angus Scale score was used to measure induced parkinsonism. The BAS was used to measure akathisia. The AIMS was used to measure TD symptoms.	The prevalence of antipsychotic medication induced parkinsonism, akathisia and tardive dyskinesia were 5.10%, 0.85%, and 0.57%, respectively. It was also noted that The higher use of atypical antipsychotics had reduced the occurrence of movement disorders
Correll et al. (2017). Efficacy of Valbenazine (NBI-98854) in treating subjects with tardive dyskinesia and mood disorder.	Quantitative Research question: Does the use of Valbenazine reduce symptoms of TD in participants receiving antipsychotic medications?	n/a	Double-blind controlled study	Participants receiving Valbenazine: n=73 Participants receiving placebo: n=77	AIMS and Clinical Global Impression of Change (CGI-TD).	A ≥ 50% in symptom reduction was noted at week 6 which further increased by week 48. A 4 week washout period was introduced thereafter and it was noted that the AIMS scores in both groups were returning back to baseline levels, indicating re-emergence of TD
McEvoy et a. (2014). Effectiveness of paliperidone	Quantitative Research question: In patient needing a long-term injectable, what	n/a	Randomized clinical trial	Participants receiving paliperidone palmitate for 24 months: n= 145 Participants receiving	Barnes Akathisia Scale, Simpson-Angus Extrapyramidal Scale, Arizona Sexual	At baseline, AIMS scores were statistically insignificant. There was no paliperidone

Author/Article	Qualitative/ Quantitative. Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings
palmitate vs haloperidol decanoate for maintenance treatment of schizophrenia: A randomized clinical trial.	difference in effectiveness is the in using paliperidone palmitate (atypical antipsychotic) versus haloperidol decanoate (typical antipsychotic)?			haloperidol decanoate for 24 months: n= 145	Experiences Scale, and Abnormal Involuntary Movement Scale	palmitate was superior to haloperidol decanoate with respect to prevention of efficacy failure. Haloperidol decanoate was associated with more akathisia. AIMS scores were 2% lower in paliperidone palmitate group.
Kinon et al. (2012). Reduction in tardive dyskinesia symptoms during treatment with olanzapine or haloperidol: Comment.	Quantitative Research question: What effectiveness of olanzapine is these when compared to the effectiveness of haloperidol?	n/a	Retrospective study	Participants treated with olanzapine: n=129 Participants treated with haloperidol: n=62	CGI-S, Brief Psychiatric Rating Scale, AIMS	The use of atypical antipsychotic drug therapy was related to a reduced prevalence of TD symptoms as assessed by the AIMS.
Huang (2017). A cross-sectional study on the characteristics of tardive dyskinesia in participants with chronic	Quantitative Research question: What are the movement patterns among participants with chronic schizophrenia with TD, and what are their clinical characteristics	n/a	Cross-sectional study	Total number of participants: n=448 Number of participants with TD: n=46	AIMS	The movement disorder caused by TD in participants with chronic schizophrenia affected the following areas: facial and oral areas, limbs and torsos. 21 participants were affected in a single area and 25

Author/Article	Qualitative/ Quantitative. Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings
schizophrenia.	and risk factors?					participants were effected in more than one area. The severity of AIMS scores in participants effected in more than one area were significantly greater than those effected in one
Munhoz et al. (2017). Not all drug-induced parkinsonism are the same: The effect of drug class on motor phenotype.	Quantitative Research question: What are the distinctive demographic and clinical features in drug induced parkinsonism among different drug classes?	n/a	Prospective study	Total number of participants: n=157 Participants receiving typical antipsychotic (most commonly haloperidol, levomepromazine, chlorpromazine): n= 95 Patient receiving atypical (most commonly chlorpromazine): n= 23 Participants receiving calcium channel blockers (most commonly flunarizine and cinnarizine): n= 80	Hoehn and Yahr score for staging, the Unified Parkinson's Disease Rating Scale, Fahn–Tolosa–Marin Tremor Rating Scale (TRS), and AIMS. The TRS and AIMS were used to assess the co-occurrence of action tremor and tardive dyskinesia.	Overall, AIMS scores were the lowest among participants receiving atypical antipsychotic, therefore lower risk of inducing both parkinsonism and TD.
Gharabawi et al. (2005). Abnormal	Quantitative Research question: What is the	n/a	Empirical study	Participants with schizophrenia or schizoaffective disorder who exhibit signs of	AIMS, ESRS, ESRS Clinical Global Impressions of severity of dyskinesia	There is significant correlation and agreement between the ratings between

Author/Article	Qualitative/ Quantitative. Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings
Involuntary Movement Scale (AIMS) and Extrapyramidal Symptom Rating Scale (ESRS): Cross-scale comparison in assessing tardive dyskinesia.	concordance between the Abnormal Movement Scale and Extrapyramidal Symptom Rating Scale?			tardive dyskinesia: n=374	(ESRS CGI-SD).	the AIMS and the ESRS. The ESRS CGI-SD best predicted AIMS-defined TD.
Rigby et al. (2012). Diagnostic challenges revealed from a neuropsychiatry movement disorders clinic.	Quantitative Research question: How congruent are the phenomenology and diagnostic labels in movement disorders when conducted by a movement disorders specialist versus physician who works in a clinic?	n/a	Retrospective chart review study	Number of charts reviewed: n=106	AIMS and ESRS	A movement disorder specialist frequently disagreed with referring physicians' identification of patient phenomenology and diagnosis.

Note: Abbreviations used: AIMS = Abnormal Involuntary Movement Scale = AIMS;
ESRT = Extrapyramidal Symptoms Rating Scale; TD = Tardive dyskinesia; PANSS = Positive and Negative Syndrome Scale; CGI-S = Clinical Global Impression and Severity; SAS = Simpson-Angus Scale; BAS = Barnes Akathisia Rating Scale.

APPENDIX B:

THE UNIVERSITY OF ARIZONA INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL LETTER

THE UNIVERSITY OF ARIZONA
Research, Discovery & Innovation

Human Subjects Protection Program

1618 E. Helen St.
P.O.Box 245137
Tucson, AZ 85724-5137
Tel: (520) 626-6721
http://rgw.arizona.edu/compliance/home

Date:	July 25, 2018
Principal Investigator:	Rosine Ndayikeze Oriabure
Protocol Number:	1807789387
Protocol Title:	Promotion of the Abnormal Involuntary Movement Scale in a Psychiatric Hospital.
Determination:	Human Subjects Review not Required

Documents Reviewed Concurrently:

Data Collection Tools: *Posttest.docx*
Data Collection Tools: *Pretest.docx*
HSPP Forms/Correspondence: *Advisor Confirmation Email.pdf*
HSPP Forms/Correspondence: *Oriabure - DeterminationOfHumanResearch.pdf*
Informed Consent/PHI Forms: *Oriabure - Disclosure.doc*
Other: *COMMON ANTIPSYCHOTIC MEDICATIONS.DOCX*
Other: *EDUCATION.DOCX*
Other Approvals and Authorizations: *Oriabure - Site Authorizarion.pdf*
Recruitment Material: *Flyer.docx*
Recruitment Material: *INVITATION LETTER.DOCX*
Recruitment Material: *LAMINATED REMINDER.DOCX*

Regulatory Determinations/Comments:

- Not Human Subjects Research as defined by 45 CFR 46.102(f): as presented, the activities described above do not meet the definition of research involving human subjects as cited in the regulations issued by the U.S. Department of Health and Human Services which state that "human subject means a living individual about whom an investigator (whether professional or student) conducting research obtains data through intervention or interaction with the individual, or identifiable private information."

The project listed above does not require oversight by the University of Arizona.

If the nature of the project changes, submit a new determination form to the Human Subjects Protection Program (HSPP) for reassessment. Changes include addition of research with children, specimen collection, participant observation, prospective collection of data when the study was previously retrospective in nature, and broadening the scope or nature of the study activity. Please contact the HSPP to consult on whether the proposed changes need further review.

The University of Arizona maintains a Federalwide Assurance with the Office for Human Research Protections (FWA #00004218).

APPENDIX C:

LAMINATED REIMINDER

Is your patient admitted on an antipsychotic medication?

This can be a medication being continued from home per the Admission Medication Reconciliation (aka “admission med rec”), or one that is newly ordered when the patient is admitted.

If so, please complete the **Abnormal Involuntary Movement Scale (AIMS)** as part of the Nursing Admission Assessment process.

The AIMS is located in the cabinet where forms are located.

Thank you.

APPENDIX D:

COMMON ANTIPSYCHOTIC MEDICATIONS

COMMON ANTIPSYCHOTIC MEDICATIONS

First-generation/Conventional/ Typical Antipsychotics	Second-generation/ Atypical Antipsychotics
haloperidol (Haldol)	aripiprazole (Abilify)
fluphenazine (Prolixin)	asenapine (Saphris)
chlorpromazine (Thorazine)	cariprazine (Vraylar)
loxapine (Adasuve)	clozapine (Clozaril)
perphenazine (Trilafon)	lurasidone (Latuda)
	olanzapine (Zyprexa)
	quetiapine (Seroquel)
	risperidone (Risperdal)
	ziprasidone (Geodon)
	paliperidone (Invega)

Please note: This is not a complete list of all prescribed antipsychotic medications.

APPENDIX E:

EDUCATIONAL POWERPOINT

Promotion of the Abnormal Involuntary Movement Scale among Registered Nurses

Rosine Ndayikeze Oriabure, RN BSN
DNP Student

THE UNIVERSITY OF ARIZONA College of Nursing

KEY TOPICS

- Abnormal Involuntary Movement Scale.
- Tardive dyskinesia.
- Company policy and registered nurses training as it relates to the AIMS.
- Needs assessment findings.
- The plan.

ABNORMAL INVOLUNTRY MOVEMENT SCALE

- 12 item to detect and rate symptoms associated with tardive dyskinesia.
- Items 1 to 10 are rated on 5 point scale. Items 11 and 12 are yes-no questions.
- Takes 5 to 10 minutes to complete.
- Reliability and validity of the AIMS discussed in literature.

(CQAIMH, n.d.)

TARDIVE DYSKENESIA

- Tardive dyskinesia is a disorder characterized by involuntary muscle movements which can be severe and permanent.
- Disorder is believed to be associated with dopamine blocking properties of antipsychotic medication.

(Solmi et al., 2018)

ANTIPSYCHOTIC MEDICATIONS

- Treatment disorders like schizophrenia, psychosis, bipolar disorder.
- Patients taking first- and second-generation antipsychotic medications are at risk of developing tardive dyskinesia.
- A study has estimated that 32.4% of the patients taking first generation antipsychotic medications and 13.1% of patients taking second generation antipsychotic medications are diagnosed with tardive dyskinesia.

(Carbon et al., 2017)

COMPANY POLICY AND BEST PRACTIVE GUIDELINES

- At this hospital, provers and registered nurse are responsible for completing the AIMS.
- AIMS upon admission.
- AIMS before a new antipsychotic education is started.

AIMS TRAINING FOR REGISTERED NURSES

- Registered nurses at the hospital trained on the AIMS.
- Upon hire and yearly to prove competency.

NEEDS ASSESSMENT

- November 2017, December 2018 and January 2018.
- Prescribed medications included Seroquel, Zyprexa, Risperidone, Geodon, Thorazine, Prolixin, Abilify.

NEEDS ASSESSMENT FINDINGS

- 333 charts were reviewed.
- 44 patients had antipsychotic medications continued from home – only 7 (16%) patients were assessed using the AIMS upon admission.
- Out of all patients who were prescribed antipsychotic medications during their hospital stay, 150 (45%) patients were never assessed using the AIMS.

WHY IS THIS IMPORTANT?

- Symptoms can occur within months or after years, and persist after discontinuation of medication.
- Symptoms can go unnoticed by patients. Obtaining a baseline score will guide further treatment options.
- Registered nurses have a shared responsibility in completing the AIMS.
- Valbenazine (Ingrezza): first FDA-approved medication for tardive dyskinesia.

(William et al., 2017)

THE PLAN

- Reminder to complete the AIMS upon admission in patients who have been prescribed an antipsychotic medications.
  - Medication administration record.
  - New patient admission packets storage.
- Six weeks after the education and use of reminders is initiated, a second chart review will be conducted.

REFERENCES

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Solmi, M., Pigato, G., Kane, J. M., Correll, C. U. (2018). Clinical risk factors for the development of tardive dyskinesia. Journal of the Neurological Sciences, 389,21-27

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APPENDIX F:

INVITATION LETTER

Dear Registered Nurse,

My name is Rosine Ndayikeze Oriabure. I am a registered nurse at this hospital and a graduate student at the University of Arizona's Doctor of Nursing Practice (DNP) Psychiatric Mental Health Nurse Practitioner program. As part of my requirements for my DNP, I am conducting a quality improvement project to promote the utilization of the Abnormal Involuntary Movement Scale (AIMS) among registered nurses. The AIMS is tool utilized by healthcare professionals in assessing patients taking antipsychotic medications for movements that may be indicative of tardive dyskinesia – a disorder that results in involuntary, repetitive body movements. If you are receiving this email, I am cordially inviting you to participate in an educational forum about the AIMS - where you will learn about the upcoming plans to unfold over the next few weeks to promote its use in our hospital.

Attend one of the two sessions that are scheduled: Tuesday August 21st, 2018 at 0730 or 1430. The educational forums will take place in the training room and each session will last 30 minutes. The same information will be covered in both sessions.

Light refreshments will be served and registered nurses who complete the educational forum will be entered to win one of two $75 VISA gift cards – one winner per session!

Your participation in any and all parts of this quality improvement project is strictly voluntary, and you may decline to participate or stop participation at any time. Information collected during the meetings will be anonymous and remain strictly confidential. There will not be a follow-up meeting to this educational forum.

Thank you for taking the time to help further my research.

Sincerely,

Rosine Ndayikeze Oriabure, RN, BSN, DNP-PMHNP Student
RosineOriabure@spsh.com
RosineOriabure@email.arizona.edu

APPENDIX G:

INVITATION FLYER

ATTENTION REGISTERED NURSES!

A quality improvement project is taking place at our hospital.

An educational forum will be held to promote the utilization of the Abnormal Involuntary Movement Scale among registered nurses and discuss upcoming plans to promote its use.

Full-time, part-time, and per diem registered nurses are all welcomed!

Your participation is voluntary and all gathered information will be anonymous and remain confidential.

Session 1: 8/21/18 and 0730
Session 2: 08/21/18 and 1430
Each session will last 30 minutes.
LOCATION: Training Room

Light refreshments will be served and registered nurses who complete the educational forum will be entered to win a $75 VISA gift cards – one winner per session!

APPENDIX H:

PRE-TEST

PRE-TEST

ID: #

Demographic information is collected to provide an aggregate picture of the participants. Please select the answer that best applies to you.

Department: Nursing Pharmacy Administrative Other:

Years of experience *in current position*: <1 2-5 5-8 9-14 15-20 21-25 >26

Years of experience *in psychiatry*: <1 2-5 5-8 9-14 15-20 21-25 >26

Employment status: Full-time Part-time Per-diem

What shift do you work? 7am-3pm 3pm-11pm 7am-7pm 7pm-7am Other:

Highest level of education: Associate Bachelor Masters Doctorate PhD

==========

Purpose: To assess the information you are familiar with before the educational forum.

1. AIMS stands for:

2. Antipsychotic medications are prescribed at this hospital.
   TRUE FALSE (please circle one)

3. Tardive dyskinesia can occur in patients taking antipsychotic medications.
   TRUE FALSE (please circle one)

4. Tardive dyskinesia is believed to be associated with which neurotransmitter?
   a) Dopamine
   b) Serotonin
   c) Epinephrine

5. Per hospital policy, the AIMS must be completed on every newly admitted patient.
   TRUE FALSE (please circle one)

PLEASE CONTINUE ON PAGE 2

6. Who can complete the AIMS at this hospital?
    a. Psychiatrists
    b. Registered nurses
    c. Psychiatrists and registered nurses

7. The AIMS assessment takes about _____ minutes to complete.

8. According to the PowerPoint, the needs assessment indicated that ____ % of patients who were admitted on antipsychotic medications were assessed using the AIMS upon admission.

9. After this educational forum, reminders will be placed:
    a. In every medication administration record.
    b. Where new patient admission packets are located.
    c. Both A and B.

10. Another chart review will be conducted in ____ weeks to determine if there a change in the number of AIMS conducted by registered nurses.

APPENDIX I:

POST-TEST

POST-TEST

ID #

Which department do you work in?

Nursing Pharmacy Administrative Other:

Purpose: To evaluate your understanding of the material presented during the educational forum.

1. AIMS stands for:

2. Antipsychotic medications are prescribed at this hospital.
   TRUE FALSE (please circle one)

3. Tardive dyskinesia can occur in patients taking antipsychotic medications.
   TRUE FALSE (please circle one)

4. Tardive dyskinesia is believed to be associated with which neurotransmitter?
   d) Dopamine
   e) Serotonin
   f) Epinephrine

5. Per hospital policy, the AIMS must be completed on every newly admitted patient.
   TRUE FALSE (please circle one)

6. Who can complete the AIMS at this hospital?
   a. Psychiatrists
   b. Registered nurses
   c. Psychiatrists and registered nurses

7. The AIMS assessment takes about _____ minutes to complete.

8. According to the PowerPoint, the needs assessment indicated that ____ % of patients who were admitted on antipsychotic medications were assessed using the AIMS upon admission.

9. After this educational forum, reminders will be placed:
   a. In every medication administration record.
   b. Where new patient admission packets are located.
   c. Both A and B.

Another chart review will be conducted in ____ weeks to determine if there a change in the number of AIMS conducted by registered nurses

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