Improving Medication Adherence in Psychiatric Patients with a

Medication Adherence Program

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Abstract

Introduction: Medication non-adherence significantly impacts patients with serious mental illness (SMI). It's estimated that over 50% of patients prescribed antipsychotic medication are non-adherent to the prescribed treatment. Medication non-adherence impedes the patient's safety, leads to relapse, and the need for rehospitalization.

Research Methodology: Literature was examined from the past five years (2016-2021) on the use of telephonic follow-up interventions to improve medication adherence in patients with psychiatric disorders and other chronic diseases at risk for mental illness. Databases (PubMed, CINAHL, ProQuest, and the Cochrane Library) were used. The inclusion criteria focused on psychiatric disorders, telephone calls to improve medication adherence, and the use of questionnaires to determine adherence.

Results and Discussion: The implementation of telephonic follow-up after discharge has proven to be an effective strategy to promote medication adherence in patients with mental illness and to provide additional support (emotional, side effect management, appointment reminders, activity involvement) to improve the patient's well-being.

Conclusion and Further Recommendations: Telephonic follow-up is an effective strategy to improve medication adherence in patients with mental illness and other chronic diseases as a short-term intervention (less than 24 months). Further research is needed on the benefits of telephonic follow-up as a long-term intervention (beyond 24 months).

Keywords: Medication adherence, telephonic follow-up, severe mental illness, medication non-adherence

Dedication

I dedicate my DNP Project to my daughter Aubrie and husband Adam for their support and encouragement throughout my doctoral education. Without their support and commitment to my success as a doctoral student the completion of this project would not be possible. May they always follow their dreams and know how much I love and appreciate them both.

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Medication non-adherence has a significant impact on patient outcomes particularly in the areas of psychiatric disorders and those suffering from severe mental illness (SMI). The result of medication non-adherence leads to lifelong complications and devasting implications for the healthcare system. Over 50% of adult patients who are prescribed psychopharmacological treatment are non-adherent with a worsening rate of non-adherence occurring over time, resulting in relapses, and the need for recurring hospitalizations (Velligan et al., 2017). Relapse diminishes the patient's quality of life and impedes their safety. Safety is impeded by the patient being at an increased risk for co-morbid medical conditions, illness exacerbation, and an increased risk of suicide (Semahegn et al., 2018). The purpose of the paper is to discuss the significant impact that medication non-adherence has on patients suffering from SMI and the positive impact that a medication adherence program with telephonic follow-up has on improving patient outcomes within the healthcare system.

Problem Statement

The following PICOT question will serve as the basis for the integrative review: *For adults, 18 years of age or older admitted to an inpatient psychiatric unit, does the implementation of a medication adherence program with telephonic follow-up, compared to current practice, impact medication adherence in 12 weeks?*

The approach to the problem is to discuss how the intervention of implementing a medication adherence program with telephonic follow-up improves medication adherence

after discharge. The Medication Adherence Rating Scale (MARS) (Thompson et al., 2000) is a call

structure for the medication adherence program and consisted of five parts (opening

conversation, individual topics, medication, suicidal tendencies, and ending) (Schultze et al.,

2019). The objectives of the integrative review are to show that a medication adherence

program with telephonic follow-up improves medication adherence in adult patients taking

antipsychotic medication who were discharged from an inpatient psychiatric unit. Telephonic

support for managing medication adherence is an effective strategy to provide support as the

patient transitions from an inpatient unit back to living in the community, reduces readmissions

related to non-adherence, and improves patient outcomes (Virgolesi et al., 2017).

Significance of the Practice Problem

What is Medication Non-Adherence?

Medication non-adherence is a significant concern for patients who are suffering from

SMI across the globe, nation, locally within the state of Wyoming, and at the local practicum

site's inpatient behavioral health unit. Medication non-adherence was first identified by

observing the frequent readmissions related to medication non-adherence. It was clear that a

practice gap existed and that there is no policy and procedure in place for a method to follow-

up, track and provide support for medication adherence. For a patient to be considered non-

adherent to a medication they must miss a medication 20%-50% of the time (Milik et al., 2020).

Impact of Medication Non-Adherence

Globally and nationally SMI drastically impacts nurses, nursing care, the healthcare

organization, quality and safety of care, society, quality of life, and the patient's support

system. According to the World Health Organization ([WHO], 2021), there has been a 13% rise

in psychiatric conditions and substance abuse over the last decade. The increase in psychiatric

conditions accounts for approximately 450 million individuals worldwide attributing to 14% of

the global burden of disease (Semahegn et al., 2018). Globally, the most common psychiatric

disorders that impact this overarching number of affected individuals is schizophrenia (21

million), depressive disorders (350 million) and, bipolar disorders (60 million) making psychiatric

disorders the main causes for long term disabilities and dependency with an estimated 1 in 5

adults having a debilitating psychiatric condition (Semahegn et al., 2018; WHO, 2021). The

global economic costs to treat these psychiatric disorders continues to be on the rise from $2.5

trillion in 2010 to an estimated $6 trillion by 2030 (Semahegn et al., 2018). The government

health expenditure to treat mental illness is only about 2% (WHO, 2021). The cost for

antipsychotic non-adherence is estimated to be 1.5 billion annually (Shafrin et al., 2017) in the

United States and the overall estimated annual medical cost for chronic disease medication

non-adherence is $100-$300 billion annually (Malik et al., 2020).

Along with increased healthcare associated costs, medication non-adherence in

psychiatric disorders also increases the risk for mortality related to poor health outcomes in this

patient population (Dou et al., 2020). It is estimated that the rate of mortality is 2-3 times

higher in patients suffering from mental illness than in the general population accounting for a

10–20-year shorter life expectancy (Dou et al., 2020). Semahegn et al. (2018) predict that

patients with psychiatric disorders have a 40%-60% greater chance of dying prematurely. A

common factor to increased mortality is medication non-adherence. Adherence to

antipsychotic medications which are commonly prescribed in the treatment of SMI are as low

as 20% (Dou et al., 2020). Gebeyehu et al. (2019) found that the overall prevalence of

medication non-adherence in patients with psychiatric disorders was 55.2%. Schizophrenia at

61% and bipolar disorder at 57% have the highest prevalence of medication non-adherence

rates (Malik et al., 2020). The consequences of medication non-adherence are multifaceted and

impact the patient's quality of life, support system, and society. When medication non-

adherence occurs, there is a high prevalence of relapse, increased psychotic symptoms, violent

behaviors, a worsening prognosis requiring rehospitalizations, increased suicide attempts, a

harder time adjusting to living in the community, and an overall poor quality of life (Gebeyehu

et al., 2019; Semahegn et al., 2018). The factors for medication non-adherence include

forgetfulness, running out of medication, poor insight into their mental illness, and the stigma

that goes with taking antipsychotic medications (Malik et al., 2020).

Impact of Medication Adherence

On the other hand, medication adherence reduces healthcare costs including those

associated with inpatient psychiatric treatment and it improves the patient's overall quality of

life (Shafrin et al., 2017). During the persuasion step of Everett Rogers Diffusion of Innovation

theory, statistical data on the rate of non-adherence being as high as 50% among patients with

serious mental illnesses such as schizophrenia and bipolar disorder is presented to

administration and the nursing staff (Schultze et al., 2019). Statistical data is also presented on

the climbing number of individuals impacted by mental illness each year and its impact on the

global burden of disease (WHO, 2021). Finally, the evidence-based intervention of follow-up

calls every two weeks to improve medication adherence and the MARS as the measurable

assessment tool is presented to administration and the nursing staff (Schultze et al., 2019).

Additionally, the MARS reliability and validity are discussed. The MARS has proven to be an

effective data collection tool to assess medication adherence with an internal reliability

consistency of 0.75 (Godspower et al., 2018).

Theory or Translation Science Framework

Everett Rogers Diffusion of Innovation Theory supports the DNP project's framework

(Rogers, 2003). The theory was developed to communicate how an idea can diffuse over time in

a particular social system or population (LaMorte, 2019). The Diffusion of Innovation Theory

encompasses a five-step innovation-decision process, five categories of adopters, and five traits

that contribute to the innovation's success (Rogers, 2003).

The first step is knowledge. Knowledge occurred when adopters first become aware of

the available innovation and its purpose (Rogers, 2003; Rush, 2019). The second step is

persuasion wherein the innovation tool is needed to be seen as useful (Rogers, 2003; Rush,

2019). Administration and nursing staff who are key decision-makers during the persuasion

stage developed either a positive or a negative attitude towards the innovation change (Rogers,

2003).

Decision is the third step of the innovation-decision process. All decision-makers are involved in

this step for it determines the acceptance or rejection of the innovation (Rogers, 2003; Rush,

2019). The fourth step is the implementation which occurs when the innovation is put in place

(Rogers, 2003). The fifth and final step in the innovation-decision process is the confirmation step (Rogers, 2003).

Considerations were given to the five categories of adopters and the contributing traits of innovation adoption as part of the Diffusion of Innovation Theory (Rogers, 2003). The five categories of adopters identified are innovators, early adopters, early majority, late majority, and laggards (Rogers, 2003). Each category of adopters accepts innovations at a different rate and finds different strategies appealing when considering innovation adoption (LaMorte, 2019). Different modalities were presented to capture the various categories of adopters. Innovators for example are the first to adopt and find adoption of the innovation to be exciting without the need for additional persuasion (Dearing, & Cox, 2017; LaMorte, 2019). Innovators are seen as being venturous and play a crucial role in the implementation of new ideas (Rogers, 2003). The second category of adopters, the early adopters often assume leadership roles, are comfortable with change, and can see that the benefits of the change outweigh the risks (Dearing & Cox, 2017; LaMorte, 2019). It is the early adopters that other members look to for guidance on innovation adoption (Rogers, 2003). The early majority is an important link in the diffusion process and hangs in the balance between the innovators, early majority, and late adopters (Rogers, 2003). They are neither the first nor the last to adopt an innovation and often deliberately wait to adopt a new idea (Rogers, 2003). The late majority approach change with caution and they rely on peer pressure as a motivational factor to adopt new ideas (Rogers, 2003). The results from supportive literature on the project implementation's success to help persuade the early majority and late majority adopters to patriciate in the project's

implementation. Laggards are the last to adopt an innovation and tend to take their time with innovation adoption (Dearing & Cox, 2017). According to Rogers (2003) laggards take a traditional view on innovation and wait to adopt it until the innovation has been tried. The barrier of laggard adopters is addressed by providing clear instructions on project implementation and the opportunity for other adopters to provide feedback on the implementation's success during bi-weekly staff huddles to showcase the project's progress.

Furthermore, the contributing traits of innovation adoption were addressed as part of the implementation process. Rogers (2003) identified five contributing traits that influence innovation adoption. The traits are relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003). Implementation of a medication adherence program with telephonic follow-up is presented as being an improved strategy to support patients after discharge compared to the current practice of not having a process in place to address medication adherence after discharge (relative advantage).

Methodology

Review Protocol

The search for current, 2016-2021, peer-reviewed articles was conducted via the Chamberlain University online library. The search strategy involved searching a variety of databases including the National Library of Medicine (PubMed), Cumulative Index to Nursing and Allied Health Literature (CINAHL), ProQuest, and the Cochrane Library. The justification for searching these four databases was to provide the most well-rounded search possible of medical and nursing journals that include articles with a specific focus on psychiatric disorders,

serious mental illness, and telephonic follow-up interventions. The selected databases provide

a broad range of research that can then be narrowed to a specific focus. By using databases

that captured a wide range of research it ensured that pertinent articles were not arbitrarily

excluded by only using very specific databases with a small repository of research. The search

strategy produced valid and reliable research articles that support the evidence-based

intervention. The following search terms were used to find articles specific to this study:

telehealth, medication adherence, mobile calls, nurse-led interventions, psychiatric disorders,

mental illness, chronic disease, long-term medication use, schizophrenia, mood disorders, and

major depressive disorder. Variations of these terms were used to ensure exhaustive search

results. Search terms were combined, and search limitations were set when available to include

date ranges from 2016-2021, full-text articles, randomized controlled trials (RCTs), systematic

reviews with meta-analysis, peer-reviewed articles, and articles with abstracts to facilitate a

more focused and robust search of the literature that would produce high-quality articles for

consideration.

The integrative review started by searching for primary research articles and systematic

reviews with meta-analysis to show high fidelity research to support the evidence-based

intervention. The search specifically looked for articles that addressed the use of telephonic

interventions to improve medication adherence in patients that have a psychiatric disorder and

are being discharged from an inpatient unit. Articles were considered for inclusion if the

intervention was specific to telephonic follow-up where a phone conversation occurred

between the patient and a healthcare professional (nurse, pharmacist, researcher) for patients

that have psychiatric disorders. Consideration was also given to articles that specifically

addressed telephonic follow-up as the primary intervention but focus on other populations

with chronic diseases to include those at risk for psychiatric disorders, those being discharged,

and those requiring long-term medication management. Articles that involved other chronic

diseases were only included if the intervention mirrored that of the telephonic follow-up

interventions included in articles specific to patients with psychiatric disorders. The

intervention also had to follow a similar call structure of weekly or bi-weekly calls to address

medication adherence, provide patient support, and that used questionnaires to measure

medication adherence.

The primary focus of the research was on the utilization of telephonic follow-up to

promote medication adherence in patients with mental illness after discharge. However, as a

DNP student, it was also important to note the viability of using telephonic follow-up among a

wide range of patient populations with chronic disease including those with mental illness. The

wide utilization of telephonic follow-up as an intervention to improve medication adherence

showcases its importance and its sustainability as a cost-effective way to improve patient

outcomes in clinical practice for those with chronic mental illness and other chronic conditions

that require long-term and often complex medication management.

Inclusion/Exclusion Criteria

The specific selection approach used focused on articles that support the outcome of

improved medication adherence by using a telephonic intervention. The inclusion criteria

consisted of articles that included patients who were admitted voluntarily and involuntarily for

psychiatric treatment, where both male and female, age 18 years and older, have a psychiatric

diagnosis (schizophrenia, bipolar disorder, personality disorders, major depressive disorder,

schizoaffective disorder, and post-traumatic stress disorder), or other chronic diseases

requiring long-term medication follow-up in populations and that are at risk for developing

mental illness and have a well-documented history of medication non-adherence. Articles were

included that used telephonic follow-up as the intervention in which the patient was required

to speak with a clinician (nurse, pharmacist, researcher), that focused on improving medication

adherence, were written in English, were RCTs or systematic reviews with meta-analysis, and

that used questionnaires to measure adherence.

The exclusion criteria eliminated articles that were pilot studies, opinion reviews,

focused on pediatric patients (patients below the age of 18 years), articles written in languages

other than English, and articles with patients who had a primary substance abuse diagnosis.

Articles were also excluded if they used text messaging or automatic reminders as the only

intervention and that measured medication adherence through serum drug levels or pill

counting. Articles that focused on acute conditions, acute recoveries such as fractures and

surgery, and those with cognitive deficits that would prevent them from participating in a

telephonic intervention were also excluded.

The rationale for selecting articles in both the inclusion and the exclusion criteria was

geared towards addressing the benefits of telephonic follow-up in enhancing medication

adherence in adult patients with psychiatric disorders and chronic disease. Since psychiatric

disorders are considered a chronic disease and are often associated with multiple chronic

comorbid conditions which are often linked to the use of antipsychotic medications it is

important to note the value that telephonic follow-up has on improving patient outcomes

among vulnerable populations. Furthermore, it speaks to the benefits that telephonic follow-up

has on improving patient's outcomes throughout the healthcare system. The inclusion criteria

are very specific to addressing the care of vulnerable populations through the evidence-based

intervention of telephonic follow-up where patients can receive continued care as they

transition from being on an inpatient unit back to the community. The exclusion criteria are

specific to populations where the use of telephonic follow-up is lacking and those that are

unable to participate in a telephonic intervention that requires continued communication with

a clinician.

Data Analysis

There were sixteen total articles selected for the integrative review. The data was

extracted from the sources using the Johns Hopkins Evidence Summary Tool (Appendix A) to

capture the quality and type of research included. The results of the study were handled and

grouped according to the type and quality of research to capture high fidelity research results.

Out of the selected articles, seven are RCTs (Flaherty et al., 2017; Najafi et al., 2016; Noel et al.,

2020; Sarayani et al., 2018; Schulze et al., 2019; Song et al., 2020; Uslu & Buldukoglu, 2020),

eight are systematic reviews (Baker et al., 2018; Basit et al., 2020; Pouls et al., 2021; Rootes-

Murdy et al., 2018; Tyler et al., 2019; Uslu & Buldukoglu, 2016; Uslu et al., 2019; Verloo et al.,

2017), and one is an experimental prospective correlation design study (Virgolesi et al., 2017).

The data was analyzed for similarities and differences in the type of study, patient

sample, setting, the method used to address medication adherence, and the intervention's

effectiveness. The data was analyzed using both quantitative and qualitative data analysis. The

rationale for using both quantitative and qualitative data analysis is to capture the full essence

of the research articles. The articles showcase statistical data that demonstrates the

effectiveness and results of the intervention. The articles also highlight themes in patient

characteristics, diagnoses, sample size, and setting that are important elements that emphasize

the application of the intervention to clinical practice across the healthcare system.

Quantitative data was analyzed to assess the effectiveness of the intervention through

evaluating the intervention's statistical data analysis results and overall improvement during

and after the intervention occurred. The pre-and post-intervention data were compared to

showcase the intervention's overall effectiveness in improving medication adherence.

Questionnaires were used to measure medication adherence in all sixteen articles, but the

selected measurement tool varied throughout the research with most of the studies using the

MARS, Morisky's 8-item Medication Adherence Questionnaire (MAQ), and Morisky Medication

Adherence Scale (MMAS) to assess adherence. All the article's quantitative data showed

favorable results with the use of a telephonic intervention improving medication adherence.

Qualitative data was also analyzed to demonstrate the traits and characteristics of the

patient populations, sample size, setting, intervention call structure, time frame, and limitations

within the research. All the studies focused on adults 18 years of age and older and took place

in an outpatient setting. Ten of the articles specifically focused on patients with psychiatric

illnesses while an additional six articles inform the design of the intervention by capturing other

patient populations with chronic diseases to include cardiovascular disease, arthritis, diabetes,

patients who are older adults, and those requiring long-term medication use to support the use

of a telephonic follow-up intervention in improving medication adherence. All sixteen articles

addressed medication adherence through a telephonic follow-up intervention, but the time

frame varied from twice weekly, weekly, bi-weekly, and with calls occurring at varying intervals.

The length of the intervention also differed in the research with some articles taking place over

three months while others continued for up to 24-months. A commonly identified theme within

the research was the limitation of having small sample sizes and the interventions occurring for

a short time.

Results and Discussion

Characterization of the Body of Literature

The process for gathering supporting research for the integrative review started with

searching the Chamberlain online library databases to gather a plethora of articles to review

and analyze for inclusion. When search terms were entered into the databases, PubMed

generated nine articles, CINAHL generated 5,426 articles, ProQuest generated 1,938 articles,

and the Cochrane Library generated three articles, resulting in a total of 7,376 articles. After

duplicate articles, articles written in languages other than English, and articles where the

abstract did not meet the inclusion criteria were removed, 371 full-text articles remained and

were screened. Out of the 371 articles, 355 of the articles were excluded for not meeting the

full inclusion criteria. This resulted in a total of sixteen articles that were used to support the

intervention and are being included in the integrative review (see Appendix A & Appendix B).

The types of journals reviewed included medical, nursing, and specific psychiatric

journal to capture a wide range of supporting research characteristics. Articles from the

following journal were included in the study: *Psychological Medicine*, *General Hospital*

Psychiatry, Psychiatric Research, International Journal of Community Based Nurse Midwifery,

BMC Family Practice, Journal of Medical Internet Research, Journal of Affective Disorders,

International Journal of Clinical Pharmacology, Psychiatric Services, Jan Leading Global Nursing

Research, BMC Health Services Research, Perspectives in Psychiatric care, Turkish Journal of

Psychiatry, Journal of Psychiatric Nursing, Age and Aging, and the *Journal of Clinical Nursing.* to

answer the practice question and support the intervention.

The sixteen articles that fully addressed the intervention of a medication adherence

program with telephonic follow-up were entered on the Johns Hopkins Evidence Summary

Tool. Once the level of quality of evidence was determined the studies were grouped on the

Johns Hopkins Evidence Summary Tool based on the level of evidence and quality that each

research study presented. This method was used to capture the studies research design and

primary characteristics that support the identified practice problem and intervention

implementation while using a clear and precise format to showcase the study's results by their

level of rigor.

The quality of the sixteen articles included in the integrative review are appraised as

having an evidence level of I, II, and III. There is a total of eleven level I evidence research

studies. Out of these eleven articles, eight received an A (high quality) rating and three received

a B (good quality) rating. There are two level II articles that both received a B quality rating and

three level III articles that also received a B quality rating. The eight articles that received a level

I evidence rating and an A quality rating were rated as such because they were either a RCT or a

systematic review that produced generalized and consistent results, had a sufficient sample

size, and provided definitive results with clear recommendations for future research (Basit et

al., 2020; Najafi et al., 2016; Noel et al., 2020; Sarayani et al., 2018; Schulze et al., 2019; Uslu &

Buldukoglu, 2016; Uslu & Buldukoglu, 2020; Uslu et al., 2019). The level I evidence that received

a B quality rating was rated as such for being either a RCT or systematic review that produced

definitive results and had a sufficient sample size and recommendations (Flaherty et al., 2017;

Pouls et al., 2021; Song et al., 2020).

The level II evidence research studies with a B quality rating consisted of a systematic

review and a study that used an experimental prospective correlation design (Verloo et al.,

2017; Virgolesi et al., 2017). Both studies had sufficient sample sizes and produced consistent

results to support the project intervention. A fair amount of the literature to support these

studies was drawn from scientific evidence.

The three level III evidence research studies that received a B quality rating were rated

as such for two of the articles being systematic reviews that combined RCTs and experimental

research (Baker et al., 2018; Tyler et al., 2019), and one study was a systematic review of RCTs

and nonexperimental studies (Rootes-Murdy et al., 2018). The results of the three studies

supported the project intervention and the results were fairly consistent along with having a

sufficient sample size and recommendations for future research.

Finally, after the article analysis was complete a synthesis matrix was used to create a

thematical analysis of the research that supports the practice problem, intervention, and

outcomes. There was a total of five identified themes throughout the literature. The themes

include a.) *medication non-adherence significance*; b.) *intervention efficacy on the outcome*; c.)

the call structure and time frame used during the telephonic intervention; d.) *challenges related*

to continued participation and e.) *strategies to overcome implementation challenges*.

Findings Synthesis

Medication Non-Adherence Significance

The significance of medication non-adherence is addressed in ten of the research

articles (Baker et al., 2018; Basit et al., 2020; Najafi et al., 2016; Pouls et al., 2021; Rootes-

Murdy et al., 2018; Schulze et al., 2019; Song et al., 2020; Uslu & Buldukoglu, 2020; Uslu &

Buldukoglu, 2016; Verloo et al., 2017; Virgolesi et al., 2017). It has been determined that

approximately 50% of patients are non-adherent to their prescribed medications (Baker et al.,

2018; Pouls et al., 2021; Rootes-Murdy et al., 2018; Schulze et al., 2019; Verloo et al., 2017;

Virgolesi et al., 2017) with rates of non-adherence increases to as much as 75% within 18

months (Basit et al., 2020). The results of medication non-adherence led to detrimental

outcomes for patients with noted increases in relapse, recurrent hospitalizations (Basit et al.,

2020; Najafi et al., 2016; Rootes-Murdy et al., 2018; Schulze et al., 2019; Uslu & Buldukoglu,

2020; Uslu & Buldukoglu, 2016; Verloo et al., 2017; Virgolesi et al., 2017) and increased

healthcare costs (Basit et al., 2020; Uslu & Buldukoglu, 2016; Verloo et al., 2017). Furthermore, medication non-adherence leads to noted increases in suicidal ideations and suicide attempts (Rootes-Murdy et al., 2018; Uslu & Buldukoglu, 2020) resulting in overall poor quality of life (Song et al., 2020; Uslu & Buldukoglu, 2016).

Intervention Efficacy on the Outcome

The intervention efficacy of improving medication adherence and providing patient support after discharge with telephonic follow-up is supported by all sixteen research articles (Baker et al., 2018; Basit et al., 2020; Flaherty et al., 2017; Najafi et al., 2016; Noel e al., 2020; Pouls et al., 2021; Rootes-Murdy et al., 2018; Sarayani et al., 2018; Schultze et al., 2019; Song et al., 2020; Tyler et al., 2019; Uslu & Buldukoglu, 2020; Uslu & Buldukoglu, 2016; Uslu et al., 2019; Verloo et al., 2017; Virgolesi et al., 2017). Results from the studies showed that the intervention group was significantly more likely than the control group to be adherent to medications at the sixth-month follow-up (Schultze et al., 2019; Song et al., 2020) and adherence was improved from baseline to the three-month follow-up in both the control and intervention group *(p*<0.01) after implementation of the intervention (Sarayani et al., 2018).

Additionally, both Uslu and Buldukoglu (2020) and Uslu and Buldukoglu (2016) found that after using the Telephone Intervention Problem Solving (TIPS) protocol for weekly follow-up calls to assess medication adherence, the intervention group had significantly higher adherence rates than the control group (*p*< 0.001) showing that telephonic follow-up calls have a positive impact on promoting medication adherence in patients suffering from psychiatric disorders along with improving problem-solving abilities, enhancing time spent in the

community, and in reducing psychiatric symptoms (Uslu et al., 2019). Telephone interventions

produced significantly positive outcomes when comparing pre-and post-test scores using the

paired samples t-test to assess medication adherence. When assessing the pre-and post-test

scores in the control group there was no difference between the scores *(p*=0.084), whereas the

intervention group showed a significant difference *(p*<0.05) (Najafi et al., 2016) with

participating patients being seven times more likely to adhere to medication (Noel et al., 2020).

Similarly, it was noted that 68% of patients in the intervention group reported a high level of

medication adherence after the intervention (Najafi et al., 2016) whereas a low level of

adherence was reported before the intervention was initiated with 100% of participants

reporting that the intervention was beneficial (Noel et al., 2020).

The intervention of telephonic follow-up was further validated by eight of the articles

(Baker et al., 2018; Basit et al., 2020; Flaherty et al., 2017; Pouls et al., 2021; Rootes-Murdy et

al., 2018; Tyler et al., 2019; Verloo et al., 2017; Virgolesi et al., 2017) for its overall positive

impact on improving medication adherence and relapse prevention. Telephone interventions

especially those that are nurse-led have been identified as being just as effective if not more

effective than traditional care interventions (Baker et al., 2018; Tyler et al., 2019; Verloo et al.,

2017) and those with ongoing staff follow-up are well equipped to address medication non-

adherence in patients with psychiatric disorders for reasons such as non-adherence related to

side effects (Basit et al., 2020). By having ongoing staff support side effects can be addressed,

counseling and education can be provided and support for appointments and activities can be

discussed (Basit et al., 2020; Schulze et al., 2019; Uslu & Buldukoglu, 2020; Uslu & Buldukoglu,

2016; Uslu et al., 2019) with telephone intervention being reported as a favorable strategy for improving medication adherence and preventing relapse among 50% of participants (Baker et al., 2018). The interventions itself of telephonic follow-up can be especially beneficial in improving medication adherence for rural populations (Tyler et al., 2019), those with mood disorders (Rootes-Murdy et al., 2018), older populations (Verloo et al., 2017), and in providing support for patients who have access to care barriers living in community settings (Baker et al., 2018; Basit et al., 2020).   In addition to improving medication adherence, the intervention of telephonic follow-up has been noted to reduce hospital readmission rates in patients with psychiatric disorders (Flaherty et al., 2017; Virgolesi et al., 2017). Patients with at least one medical hospitalization were significantly reduced with the use of a telehealth intervention *(p*<0.05) (Flaherty et al., 2017), and patient satisfaction was improved (Virgolesi et al., 2017). Telehealth interventions which are often multifaceted have been shown to promote medication adherence in a wide range of patient populations requiring long-term medication use even when standalone technologies such as phone calls are applied (Baker et al., 2018; Pouls et al., 2021) with participants answering daily questionnaires about medication adherence, depression, and suicidality 80% of the time showing an improvement in treatment engagement and enhanced involvement in their care throughout the intervention (Flaherty et al., 2017).

Call Structure and Time Frame   The intervention call structure and time frame are addressed in sixteen articles (Baker et al., 2019; Basit et al., 2020; Flaherty et al., 2017; Najafi et al., 2016; Noel et al., 2019; Pouls et al., 2021;

Rootes-Murdy et al., 2018; Sarayani et al., 2018; Schultze et al., 2019; Song et al., 2020; Tyler et al., 2019; Uslu & Buldukoglu, 2020; Uslu & Buldukoglu, 2016; Uslu et al., 2019; Verloo et al., 2017; Virgolesi et al., 2017) and ranges from weekly calls and bi-weekly calls to calls that had varying intervals. Likewise, the time frame for the interventions also ranged in longevity from eight weeks to twenty-four months. Weekly calls took place in four of the articles (Rootes-Murdy et al., 2018; Uslu & Buldukoglu, 2020; Uslu & Buldukoglu, 2016; Uslu et al., 2019) with the time frame for the intervention occurring over two months (Uslu & Buldukoglu, 2020), three months (Uslu & Buldukoglu, 2016) and in some cases for as long as six months (Rootes-Murdy et al., 2018).   Bi-weekly calls took place in two of the articles (Schulze et al., 2019; Song et al., 2020). The intervention in the article by Schultze et al. (2019) took place for six months, whereas the intervention in the article by Song et al. (2020) took place for three months. Both studies completed follow-up assessments to determine medication adherence at three and six months (Schultze et al., 2019; Song et al., 2020). Additionally, in one study the intervention occurred twice-weekly (Flaherty, et al., 2017). Whereas seven studies had variances in the intervention call structure ranging from seven days after discharge to twenty-four months with calls occurring weekly, bi-weekly, and at varying intervals (Baker et al., 2018; Basit et al., 2020; Najafi et al., 2016; Noel et al, 2020; Sarayani et al., 2018; Tyler et al., 2019; Verloo et al., 2017; Virgolesi et al., 2017).

Challenges with Continued

Participation   Challenges with continued

participation in the intervention were addressed in eight articles (Basit et al., 2020; Noel et al.,

2020; Rootes-Murdy et al., 2018; Schulze et al., 2019; Song et al., 2020; Tyler et al., 2019; Uslu & Buldukoglu, 2020; Uslu & Buldukoglu, 2016) and include the themes of patient dropout rates and nursing staff engagement. It has been noted that SMI itself is a barrier to participating in technology-based interventions despite most patients owning a mobile device (Basit et al., 2020), and substance misuse, unstable social relationships, and behaviors that inhibit recovery can contribute to barriers to intervention participation during intervention care transition (Tyler et al., 2019).

Rootes-Murdy et al. (2018) identified that dropout rates in most cases are low and when dropout does occur it is often attributed to issues with the technological device or for an unknown cause (Noel et al., 2020; Song et al., 2020). It was also found that patients are not always reachable at their scheduled call times and require additional attempts before the call is completed or the patient is removed from participating in the intervention (Schulze et al., 2019). The reasons why patients are unreachable were not readily addressed in any of the studies as having an identifiable cause.

Three of the articles (Tyler et al., 2019; Uslu & Buldukoglu, 2020; Uslu & Buldukoglu, 2016) discussed the challenges of continued participation from the staff and service level perspective. When considering the service level barriers, it was found that common barriers to successful intervention implementation are often attributed to inadequate funding, poor communication sharing, or poor planning for the implementation of the intervention (Tyler et al., 2019). Additionally, nursing staff often report feeling unprepared for telehealth roles in nursing and voice concerns about technological training, health policy (Uslu & Buldukoglu,

2016), and education (Tyler et al., 2019). There have also been concerns voiced about the

consideration of telenursing being a valid nursing practice, frustration around patient

participation in the intervention, and access to services (Uslu & Buldukoglu, 2020; Uslu &

Buldukoglu, 2016). Since the success of the intervention is heavily dependent on the staff's

opinions, behaviors towards the intervention, and willingness to be flexible with intervention

adoption and delivery these are other concerns that can impact the intervention's effectiveness

(Tyler et al., 2019).

Strategies to Overcome Implementation Challenges

Strategies to overcome challenges with implementation are equally as important as the

implementation itself and require close observation. Strategies to overcome implementation

challenges were identified in four articles (Schulze et al., 2019; Tyler et al., 2019; Uslu &

Buldukoglu, 2020; Uslu & Buldukoglu, 2016) and focus on follow-up protocols and education.

Schulze et al. (2019) developed a standard protocol for additional follow-up calls for patients

who did not answer at their respective call time whereas Uslu and Buldukoglu (2020) provide

participant education using Medication Adherence Training (MAT) which included training on

medication side effects, information, and medication solutions before participating in the TIPS

intervention. The training showed positive results in increasing medication adherence and

spoke to the benefits of the TIPS intervention as an effective strategy for improving medication

adherence over psychoeducation as a foundation for improving adherence (Uslu & Buldukoglu,

2020; Uslu & Buldukoglu, 2016). Education for nursing staff on technologies, skill development,

increased productivity, and recognizing telenursing as an equally meaningful nursing practice as

that of hands-on nursing care is essential to promote successful implementation of telenursing interventions (Uslu & Buldukoglu, 2016) as well as showing the intervention will decrease the nursing workload and identifying a champion staff member to advocate for the intervention (Tyler et al., 2019).

<div align="center">**Conclusions and Further Recommendations**</div>

Implications for Nursing Practice

Telephonic follow-up is an effective intervention in improving medication adherence among patients with psychiatric disorders and other chronic diseases who require long term medication follow-up. The intervention is cost-effective (Basit et al., 2020; Najafi et al., 2016; Rootes-Murdy et al., 2018; Uslu & Buldukoglu, 2020; Uslu & Buldukoglu, 2016), has the potential to alleviate readmissions associated with medication non-adherence (Flaherty et al., 2017; Virgolesi et al., 2017), and addresses a practice gap by providing support for patients after discharge from the inpatient psychiatric unit. The intervention of telephone follow-up can improve nursing practice and patient outcomes by increasing patient's confidence in the healthcare system by enhancing patient-nurse collaboration and increasing patient satisfaction (Virgolesi et al., 2017). The use of telephone follow-up bolsters medication adherence by reinforcing education and positive patient behaviors towards medication adherence. The impact for nursing practice is also noted in the fact that the medication adherence program provides nurses with a standardized approach to promoting medication adherence after discharge from the inpatient psychiatric unit through ongoing telephonic support. The ongoing telephonic support provides a collaborative approach between the patient and the nurse to

build a trusting relationship centered around medication adherence and that promotes the

intervention's use when needed to address medication adherence barriers. The combined

benefits of both nursing practice and patient outcomes led to a positive impact on the inpatient

unit with nursing staff and department leadership being able to show better results in patient

outcomes through ongoing telephonic support after discharge to address side effects, answer

questions, and intervene promptly when needed thus resulting in improved medication

adherence. The organization has also benefited from the implementation of the medication

adherence program by demonstrating organizational commitment to evidence-based practice

change to improve patient outcomes through enhanced medication adherence across the

healthcare system.

Furthermore, telephonic follow-up can significantly impact nursing practice by providing

an outlet to reach patients with access to care barriers who are unable to make it to routine

follow-up appointments and who may lack a support system in the community. With a

telephonic follow-up intervention, the nurse becomes a resource for the patient to provide

continued education, support, address side effects, assess medication adherence, overall mood,

personal content with hobbies and employment, and assess suicidal tendencies (Flaherty et al.,

2017; Schulze et al., 2019; Tyler et al., 2019). If a problem does arise the nurse can quickly

intervene to provide the patient with the support they need and reduce the potential for

further complications.

Recommendations for intervention effectiveness and sustainability include education

for the interdisciplinary team (nursing staff, providers, case managers) and the patient.

Although the nursing staff is the primary stakeholder in intervention implementation and will

be responsible for making the follow-up calls the intervention requires collaboration and

communication among all members of the department. All department members should have a

clear understanding of medication non-adherence significance, the intervention call structure,

and the goal of improved patient outcomes. Patients will also need to be educated on the

intervention before discharge, can ask questions, and sign an informed consent to participate.

To facilitate the intervention's sustainability the follow-up calls should be scheduled on

different shifts and different days of the week to minimize the nurse's workload and promote

shared responsibility and ownership of the intervention.

Conclusions and Contributions to the Professions of Nursing

A key finding of the integrative review is that telephonic follow-up has proven to be an

effective intervention for improving medication adherence in patients who have psychiatric

disorders (Baker et al., 2018; Basit et al., 2020; Flaherty et al., 2017; Rootes-Murdy et al., 2018;

Schulze et al., 2019; Tyler et al., 2019; Uslu, & Buldukoglu, 2020; Uslu & Buldukoglu, 2016; Uslu

et al., 2019; Virgolesi et al., 2017). In all the reviewed studies, it was noted that participants

who received routine follow-up calls had better medication adherence than patients who did

not receive routine calls and were part of the control group. Furthermore, the intervention

design has been validated by six of the studies (Najafi et al., 2016; Noel et al., 2020; Sarayani et

al., 2018; Song et al., 2020; Pouls et al., 2021; Verloo et al., 2017) as an effective intervention

for improving medication adherence among other patient populations with chronic diseases to

include arthritis, cardiovascular disease, diabetes, long term medication use, and for older adult

populations which speaks to the intervention's significance in improving patient outcomes across the healthcare system.

The call structure used in the reviewed studies varied with each study and ranged from weekly calls (Rootes-Murdy et al., 2018; Uslu & Buldukoglu, 2020; Uslu & Buldukoglu, 2016; Uslu et al., 2019), bi-weekly calls (Schulze et al., 2019; Song et al., 2020), to calls that ranged in interval anywhere from seven days after discharge to varying intervals of time with calls occurring weekly, bi-weekly and at staggered intervals (Baker et al., 2018; Basit et al., 2020; Najafi et al., 2016; Noel et al, 2020; Sarayani et al., 2018; Tyler et al., 2019; Verloo et al., 2017; Virgolesi et al., 2017). The time frame for intervention implementation in the studies varied with common intervention time frames ranging from two months (Uslu & Buldukoglu, 2020), three months (Najafi et al., 2016; Song et al., 2020; Uslu & Buldukoglu, 2016), six months (Rootes-Murdy et al., 2018; Schulze et al., 2019) and in one study for as long as 24 months (Baker et al., 20218). There was not a remarkable difference noted in improved patient outcomes based on the call structure used in the studies. The reviewed studies had slight variations in their statistical data based on the analytic method used with the studies showing a positive impact on improving medication adherence in patients who participated in a telephonic intervention.

Another note worth finding is the cost-effectiveness of telephonic interventions which can have a significant impact on improved nursing practice. The utilization of telephonic follow-up is relatively inexpensive (Basit et al., 2020; Najafi et al., 2016; Rootes-Murdy et al., 2018; Uslu & Buldukoglu, 2020; Uslu & Buldukoglu, 2016) and provides the opportunity to reach rural

populations (Tyler et al., 2019) to improve medication adherence for patients that without such

an intervention may be subject to access to care barriers. The exact cost was discussed in one

of the studies as being as low as $239.50 per patient for weekly calls over 52 weeks not

including overhead costs (Basit et al., 2020). The other studies mentioned the intervention's

cost-effectiveness but did not elaborate on a specific dollar amount.

Additionally, outside of the telephonic intervention addressing medication adherence it

also provides an outlet for patient education on side effects, overall mood, personal content

such as employment and hobbies, and suicidal tendencies (Flaherty et al., 2017; Schulze et al.,

2019; Tyler et al., 2019). By having this extra layer of support after discharge the nurse can

easily intervene if a problem does arise by notifying the psychiatrist, initiating a wellness check,

and directing the patient to go to the emergency room. This extra support is particularly helpful

in cases where the patient is expressing suicidal ideations. In conclusion, having a telephonic

intervention in place may minimize further complications and prevent poor patient outcomes.

Recommendations

Throughout the research studies, there were several noted themes with study

limitations, nursing staff education, and further research that are being recommended based

on findings from completing the integrative review. A commonly identified limitation in the

reviewed studies was that of small sample sizes which impede the ability to gather conclusive

evidence (Baker et al., 2018; Flaherty et al., 2017; Najafi et al., 2016; Song et al., 2020; Tyler et

al., 2019; Verloo et al., 2017; Virgolesi et al., 2017). Another limitation was the length of time

that implementation follow-up occurred. The studies did not complete follow-up assessments

after 24 months. As it currently sits medication adherence has proven to be effective for short

periods (24 months or less), but little is known about the long-term results of telephonic

interventions in improving medication adherence. Two of the studies (Uslu & Buldukoglu, 2016;

Tyler et al., 2019) identified that nursing staff can have reservations about telemedicine

interventions and their applicability to nursing practice which requires the need for nursing

education before telephonic interventions can take place. Cost-effectiveness was also

mentioned in five of the studies (Basit et al., 2020; Najafi et al., 2016; Rootes-Murdy et al.,

2018; Uslu & Buldukoglu, 2020; Uslu & Buldukoglu, 2016) but there was little discussion on the

actual costs associated with a telephonic intervention versus traditional care. The reviewed

studies used patient questionnaires to assess medication adherence. It was noted by Schulze et

al. (2019) that using pill counting or serum medication levels might be a more precise strategy

to assess medication adherence among populations with psychiatric disorders and could be a

beneficial addition to include in future research studies.

Recommendations for future research should include larger sample sizes, longer follow-

up period beyond 24 months, nursing staff education, cost-effectiveness, and considerations

for alternative methods of assessing medication adherence. By having larger sample sizes there

is the opportunity to capture more specific diseases and more diversity within the selected

sample population regarding demographic data. Having longer follow-up periods allows for a

more accurate assessment of the long-term benefits of telephonic interventions on improving

medication adherence for patients with psychiatric disorders as well as patient populations

with other chronic diseases that require long-term medication follow-up which can further

impact patient outcomes. By assessing associated costs, it will provide organizational leadership with information for department budgets and potential revenue that can be generated from improved patient outcomes through implementing an evidence-based practice strategy in the clinical setting.

Nursing staff education is another recommendation that is geared towards department leadership and policy development. It is recommended that a clearly articulated policy for nursing staff education should be developed to provide guidelines for the nursing staff and to promote the intervention's sustainability. The nursing staff needs to feel well prepared to implement the telephonic intervention and see the intervention as a beneficial strategy to improving patient outcomes. Nursing staff education should include information on the significance of medication non-adherence, the utilized call structure for intervention implementation, training on the assessment tool that will be used to measure medication adherence, the informed consent process for patient participation, and the plan for dividing the call schedule up between shifts to minimize the nursing staff's workload. During the education offerings information on the value that a medication adherence program with telephonic follow-up has in reducing repeated readmissions related to non-adherence should be presented (compatibility). Simple handouts on the call structure and MARS with instructions are provided to the nursing staff (complexity). Using the implementation time frame as an opportunity to trial the intervention before confirmation that it is a sustainable innovation should also be presented (trialability). The paired-samples t-test analysis is recommended to show the rate at

which medication improvement occurs by using the medication adherence program with

telephonic follow-up (observability).

Furthermore, through completing the integrative review to address the intervention of

implementation of a medication adherence program with telephonic follow-up it was

discovered that the process of implementing this intervention with the use of the MARS as the

assessment tool has allowed for the determination of patients at high risk for non-adherence to

medications and can aid in preventing readmissions through providing routine follow-up care to

patients after discharge. Future research should further explore the use of the MARS and its

results in determining high risk patients and preventing readmissions.

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Appendices, Tables, and Figures

Appendix A

Article #	Author & Date	Evidence Type	Sample, Sample Size & Setting	Study findings that help Answer the EBP Question	Observable Measures	Limitations	Evidence Level & Quality
1	Flaherty et al., 2017	RCT sub analysis	**Sample:** Veterans with schizophrenia or schizoaffective disorder **Size:** 51 participants, 25 in intervention group **Setting:** VA outpatient	Twice weekly phone calls from nurses for VA standardized level of care. In addition, the intervention group received Intensive Case Monitoring (ICM) with the daily queries about depression, SI, medication adherence. Participants in the intervention group were significantly less likely to have a hospitalization 5.0% versus 32.0% in the control group. Increasing connections between providers and patient increased treatment adherence.	Mini Mental Status Exam (MMSE), Beck Sale for Suicidal Ideations (SSI), Hamilton Depression Rating Scale (HAMD). Daily queries.	Intervention completion rates might account for difference in hospitalization.	Level I B Good quality

| 2 | Najafi et al., 2016 | RCT | **Sample:** Adults with first time MI

Size: 100 participants

Setting: Outpatient | Nurse-led telephone calls for a total of 12 weeks. Twice a week calls for the first four weeks, once a week for the next for weeks and bi-weekly for the last four weeks. The intervention significantly increased medication adherence. When assessing the pre-and post-test scores in the control group there was no difference between the scores *(p*=0.084), whereas the intervention group showed a significant difference *(p*<0.05) with the mean difference showing 4.08 (SD=0.367) and 0.34 (SD=0.192). | The Morisky's 8-item Medication Adherence Questionnaire (MAQ) was administered before the intervention and three months after to determine medication adherence. | Small sample size and short follow-up period. | Level I
A High quality |
| 3 | Noel et al., 2020 | RCT | **Sample:** Adult pages age 30 or older with two or more chronic diseases

Size: 102 participants

Setting: Outpatient | Telehealth intervention for 12 months used to provide remote patient monitoring and weekly video visits to assess hospital readmissions and emergency room | REDCap electronic data to store information on medication adherence. | Study was underpowered to evaluate hospital readmissions and ED utilization. | Level I
A High quality |

			post hospital discharge	utilization. Secondary outcomes were to assess access to care, medication management and adherence to patient engagement. Telehealth patients were 7 times more likely to be adherent to medication. First follow-up took place 7-10 days after discharge. Patient provided with a telehealth tool kit for daily monitoring and had weekly virtual visits with a telehealth physician. During visits medication reconciliation took place and medication adherence was assessed with education. . The results of the study showed that Telehealth provides a safe transition of care, increases satisfaction and improved medication adherence. Secondary data			

				captured with phone survey. Mediation reconciliation and medication adherence was collected during the virtual visits and stored in REDCap Results showed (OR = 6.925, 95% CI: 1.2–39.9, p = 0.03) and 100% of patients reported the intervention was beneficial.			
4	Sarayani et al., 2018	RCT	**Sample:** Adult patients with diabetes **Size:** 100 participants **Setting:** Outpatient	Pharmacist based telephone intervention to improve medication adherence in type 2 diabetic patients. Assessment was performed at baseline, 3 months after intervention and at 9 months for a follow-up. Participants received 16 calls total. The calls were broken down by two calls per week for the first month, one call per week for the second and third months. During the trial the	Morisky Medication Adherence questionnaire measure medication adherence.	Study population was motivated and most likely already prepared to adjust their lifestyle.	Level I A High quality

				intervention group showed a significant improvement in medication adherence at 3 months. Adherence was maintained at the 9-month follow-up. The final results of the study showed that using telephone interventions are effective in improving medication adherence at short and mid-term follow-up intervention periods.			
5	Schulze et al., 2019	RCT	**Sample:** Adult patients with schizophrenia & bipolar disorder **Size:** 120 participants **Setting:** Outpatient	Telephone call intervention to improve medication adherence in patients with severe mental illness. Patients were 18 or older with schizophrenia and bipolar disorder taking antipsychotic medication are the study's focus. Telemedicine via telephone can deliver low threshold support to patients	Medication adherence was measured using the Medication Adherence Rating Scale (MARS).	Possible alternatives could be measuring adherence with pill counting, measuring serum antipsychotic levels and electronic monitoring might be more objective but are also more invasive.	Level I A High quality

				who are otherwise at risk for nonadherence after 6 months. Calls took place every second week after discharge from an inpatient unit for 6 months. A logical regression analysis of the two groups showed the odds ratio (OR) was 4.11 with a 95% confidence interval (CI) (95% CI=1.47-11.45, p=.007).			
6	Song et al., 2020	RCT	**Sample:** Adults with rheumatoid arthritis (RA) **Size:** 92 participants **Setting:** Outpatient	12-week long tailored telehealth education intervention for medication adherence and disease activity facilitated by nursing staff. Education content consisted of knowledge about disease, treatment goals, importance of medication adherence, and side effect management. Calls took place at the 2nd, 4th, 8th and	Medication adherence was measured by the Chinese version of the Compliance questionnaire Rheumatology (CQR) 19-item instrument.	All participants were recruited from the tertiary hospital in Southwest China-may have limited generalizability. Although the study was conducted in China with a limited sample size the results mirror other studies that have been conducted in the United States and	Level I B Good quality

				12th week after the patient was discharged. Data was collected at 12 weeks and 24 weeks during outpatient visits. At both assessment periods medication adherence was significantly higher in the intervention group- 12 week (t=-2.528, p=.014), 24 week (t=-2.073, p= .042). Effect size on medication adherence was 0.58 (95% Cl: 0.12,1.03).		Internationally. Medication adherence was not assessed at baseline.	
7	Uslu, & Buldukoglu, 2020	RCT	**Sample:** Adults with schizophrenia diagnosis **Size:** 46 participants **Setting:** Outpatient	Weekly phone calls using Telephone Intervention Problem Solving (TIPS) in patents who have schizophrenia to improve medication adherence for two months follow up. Results showed significant improvement in continuing medications and in the belief of their necessity. The MARS was administered	Medication Adherence Rating Scale (MARS) pre/post intervention.	Limited within the scope of a doctorate thesis, intervention and interview conducted by the same researcher with no blinding.	Level I A High quality

				pre-and post-intervention for a comparison.			
8	Virgolesi et al., 2017	Experimental Prospective correlation design	**Sample:** Adults with chronic disease/bipolar disorder or schizophrenia **Size:** 135 participants **Setting:** Outpatient	Nurse training occurred before implementation. Within 7-10 days from discharge a telephone call was made to the patient by the same nurse who completed the discharge interview. Each follow-up call consisted of questions about medication and its effects, emphasis of taking. The frequency of follow-up calls varied with the patients' needs and availability. The purpose of calls was to remind patient of appointments, provider instructions and to evaluate adherence by administering the MMAS-4. The results showed that patients who participated in the follow-up intervention were	Morisky Medication Adherence Scale (MMAS-4) , Satisfaction with information about Medicine Scale and General Satisfaction Questionnaire.	Small sample size.	Level II B Good quality

				more likely to be adherent to treatment and had reduce hospital readmissions. The results of the MMAS-4 (M) and Satisfaction with Information about Medication Scale (SD) are as follows: women/men adherence-(m=2.93, SD=1.27 vs. M=2.79, SD=0.97). married/single-(M 3.31, SD=0.97 vs. 2.76,SD=1.15), higher education/lower education- (M=2.94, SD=1.03 vs. m=2.75, SD= 1.03). significant improvement was seen in those who are married (p=.018).			

Appendix B

Systematic Reviews Evidence Table

<td colspan="8" align="center">Johns Hopkins Nursing Evidence-Based Practice Appendix G Individual Evidence Summary Tool </td>
Article #	Author & Date	Evidence Type	Sample, Sample Size & Setting	Study findings that help Answer the EBP Question	Observable Measures	Limitations	Evidence Level & Quality
1	Basit et al., 2020	Systematic Review of RCTs (meta-analysis)	**Sample:** Adult patients with schizophrenia, bipolar disorder & depression **Size:** 17 RCT articles	Low, medium and high intensity studies were reviewed that used text messaging, telephone calls, remote monitoring and video	Cost. PRISMA diagram of study results.	Only two major databases were searched. This could have caused unintentional exclusion of	Level I A High quality

				conference. The high intensity studies used phone calls as the primary intervention with consistent staff follow-up. High intensity studies had the best results in improving medication adherence with an intervention range from 3-12 months. Phone delivery is in-expensive.		other articles. Non-English journals were excluded. Jaded score showed more than half of the studies were low quality.	
			Setting: Outpatient				
2	Pouls et al., 2021	Systematic Review of RCTs (meta-analysis)	**Sample:** Adult patients with long-term medications **Size:** 21 articles, minimum 50 participants per article. **Setting:** Outpatient	Use of eHealth telemedicine intervention to improve medication adherence in adult patients taking long term medications. Evaluated 21 different eHealth including phone calls. Follow-up took place for at least a six-month period. 17 articles using phone calls, text messaging or mobile apps showed significant improvement in adherence using	Table 1 shows intervention, outcome and description of intervetion. All interventions took place for six months or less.	Limited to medication adherence outcomes and did not include other outcomes.	Level I B Good quality

				intervention. Six of these articles used a phone call only intervention. Call consisted of counseling and support. The study showed that eHealth measures that used calls, text messages or mobile apps provided the best evidence to support positive effects on tele-feedback for adherence. Final conclusion found that eHealth interventions with calls or text messaging can be beneficial in a wide variety of patient populations.			
3	Uslu & Buldukoglu, 2016	Systemic Review of RCTs (meta-analysis)	**Sample:** Adults with schizophrenia **Size:** 6 articles **Setting:** Outpatient	TIPS was used as the intervention for assessing medication adherence weekly. The time frames for the intervention varied from six weeks to six months.	MARS pre/post intervention. Intervention showed an 80% medication adherence rate compared to 60.1% in the control group.	Articles in language outside of English and one Turkish were excludes. Six data based used and grey literature was not included. Small sample size.	Level I A High quality

| 4 | Uslu et al., 2019 | Systematic Review of RCTs (meta-analysis) | **Sample:** Adults with schizophrenia

Size: 350 participants in 6 studies

Setting: Outpatient | TIPS was used as a telephone intervention to improve medication adherence in adults with schizophrenia. The intervention range took place from six weeks to nine months in the studies. Small sample size but the effect of intervention was so high the studies power was 100%. Authors are subject matter experts. | Standardized question protocol. | Limitations addressed in each study. Small sample size was one of them, but results were notable. | Level I
A High quality |
| 5 | Verloo et al., 2017 | Systematic review of RCTs and CCTS (meta-analysis) | **Sample:** Discharged older adults with numerous medications

Size: 2,028 participants from 14 studies

Setting: Outpatient | All studies included nurses. 7 were nurse led. 7 were nurse collaborated. Majority of nurse-led interventions involved comprehensive assessments of medication at home visits, verbal advice, medication education, written factsheets, care plans, medication schedules, verbal and written reminders by phone and using | Validated measurements to measure adherence were completed using the Brief Medication Questionnaire (BMQ), Medication Adherence Scale, Medication Error Rating, Medication Possession Rating, Modified Centre for | Many studies did not provide sufficient detail to gain a precise assessment of the risk of bias, or exact nature, frequency and duration of the intervention. Care as usual was not always described in detail. | Level II
B Good quality |

				electronic devices. Participants received discharge planning and education to improve medication adherence before discharge. Nurse collaborated interventions included pharmacist/physician education on medications, aid of electronic device for weekly. telemonitoring, daily ECG, weights, medication organizers and electronic patient reminders. Interventions took place from 1 month to 12 months. . Telephone call follow-up varied from weekly, monthly, three-monthly contacts. It was found that in nurse-led and nurse collaborated interventions showed medication adherence was	Adherence Support Evaluation (CASE). PRISMA Guidelines.		

				higher in the intervention group.			
6	Baker et al., 2018	Systematic review of a combination of RCTs and experimental studies (meta-analysis)	**Sample:** Adult patients with psychiatric disorders **Size:** 20 trials total, 13 RCT, 3 specifics to medication-adherence **Setting:** Outpatient	Medication adherence was improved with telephone intervention. One of the three RCT showed a 50% outcome in favor of the telephone intervention. The study also discussed relapse prevention and behavioral health management.	Study tables 1 & 2 outlined outcome for each article. The MARS was used in some.	Modest sample of heterogeneous studies. Differences in outcome assessment, intervention and comparison conditions precluded meta-analysis. Uncontrolled studies with less than half being RCTs.	Level III B Good quality
7	Rootes-Murdy et al., 2018	Systematic Review of a combination of RCTs and nonexperimental (observational) studies	**Sample:** Adult patients with mood disorders **Size:** 9 studies including 1 RCT **Setting:** Outpatient	Mobile technologies including phone calls, text messages, mobile surveys and application reminders improve medication adherence in patient with mood disorders. Both studies that focused on phone calls as the intervention used weekly calls which were measured by the Morisky Medication Adherence Scale	Morisky Medication Adherence Scale (MMAS) pre/post intervention.	Most studies were observational design.	Level III B Good quality

				(MMAS). All studies targeted clinical outcomes with medication adherence, appointment follow-up and mood.			
8	Tyler et al., 2019	Systematic review and narrative synthesis of RCTS and experimental studies (meta-analysis)	**Sample:** Adult patients with mental illness including schizophrenia **Size:** 45 articles **Setting:** Outpatient	Review assessed Critical Time Intervention, Transitional Discharge Model. Other key interventions including contact-based support with telephone calls, face-to-face, video. Primary goal with contact-based intervention-reduce suicide, increase treatment adherence and reduce readmissions. Early telephone follow-up is effective in large scale RCTs, small RCT showed it effective in decreasing suicidal ideations and improving relationship with professionals. useful in improving	Narrative synthesis due to heterogeneity sample. PRISMA Guidelines.	Less restrictive search strategy resulting in broad aim and varying studies.	Level III B Good quality

				adherence especially in rural populations.			