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Medication Non-Compliance: Compliance to Psychotropic Medications within Community Mental Health

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Community Mental Health

By

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We the undersigned committee, having examined the submitted doctoral research project, "Medication Non-Compliance: Compliance to Psychotropic Medications within Community Mental Health" by Emily E. DePetro, M.S. hereby indicate its unanimous approval.

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Abstract

Medication Non-Compliance: Compliance to Psychotropic Medications within

Community Mental Health

by

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According to the American Psychological Association (2019),

approximately 25% of the adult US population has a mental illness. The cost to

individuals as well as the United States government is significant, as it has been

found that approximately 100-300 billion dollars spent annually are attributed to

medication non-compliance (Iuga & McGuire, 2014). There has been significant

research completed with regards to medication non-compliance within specific

populations including individuals afflicted with Schizophrenia and Bipolar

Disorder. However, there is a significant gap in the literature regarding

psychotropic medication non-compliance in the general mental health outpatient

population, as well as with regards to the barriers to compliance with psychotropic

medication.

The present study sought to identify which factors including: Forgetting,

Adverse Side Effects, Financial Reasons, Religious Reasons, History of Addiction,

Unsure if Medications are Working, and Inconvenience: significantly increase

medication non-compliance in the general outpatient mental health population. The survey utilized in this study was used to identify medication non-compliance and its factors within the local population. The survey was disseminated to two local community mental health outpatient clinics and participants (n=195) were asked to provide information regarding medication compliance behaviors. Results of the study found that no individual factor significantly predicted medication non-compliance F (8,89) = .90, p= .52.

Adverse Side Effects and Forgetting, on the other hand, were found to be more likely than other factors to predict the non-compliance. It was also found that Adverse Side Effects were found to be significantly more likely to result in the individual terminating their medication usage without first consulting their medication provider F (8,63) = 3.46, p<.002, with an R_2 of 0.31. Contrary to the hypothesis, no significant difference was found between individuals' medication non-compliance and the inclusion of a prescribed antipsychotic medication (M = 0.63, SD= 0.49; M=0.5, SD = 0.58). Despite inconsistent results, it is noted that Adverse Side Effects is recognized as a factor that is significantly likely to influence individuals terminating their medication usage without consulting their provider. It is also beneficial to acknowledge that Forgetting and Adverse Side Effects are likely to be target factors for preventative action to be taken by medication providers. Future studies may add to this literature by examining the

efficacy of preventative measures on medication non-compliance factors such as

Forgetting and Adverse Side Effects.

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Medication Non-Compliance: Compliance to Psychotropic Medications within

Community Mental Health

The American Psychological Association reported that approximately one in four, or 25% of U.S. adults have a mental illness. It was further reported that nearly 50% of U.S. adults will develop a mental illness within their lifetime (American Psychological Association, 2019). Of those suffering, less than half, or 19.2 million individuals received mental health treatment, which consists of either inpatient or outpatient treatment/counseling, and/or the use of prescribed psychotropic medication (NAMI, 2017). Medication non-compliance amongst mental health patients, especially those with serious mental illness such as schizophrenia, is the most frequent reason for rehospitalization in a mental health facility (Sullivan, Wells, Morgenstern, & Leake, 1995). Between 100-300 billion dollars of avoidable healthcare costs have been attributed to medication non-compliance in the United States annually (Iuga & McGuire, 2014). Avoidable costs include such things as misplaced resources, unemployment, absence from work, and premature mortality are associated with medication non-compliance in mental health patients (Semahegn et al., 2018). In fact, approximately 26% of homeless adults staying in shelters are living with a serious mental illness (Khadduri & Culhane, 2011). It has also been found that approximately 20% of state prisoners and 21% of local jail prisoners have a history of a mental health condition (Glaze & James, 2006). A startling statistic indicates that more than 90% of individuals who

die by suicide show symptomatology of a mental health condition (Isometsa, 2001).

This is even more concerning when recognizing that the National Institute of

Mental Health (NIMH; NIMH, 2019) stated in 2018 that suicide is the 10th leading

cause of death in the U.S., and it is the 2nd leading cause of death for individuals

who are between the ages of 10-34. This significant impact of mental health

problems in the U.S. can be mitigated through the use of medication and mental

health treatment compliance.

Psychotropic Medication Non-Compliance

Research has shown that the clinical non-attendance rate in mental health

treatment is twice that which is seen in most other medical specialties (Adeponle,

Baduku, Adelekan, Suleiman, & Adayemi, 2009). This is disturbing, when

considering that individuals who attend their mental health appointments are found

to be significantly more likely to comply with their psychotropic medications, than

those who do not or do so inconsistently (Joe & Lee, 2016). It has been also found

that individuals diagnosed with major psychiatric disorders tend to be the most

non-compliant with their psychotropic medication. One suspected cause of this is

that individuals who suffer from major psychiatric disorders tend to have impaired

reasoning skills and insight (Semahegn, et al., 2018).

A combination of psychotropic medication and psychotherapy is the most

efficacious form of treatment for mental health problems; however, there is still

significant concern with the lack of medication compliance amongst mental health

patients. It has been estimated that after a period of six months, more than 50% of individuals diagnosed with a chronic illness do not take their medication as prescribed (World Health Organization, 2003). For psychotropic medication to provide the individual with the greatest benefit, the individual needs to take the medication at the correct time, for the prescribed amount, and complete the full course of medication treatment (Chapman & Horne, 2013). If the individual is not taking their medication as prescribed and does not adequately report this to their prescribing physician, the physician is then likely to prescribe unnecessary increases in medication dosage, changes within the patient's medication, addition of supplementary medication, or the mistaken labeling of the patient as being "treatment resistant" (Velligan et al., 2003). For instance, research has found that only 67% of individuals diagnosed with Major Depressive Disorder achieve full remission of symptoms after one year of treatment (Lam, 2011). However, what is not included in that statistic is the compliance level of those individuals with their medications.

When discussing compliance, it is important to understand the origin of the word. Compliance was derived from the Latin word, *complere*, which means to fulfill or complete an action or to fulfill a promise (Complere, n.d.). Therefore, when one is *medication* compliant, it indicates that the individual is completing the action of consuming their medication to continue the stated and expected treatment. From the original definition of complere, it could also be interpreted that the patient

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is fulfilling the promise to one's medical provider to continue and complete the prescribed treatment. However, for the purposes of this paper, medication compliance will refer to an individual effectively fulfilling the action of medication completion, as prescribed by one's provider, including dosage amounts, frequency, and duration. It should also be noted, throughout this paper, the terms compliance and adherence will be used interchangeably.

Definition of medication non-compliance. A variety of different operational definitions have been utilized for research dealing with psychotropic medication non-compliance. These include: (a) failure to take any medication, (b) taking a different dose than prescribed, and (c) premature termination of a medication (Breen & Thornhill, 1998). Other studies have identified non-compliance as individuals taking only half or less than half of their prescribed medications (Nageotte, Sullivan, Duan, & Camp, 1997), not taking medication as prescribed (Bennet et al., 2013), having a pharmacy refill rate of 50% or less, (Rosack, 2014) or a set of high risk behaviors with regard to taking medication (Mahone, 2004).

Therefore, the following was considered to be most pertinent of the above definitions; the premature termination of medications, taking half or less than half of medications, not following dosage guidelines, and/or a set of high-risk behaviors with regard to taking medication. As a result, the operational definition for measuring psychotropic medication non- compliance from here forward will be: a

set of high-risk behaviors comprised of the following characteristics: not following dosage guidelines, talking half or less than half of prescribed medication, or choosing to prematurely terminate medication usage.

Diagnosis-Specific Medication Non-Compliance

  Schizophrenia disorder. Patients diagnosed with schizophrenia is one of the more widely researched disorders, in terms of medication compliance (Joe & Lee, 2018). For example, a study based on former psychiatric inpatients from rural Mississippi, comprised of all African- American males diagnosed with schizophrenia found that out of 202 individuals, 47% were found to be non-compliant, with non-compliance measured as individuals who missed taking their medication more than once or twice in the three-month period of the data collection portion of the study. (Nageotte et al., 1997). These compliance data were gathered not only through self-report, but also through their family members verifying the validity of the report. The most salient reasoning for non-compliance for this population was a disbelief/denial of having a mental illness, and not having participated in outpatient care at the community mental health center for the past three months (Nageotte et al., 1997).

  In looking at the reasoning in which individuals with schizophrenia choose to not comply with their medication regimes, there are multiple contributing factors for consideration, including but not limited to: stigma, culture, and attitudes towards medication. A study completed in India aimed to identify the relationship

between the attitudes towards medication and the reasons for non-compliance with their medication used to treat their schizophrenia (Chandra, Kumar, Reddy, & Reddy, 2014).). The researchers utilized a psychological instrument, the Positive and Negative Symptoms Scale (PANSS) to assess the severity of the schizophrenia in the participants (Chandra et al., 2014). Understanding of medication compliance was assessed through the use of the 20-item Rating of Medical Influence scale (ROMI). Analyzing the results of this data found that of 105 patients with schizophrenia, 41.9% were found to be non-compliant with their medication. The results of this study indicated that factors such as younger age, unemployment, younger age at the onset of illness, and higher scores on the PANSS significantly increased the likelihood of the occurrence of medication non-compliance (Chandra et al., 2014).

Byerly et al. (2005) examined the accuracy of clinician rating antipsychotic medication compliance in patients with schizophrenia through the use of an electronic monitoring source of medication compliance. This study was comprised of 25 adult participants that met the diagnostic category for schizophrenia or schizoaffective disorder utilizing the Diagnostic and Statistical Manual of Mental Disorders IV- Text Revision (DSM- IV- TR), and who were receiving outpatient care from Dallas mental health clinics. Also incorporated in the inclusion criteria was at least one hospitalization or psychiatric emergency room visit within the past two years (Byerly et al., 2005). The subjects were given a Medical Event

Monitoring System (MEMS) cap for each of their prescribed antipsychotic medications, and each time the medication bottle was opened, the monitoring system produced a recorded date and time that would be printed out at the end of the month. This data collection was a three-month period and non-compliance for this study was declared when the individual was found to have opened the medication bottle less than 70% of the prescribed medication times for each month. During this assessment, the clinician would ask the participants information about their medication compliance, and then rate each subject on the Clinician Rating Scale, which is an ordinal scale of 1-7, with the higher numbers indicating stronger compliance to medication. At the end of the three-month period, the MEMS data and the Clinician Rating Scale data for each participant was obtained and recorded. It was found that 48% of the subjects were found to be non-adherent to their medication regime as recorded by the MEMS cap, whereas 0% of subjects were found to be non-adherent by the clinician (Byerly et al., 2005). This study indicated the likelihood of a significant overestimation of clinician's ability to measure medication compliance in their patients. This then leads to the question, why do individuals continue to not adhere to their medication regimes?

Bipolar disorder. Individuals suffering from Bipolar Disorder often are non-compliant with their prescribed medication regimes during the maintenance treatment of their disorder (Li, Chen, Qiu, & Yang, 2014). It has been found that approximately half of the individuals diagnosed with Bipolar Disorder are non-

compliant with long-term treatment with no significant distinction as to whether they are prescribed mood stabilizers or antipsychotics (Chakrabarti, 2016). Bipolar Disorder medication non-compliance is a salient issue, as suicide attempts occur in 25-50% of patients diagnosed with Bipolar Disorder (Berk et al., 2010). In fact, Gonzalez-Pinto et al. (2006) found that patients who were non-adherent to their medication, Lithium, were 5.2 times more likely to attempt and complete suicide than those who were medication compliant.

Mood disorders, such as Major Depressive Disorder, Bipolar Disorder, and Dysthymic Disorder have been found as the third most common cause of hospitalization for U.S. individuals aged 18-44 years old (Agency for Healthcare Research and Quality, 2009). Bipolar Disorder is often found to be comorbid with substance abuse, anxiety disorders, and personality disorders. Furthermore, significant non-compliance that occurs with individuals diagnosed with Bipolar Disorder often results in skewed research of the efficacy of future treatments for this disorder (Berk et al., 2010).

Rahmani, Ebrahimi, Ranjbar, Razavi, and Asghari (2016) reported that nine out of ten individuals diagnosed with Bipolar Disorder think about quitting their treatment, and at least one of these 10 individuals consider giving up mental health treatment entirely during his/her lifetime. They also reported that at least 1 out of 3 individuals with Bipolar Disorder does not take more than 70% of the prescribed medication, resulting in treatment failure, and an overall declining prognosis. As a

result of this information, a study was conducted by Rahmani et al., (2016) to identify the efficacy of psychoeducation on medication compliance in Bipolar Disorder individuals. This study was comprised of 72 individuals, ages 18-50, who were diagnosed as suffering from Bipolar Disorder I. These individuals were then placed either in the experimental group (n=38) or the control group (n=38). Those in the experimental group received 10 continuous 90 minute sessions of psychoeducation on medication compliance twice per week. Those in the control group did not receive any psychoeducation. The results of the study indicated that there was a significantly higher medication compliance level in those in the experimental group in comparison with those in the control group (Rahmani et al., 2016). Therefore, providing clients with psychoeducation with relation to both their medications and their disorder proves to be more efficacious in their psychotropic medication compliance.

Another study conducted by Li, Chen, Qiu, and Yang (2014), sought to identify medication compliance and rehospitalization rates of 210 participants with Bipolar Disorder, one and two years after their initial psychiatric hospital visits. It was found that at one year post-discharge, 59% of the participants were considered non-compliant with their medication. At two-years post-discharge, 64.3% of participants were considered non-compliant. It was also found that the reoccurrence, or rehospitalization rates at the one-year and two-year follow up were, 42.4% and 61%, respectively (Li, Chen, Qiu, & Yang, 2014). This indicates a

positive relationship between medication non-compliance and rehospitalization

rates for individuals with Bipolar Disorder, therefore likely resulting in significant

costs, manpower, and overall distress that perhaps could have been avoidable with

medication compliance.

Developmental disorders. Unlike schizophrenia, a population that has not

received a significant amount of research attention are the individuals who are co-

morbidly diagnosed with those developmental disabilities and mental illnesses

requiring psychotropic medication. Over 7.5 million individuals in the United

States are affected by a developmental disability (Tan et al., 2015). A

developmental disability is considered to be a group of chronic conditions that

develop from birth to the age of 22 years-old, which can impair physical, cognitive,

communication, behavioral or learning development (Rubin & Crocker, 1989). The

Diagnostic Statistical Manual of Mental Disorders Fifth Edition (DSM-5), refers to

developmental disabilities as Neurodevelopmental Disorders. The DSM-5 states:

The disorders typically manifest early in development, often before the child enters

grade school, and are characterized by developmental deficits that produce

impairments of personal, social, academic, or occupational functioning (p.71,

American Psychiatric Association, 2013).

It has been found that 31-41% of the developmental disability population

suffer from mental illness, therefore resulting in this population having four times

the prevalence rate of mental illness compared to that of the general population

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(Tan et al., 2015). Another distinction of the developmental disability population in comparison to the general public is that the individuals in the developmental disability population often rely on their caregivers to provide them with their medication. Therefore, this adds another confounding variable to the compliance of medication, due to the decision-making often being done for the individual by another person (Tan et al., 2015).

In a study comprised of 3,905 individuals co-morbidly diagnosed with developmental disability and mental illness who were prescribed psychotropic medication, it was found that 25.7% (approximately 976 individuals) were non-compliant with their medication (Tan et al., 2015). It was also found that significant barriers to psychotropic medication non-compliance included being female, belonging to a minority race, suffering from gastroesophageal reflux disease (GERD), and enrollment in a capitated health plan (Tan et al., 2015).

Substance use disorder (SUD). It has been found that individuals who have a co-morbid psychiatric diagnosis(es) and a substance use disorder (SUD) are found to be significantly less compliant with their medications, in comparison to those individuals without a SUD (Herbeck et al., 2010). The Substance Abuse and Mental Health Services Administration reported in 2015 that there are approximately 20.2 million adults in the U.S. who have experienced, or are living with a SUD. Of those, 20.2 million, approximately 50.5%, or 10.2 million adults also suffered from a co-occurring mental illness. With regard to research, there has

been a significant focus on the relationships between cannabis use and medication compliance in individuals experiencing their first episode of schizophrenia. However, despite the numerous studies on this topic, it remains unclear whether cannabis use has a significant effect on medication non-compliance (Miller et al., 2009).

To further clarify the relationship between cannabis use and medication non-compliance with individuals diagnosed with schizophrenia, Miller et al. (2009) conducted a study in which individuals experiencing their first schizophrenia episodes were monitored for a 12-month period with both their medication compliance, as well as their cannabis use. At the conclusion of the study, it was found that participants who utilized cannabis during the 12-month period, were found to be significantly less compliant with their medication, compared to individuals who did not use cannabis during this treatment period (Miller et al., 2009).

Psychotropic Medication Abuse

Thus far, this paper has focused more on medication non-compliance being defined as either missing medications, or taking less than the prescribed amount. However, alternatively, medication non-compliance can also be thought of as overusing, or abusing the prescribed psychotropic medication. There are a few medications well-known in the psychiatric community as "drugs of abuse"; these generally include both stimulants and benzodiazepines (Pierre, 2019). As a result of

the common-knowledge of the abuse potential of these medications, they are considered to be government controlled substances.

However, research highlights the evidence that more frequently non-controlled substances such as anticholinergics, antidepressants, antipsychotics, and gabapentinoids are being abused or sold to others, by the individuals to whom they are prescribed (Pierre, 2019). An anticholinergic, Trihexyphenidyl, has been found to be used as a form of currency in the prison system due to its popularity, as inmates reportedly crush this medication and smoke it by combining it with tobacco (Christensen & Garces, 2006). Trihexyphenidyl has also been reported to have been consumed with alcohol to increase the effects of both substances, simultaneously (Pierre, 2019).

During 1966-1998, 21 case reports were published depicting individuals experiencing psychological and physical dependence to antidepressant medications. When compared to the millions that were prescribed antidepressants during this time period, it is not found to be a significant percentage that developed addictions. However, since 2002, individuals have been reported for non-compliance with the antidepressant, Bupropion, also commonly sold under the brand name Wellbutrin and Zyban, in numerous ways such as taking over five times the prescribed dose, snorting the medication, and most recently, through intravenous injection (Pierre, 2019).   In fact, between 2000-2013, more than 975 cases of intentional Bupropion abuse were reported to the US Poison Control Centers, it was also reported that the

numbers of this intentional abuse to the US Poison Control Centers tripling annually between the years of 2000-2012.

Second generation antipsychotics, also known as, atypical antipsychotics, have also increased their abuse potential. It has been reported that both Olanzapine and Quetiapine have been found to be bought, sold, or traded among users for their stimulating effects, as well as their ability to ease a "come down" from other drugs (Pierre, 2019). Quetiapine is often used in the prison population for its sedative properties, and it is found to be used both orally and intranasally and is referred to as "quell" (Christensen & Garces, 2006).

Gabapentinoids are also a commonly found psychotropic drug of abuse. These medications are often abused in numerous manners including orally, intramuscularly, intravenously, rectally, and intranasally (Pierre, 2019). There has been a significant increase in the street value of these medications since 1997, resulting in a simultaneous medication non-compliance such that those who are prescribed this medication are selling it rather than using it, while those who are not prescribed this medication are found to be abusing it (Pierre, 2019). It should be noted that a common practice of Bupropion abusers is to first insufflate, or snort, gabapentinoids, as a method for numbing the nose before snorting the Bupropion (Christensen & Garces, 2006).

Ethnic Diversity and Non-Compliance

Research has shown that there are significant distinctions found when comparing race and medication non-compliance rates. A study in 2005 illustrated this difference by comparing the medication compliance of monolingual Hispanics, bilingual Hispanics, Caucasians, and African Americans (Diaz, Woods, & Rosenheck, 2005). In this study, medication compliance was accounted for by the use of a Medication Event Monitoring System cap (MEMS™; Diaz, Woods, & Rosenheck, 2005). The results indicated that of 44 monolingual Hispanics, 23% were found to be non-compliant, of 25 bilingual Hispanics, 24% were found to be non-compliant, and of 19 African American participants and 34 Caucasian participants, 32% and 10%, respectively, were found to be non-compliant (Diaz, Woods, & Rosenheck, 2005). Therefore, the hypothesis was supported that of those studied, minority ethnic groups are significantly less compliant with their prescribed medications than are Caucasians (Diaz, Woods, & Rosenheck, 2005).

A study focusing on medication non-compliance for individuals prescribed antidepressants found that age and race were the strongest predictor factors in non-compliance (Rivero-Santana, Perestelo-Perez, Perez-Ramos, Serrano-Aguilar, & De Los Cuevas, 2013). It was found that the increased age of the participants significantly enhanced the likelihood for medication compliance. It was also found that with regard to race, Caucasian participants had significantly higher results of

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medication compliance, and the Hispanic population within the sample had the lowest rates of compliance (Rivero-Santana et al., 2013).

Lanouette, Folson, Sciolla, and Jeste (2009) found that in multiple studies, Latino individuals consistently exhibited significantly greater medication non-compliance in comparison with their Euro-American counterparts. They also reported that significant barriers to medication compliance for this population included, being a monolingual Spanish speaker, low socioeconomic status, and lacking health insurance. Ralat, Depp, and Bernal (2018) further investigated the low medication compliance rates in the Latino mental health community. After completing extensive interviews with 22 participants diagnosed with Bipolar Disorder I/II, five significant reasons for non-compliance were brought to light; stigma about the psychiatric condition, patient-related reasons, medication-related reasons, poor support from family members, and provider relationship factors (Ralat et al., 2018).

The Substance Abuse and Mental Health Services Administration reported in 2015 that there were significant differences in mental health service use in comparing ethnicities. They reported that African American and Hispanic Americans were half as likely to use mental health services compared to Caucasian Americans. Furthermore, it was found that Asian Americans were only one third as likely to use mental health services as Caucasian Americans.

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Geriatric Population: Aging Effect and Non-Compliance

Another population that is often overlooked when researching and
discussing medication non-compliance is the geriatric population, which is a
significant oversight when it is recognized by previous studies that 20-80% of
geriatric patients prescribed antidepressant medication fail to adhere to their
medication within one month of the prescription being filled (Bosworth, Voils,
Potter, & Steffens, 2008). A consideration that needs to be made when studying
geriatric psychotropic medication compliance is the real concern of the effect of
dementia on medication compliance.

In 2018, it was found that 5.6 million individuals age 65 or older had been
diagnosed with Alzheimer's dementia in the United States, with a predicted
increase to approximately 14 million individuals, by 2050 (Alzheimer's Cares
Resource Center, 2019). Dementia has been found to cause cognitive deficits in
older adults that affect their ability to organize, plan, and perform medication
management tasks (Smith et al., 2017).

A study completed on a geriatric population was performed analyzing the
treatment attitudes and beliefs, in association with race and gender difference, in
compliance with antidepressant medications (Burnett-Zeigler et al., 2013). The
study was comprised of 186 African-American and Caucasian participants aged 60
years or older, diagnosed with depression, as indicated by a score of 5 or higher on
the Geriatric Depression Scale, and provided with recommendation for

antidepressant medication (Burnett-Zeigler et al., 2013). The subjects were assessed at the initial baseline interview and again at the four- month follow-up session. Medication compliance was measured through the use of the Brief Medication Questionnaire (BMQ) validated compliance question.

For this study, medication compliance was defined as missing 0-1 doses within a one-week period. The participants also completed the Patients Attitudes Toward and Ratings of Care for Depression, and a modified version of the Stigma Scale for Receiving Psychological Help. After the four-month follow-up period, the results were analyzed, and it was found that both African American men and women had significantly more concerns with regard to the antidepressant treatment, and significantly less understanding about the treatment than the Caucasian women in the study. It was also found that African American men experienced significantly more negative views of healthcare providers than African American or Caucasian women. In actual medication compliance, it was found that Caucasian women were significantly more adherent to their medication regime than were the African American women (Burnett-Zeigler et al., 2013). Therefore, it is suggested that both African American men and women are more likely to be non-compliant with their medication in comparison with Caucasian women.

Another factor to consider when analyzing medication non-compliance with geriatric populations is the ability to properly read and understand the prescription labels printed on their medication bottles. Moisan, Gaudet, Gregoire, and

Bouchard, (2002) conducted a study comprised of 325 participants aged 65 or older living in Quebec City, Canada. These individuals were asked to read three prescription labels out-loud to the evaluator of the study, and were then assessed as to their understanding of the prescription label instructions. It was found that of the 325 participants aged 65 or older, 126 respondents (38.8%) were unable to read all of the labels, and 218 (67.1%) respondents did not fully understand the prescription instructions (Moisan et al., 2002).

Therefore, over two-thirds of this sample population was unable to fully understand the medical instructions accompanying their prescriptions. These findings would suggest that the ability of individuals age 65 or older to properly comply with their medications would be quite hindered if they could not either read, or fully understand, either the dosage or times to take said medication. The study found that of the 325 participants, 153 (47.1%) were medication non-compliant.

Factors Contributing to Non-Compliance

Participants in medication non-compliance studies have attributed their non-adherent behavior to reasons such as forgetting (Bulloch & Patten, 2010), experiencing adverse side-effects from the medication (Breen & Thornhill, 1998; Chandra et al., 2014),), financial issues/ limitations (Breen & Thornhill, 1998; Chandra et al., 2014), the amount of participation the patients have with their provider (Mahone, 2004; Nageotte et al., 1997), perceived ineffectiveness of the

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medication (Breen & Thornhill, 1998), feeling embarrassed about needing

medication (Rummel-Kluge, Shuster, Peters, & Kissling, 2008), and discontinuing

the medication because of feeling better (Bulloch & Patten, 2010).

Medication and adverse side-effects. Another significant factor found in

medication non-compliance is the individual's decision that the adverse side effects

from the medication outweigh the benefits that would result from complying with

medication (Breen & Thornhill, 1998). Categorically, the seven groups of

medications which are often considered to be the most common prescribed to

individuals suffering from mental illness include: antidepressants, mood stabilizers,

antipsychotics, anxiolytics, sedative-hypnotics, antiepileptic's, and sedating

antihistamines (Bennet et al., 2018; Bulloch & Patten, 2010; Lupattelli et al., 2015;

Nageotte et al., 1997; Tan et al., 2015). Breen and Thornhill's (1998) research

found that all psychotropic medications are able to induce at least one or more

significant side effect for the user. In fact, each category of psychotropic

medication listed above maintains its own set of adverse side effects that may result

in medication non-compliance.

Antipsychotic medications have long interested researchers because of their

significant side effects on individuals. The extrapyramidal syndrome that often

occurs with antipsychotic medication use is comprised of many debilitating

symptoms including Parkinsonian muscle rigidity, drooling, tremors, slowness of

movement, and tardive dyskinesia (Breen & Thornhill, 1998). Other adverse side

effects often found correlated with use of antipsychotic medication include: Akathisia, extremely uncomfortable restlessness, dysphoria, or sedation, which can all negatively impact the individual's ability to work, obtain an education, or drive (Breen & Thornhill, 1998). The development of second generation antipsychotics, otherwise known as atypical antipsychotics, allow individuals more efficacious treatment with less adverse side effects. Nonetheless and despite these changes, there is still a significant amount of medication non-compliance within the population prescribed these medications (Velligan, Lam, Ereshefky, & Miller, 2003).

A common atypical antipsychotic adverse side effect is significant weight gain, which is likely to result in more medication non-compliance amongst those who are experiencing these side effects. (Verma, Rao, & Verma, 2015). Adverse side effects are not always acute, and at times, may lead to presentations that are more chronic. One of example of this is the complications associated with tardive dyskinesia.

Atypical antipsychotic use has also been positively correlated with the production of Type 2 Diabetes Mellitus in children and adolescents who are being treated for psychiatric disorders (Lee et al, 2018). A Korean study compared 1,092,019 children ages 2-19 who were prescribed antipsychotic medications compared to non-medicated controls. After four years of data collection, it was found that Korean children who were prescribed atypical antipsychotics were

significantly more likely to develop Type 2 Diabetes Mellitus than controls. It is interesting to note that the primary diagnosis for atypical antipsychotic medication use was Anxiety, followed by Depression. It is further noted that, Bipolar Disorder and Schizophrenia were found to be the least diagnosed disorders for antipsychotic medication use in this sample (Lee et al., 2018).

Usher, Park, and Foster's (2012) study conducted in Australia, performed in-depth interviews with eight participants, age 18 to 60, who experienced significant weight gain as a result of taking atypical antipsychotic medications after being diagnosed with schizophrenia. The results of these interviews indicated that these individuals gained between 10 to 50 kilograms, or 22 to 110 pounds, respectively, after beginning to take their atypical antipsychotic medications. All of the participants in this study reported either taking themselves off of the medication, having their doctor take them off of the medication, or seriously considering no longer taking the medication as a result of the weight gain side effect. The participants also discussed the lowered quality of life, despite a significant decrease in their schizophrenic symptoms, they experienced due to feeling shame as a result of the weight gain (Usher et al., 2012).

Selective serotonin reuptake inhibitors (SSRI's) are a frequently prescribed antidepressant. Common adverse side-effects related to SSRIs include nausea, which can develop into significant vomiting and diarrhea (Breen & Thornhill, 1998). Another common adverse side effect of taking antidepressant medication is

sexual dysfunction, including both loss of libido, and an increase in premature ejaculation (Hudson, Fortney, Pyne, Lu, & Mittal, 2015). Sleep changes such as insomnia or hypersomnia are also side effects of antidepressant medication, as well as headache, dry mouth, dizziness, and vision change (Hudson et al., 2015). Antidepressant medication is also found to be used to treat disorders other than depression, such as anxiety disorders, eating disorders, sleeping disorders, social phobia, panic disorders, urinary incontinence, and neuropathic pain (Gardarsdottir, Heerdink, Djik, & Egberts, 2007).

Anxiolytics (i.e., Xanax, Ativan, Klonopin, and Valium) are commonly prescribed in the mental health community to treat anxiety-based disorders. Side effects of anxiolytics include drowsiness, sedation, postural instability, visuomotor impairment and memory impairment (Chen et al., 2017). Furthermore, anxiolytics have a high tendency for potential abuse, dependence, as well as tolerance and withdrawals symptoms when used for long-term treatment (Tiwari, Souza, & Muller, 2009). This highlights the area of non-compliance such that, and unlike with antidepressants and antipsychotics, the individuals taking anxiolytics are more likely to overtake or abuse their medication. Additionally, it is not uncommon for an individual to take these medications sparingly, in an effort to self-regulate the potential for substance dependence.

As the concern of adverse side effects continues to be correlated with non-compliance to medication, research has continued to work to understand the

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significance of this barrier so that it may be properly addressed in the future. A study performed in 2008 in the United Kingdom focused on the non-compliance rates of bipolar disorder individuals to further understand the salience of this phenomenon (Clatworthy et al., 2009).

In this study, participants were recruited through the use of an advertisement in the Manic Depression Fellowship newsletter (Clatworthy et al., 2009). 259 participants requested to join the study and were provided with booklets containing the Beliefs about Medication Questionnaire, the Medication Adherence Report Scale, the Beck Depression Inventory, and the Altman Self-Rating Mania Scale (Clatworthy et al., 2009). All the individuals (N=223) completed and returned the questionnaire booklet and it was found that 90% of the responding individuals had experienced one or more hospitalizations and 30% of responders were considered to be low adherers to their medication (Clatworthy et al., 2009). It was also found that the individuals who were prescribed lithium had a stronger likelihood of being medication adherent when compared to those who were not prescribed it (Clatworthy et al., 2009). The results also supported the hypothesis that individuals who have a lower perceived need for treatment would also have a lower medication adherence rate (Clatworthy et al., 2009).

Forgetting. Another significant barrier to medication compliance has found to be the act of forgetting. A study measuring the medication non-compliance of 6,201 Canadian citizens prescribed psychotropic medications found that the most

common reason for non-compliance across the five medication classes studied, was the forgetting to take one's medication (Bulloch & Patten, 2010). The study also found that the non-compliance rates varied depending on the class of the medication: the non-compliance rate for individuals taking antipsychotic medications was 34.6%, whereas the non-compliance rate for those taking antidepressants was 45.9% (Bulloch & Patten, 2010). Similarly, to the antipsychotic class, individuals taking sedative-hypnotics and anxiolytics reported non-compliance rates of 34.7% and 38.1% respectively, whereas the individuals taking mood stabilizers reported a non-compliance rate of 44.9% (Bulloch & Patten, 2010).

Stigma and non-compliance. Another reason that individuals report non-compliance to their medications is due to experiencing, or anticipating experiencing, stigma from others due to their mental health conditions. A study completed by Chaudhry, Kumar, and Mishra (2016) revealed that out of 100 participants, aged 18-65, who were identified as non-compliant with their medications, 40% cited one of the factors involved in their non-compliance to be the stigma perceived or felt by others due to their mental illness.

A study based in Hong Kong found that stigma was a significant factor in medication non-compliance for Chinese individuals. Lee, Chiu, Tsang, Chui, and Kleinman (2006) conducted a study comparing the stigmatization of a schizophrenia diagnosis and subsequent treatment, with a diagnosis of Diabetes

Mellitus and subsequent treatment. This study was comprised of 320 participants diagnosed with schizophrenia and 160 participants diagnosed with diabetes mellitus, and the individuals were asked to complete surveys which measured the amount of stigma they received as a result of their illness and how this stigma affected their behaviors with regard to their illness.

It was found that 48% of the participants diagnosed with schizophrenia felt significantly more stigmatized due to their diagnosis when compared to those with diabetes. This felt-stigmatization resulted in those participants reported suffering workplace difficulties, family rejection, and treatment non-compliance (Lee et al., 2006).

Decreasing Non-Compliance

As medication non-compliance is a salient global issue, there are many researchers who are working towards solving this seemingly endless problem. One of the methods considered is the use of technology to aid in reminding individuals to take their medication. A 2013 study analyzed the efficacy of short messaging service (SMS) text reminders to measure the compliance of medication compliance with an intervention group, and comparing the findings to a control group that received no such reminders (Huang et al., 2013)

This study was comprised of 1198 participants who had been recruited by pharmacists from three medical centers. The experimental group was comprised of 763 participants who received the SMS reminders daily for seven days, and 435

participants were placed in the control group who did not receive SMS reminders. On the eighth day, the participants completed a follow-up interview phone call in which they completed a survey to verify their medication compliance. It was found that the participants who received the reminder messages were significantly more likely to be medication compliant when compared to the control group. In fact, the individuals in the intervention group were 3.2 times as likely to take their medication on time, and 2.2 times less likely to miss a dose than those in the control group (Huang et al., 2013).

Another salient factor of mental health medication compliance is the relationship between the individual and their medical provider. This notion became popular after Sigmund Freud declared the importance of connecting the individual to the treatment as well as to the physician (McCabe et al., 2012). Although this statement was originally made with regard to psychotherapy, it has since generalized to psychiatry and pharmacological treatment in the mental health field.

McCabe et al. (2012) conducted a study in which 134 clinicians were paired with 507 of their patients and asked to rate their therapeutic relationship as well as predict the medicine compliance of the individual. It was found that the better the patient perceived the therapeutic relationship between themselves and their clinician, the more likely they were to be medication compliant (McCabe et al., 2012).

A study conducted by Hamrin and Iennaco (2017), explored the efficacy of using Motivational Interviewing to increase psychotropic medication compliance in adolescents. This study was comprised of 41 adolescents ranging in age from 12-18, recruited from a university mental health center. The study utilized the Medication Electronic Monitoring System (MEMS) as the primary measure of medication compliance and the Drug Attitude Inventory (DAI) was used as a secondary measure. All participants provided a 30-day baseline MEMS and DAI measurement at the beginning of the study. Each participant received two Motivational Interviewing sessions within their standardized medication treatment appointments with their provider. At least 30 days following their second Motivation Interviewing session, each participants MEMS and DAI were re-measured.

Results of the study found that, at baseline, 43.9% of participants were taking their medications between 80-100% of the time. However, after the Motivational Interviewing intervention, 70.7% of participants were taking their medications 80-100% of the time. There was also found to be a significantly higher DAI score after the Motivational Interviewing sessions than at baseline (Hamrin & Iennco, 2017). This study indicates the salient effect that can occur on psychotropic medication compliance through the use of non-invasive measures such as providing motivational interviewing at medication appointments.

Rationale for Purposed Study

  Psychotropic medication non-compliance is a global issue that negatively influences the lives of millions of individuals every year. Non-compliance with psychotropic medications also has significant economic consequences, as between 100-300 billion dollars are annually spent on avoidable costs including; rehospitalization, unemployment, absence from work, and premature mortality (Semahegn et al., 2018). There has previously been substantial research conducted on psychotropic medication non-compliance in specific populations, such as individuals diagnosed with Schizophrenia and Bipolar Disorder. However, there is a noteworthy gap in the literature with regard to general outpatient community mental health populations.

  The American Psychological Association reported that approximately 25% of all U.S. adults have a mental illness, and that almost 50% of all U.S. adults will develop a mental illness during their lifetime (American Psychological Association, 2019). This is significantly greater than the prevalence of individuals suffering from schizophrenia in the U.S. at 0.3%- 0.7%, and greater than the prevalence of individuals in the U.S. suffering from Bipolar Disorder I at 0.6% and Bipolar Disorder II at 0.8% (American Psychiatric Association, 2013).

  Therefore, there has been drastically more research on medication non-compliance for disorders that make up less than 3% of the population, and very

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little research on the medication compliance of the general outpatient mental health population, which is nearly half of the population of adults in the United States.

Data obtained from this proposed research could have potentially meaningful implications for both the individual and the medication provider. By identifying the factors preventing psychotropic medication non-compliance in the general mental health outpatient population, the barriers to fully complying with medication can begin to be overcome. This would benefit the individual in receiving the full efficacy of the treatment effects of the medication, which would in turn benefit the provider.

Furthermore, more studies conducted regarding factors contributing to medication non-compliance in the general mental health population could result in preventing billions of dollars being spent annually on rehospitalization, unemployment due to mental health problems, absence from work, and premature death. Additionally, mental illness is significantly associated with chronic diseases such as cardiovascular disease, obesity, asthma, epilepsy, and cancer (American Psychological Association, 2019). In fact, the National Association of State Mental Health Program Directors Council reported in 2006, adults in the U.S. living with serious mental illness, on average, die 25 years earlier than others, largely due to medical conditions that are treatable! Therefore, by creating more medication compliance, through the identification of factors that preclude compliance in the general mental health outpatient population, this study also has the potential to

contribute to the growing information in the medical field with regard to the prevention of such chronic diseases, and premature death in the general population.

Goals and Objectives

Review of the literature has suggested that medication non-compliance in the general mental health population is a significant problem, and that it negatively impacts not only the health of individuals, but also significantly impacts our economy. It is also suggested that medication non-compliance is the result of multiple factors, including; Forgetting, Adverse medication Side Effects, Religious Reasons, Inconvenience, History of Addiction, Instructions too Complicated, and Unsure if Medications are Working.

The goal of this study is to identify which factors are the most salient in precluding medication compliance amongst the general mental health outpatient population, in the hopes that preventative measures can be developed to assuage these barriers to compliance.

Therefore, identifying (1) the factors that impede psychotropic medication compliance, and, (2) if individuals prescribed antipsychotics have significantly less medication compliance than others in the general mental health population, are relevant objectives to this study. Obtaining this information will provide health care workers in the mental health field a basis from which to begin developing programs and practices to overcome these compliance obstacles. As there is currently a significant paucity of information as to the factors that inhibit medication

compliance in the general outpatient mental health population, this study could

provide a deeper understanding as to interventions that need to be implemented to

make medication compliance accessible to everyone. The purpose of the current

study is to expand the research of psychotropic medication non-compliance to that

of the general outpatient mental health population, rather than focusing on specific

disorders such as Schizophrenia and Bipolar Disorder. This will increase our

understanding of the challenges that the general population faces with regard to

fully complying with their medications and allow future research to expand upon

interventions that will increase psychotropic medication compliance in the general

mental health outpatient population.

Aims and Hypotheses

Based on the reviewed literature relating to this project, the following hypotheses

will be tested:

1. The most salient factor of non-compliance will be due to Forgetting,
   followed by adverse side effects, as a result of the medication.

2. Participants who are prescribed antipsychotics will report significantly
   more medication non-compliance than individuals who are prescribed
   antidepressants, anxiolytics, anti-epileptics, sedative-hypnotics, or
   sedating antihistamines.

3. As the number of factors that influence medication compliance
   increases, participants' non-compliance should likewise increase.

Method

Procedure

This study was approved by the Florida Institute of Technology Institutional Review Board (IRB) prior to participant recruitment. Participants were recruited from within two local, Circles of Care Inc., community mental health clinics. Circles of Care, Inc. is a non-profit mental health-based program comprised of inpatient, crisis services, and outpatient mental health care services through its hospital-based and State and County contracted programs. Circles of Care has 52 licensed hospital beds, 50 state licensed adult crisis stabilization beds, 78 licensed residential and treatment beds, 18 licensed chemical dependency detoxification beds, 12 licensed chemical dependency intensive residential treatment beds, 16 children's crisis stabilization beds as well as a complete continuum of outpatient care to provide services to residents of the Brevard County community. Permission was granted to the authors to survey and collect data from the clients at their two local outpatient clinics. Data was collected via a self-report survey. Participants were provided with a paper copy of the informed consent and survey as part of their intake packet for treatment (see Appendix B.).

Patient's responses were kept confidential and they were not asked to identify themselves on the questionnaire. The informed consents were kept in a separate file from the surveys that were collected. This allowed there to be no matching of informed consent with survey data and maintain the confidentiality of

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the participant. Inclusion criteria for the study consisted of a: (1) diagnosis of a psychiatric disorder, (2) prescription of a psychotropic medication, (3) concurrent illicit drug use and, (4) be between the age of 18-90.

Outcome Measures

The survey utilized was created specifically for use within this study. The survey requested basic demographic information such as age, gender, ethnicity, employment status, sexual orientation, and education level. It also asked participants to identify which of the psychotropic medications, if any, provided on the survey, they are prescribed, with an option to write in medications if they are not listed on the survey. Compliance with medication was evaluated using a Likert scale.

The Likert scales provided a measure of the participant's compliance with their prescribed dosage guidelines and their likelihood of terminating medication use without consulting their prescribing doctor. An example of one of the Likert Scale questions on the survey is as follows:

> *Of the medications circled above, and is prescribed daily, (Please write in your medication) _____, How often do you take half, or less than half of the recommended dosage of this medication?*

The participants were then provided a Likert Scale from 1 (Never) to 4 (Always). If medication non-compliance was identified, as evidenced by choosing; 3 (Most of the Time) or 4 (Always), patients were then asked to identify the

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factor(s) that function as a barrier to their medication compliance. Additionally, the questionnaire utilized questions from the Drug Use Screening Inventory-Revised adult survey (DUSI-R).

The DUSI-R is a self-report questionnaire used to examine the severity of problems in 10 domains, one of them being substance use. For the purpose of this study, only the component of the DUSI-R, which is used to screen for involvement with drugs, was utilized. This measure allowed the researchers to analyze potential associations between rate of medication non-compliance and frequency of drug use. The participants were asked to identify each substance used within the past year, and how many times used per month (see Appendix A.).

Data Analysis

The questionnaire utilized four types of questions to measure rates of participant compliance and non-compliance to medication. Two types of questions asked participants to rate non-compliance on a Likert scale while the other two asked for the same ratings pertaining to compliance. To obtain an overall non-compliance score, response to questions pertaining to compliance were reverse coded to reflect a rate of non-compliance. Then, ratings across all questions were summed to obtain an overall non-compliance score for each participant.

To test the first hypothesis a multiple regression was performed to identify if the factors of *Forgetting* followed by *Adverse Side Effects* were predictive ones. The goal was to identify which, if any, were significant as the most salient factors

that preclude medication non-compliance. A simple linear regression was then conducted on the conditions of compliance including: Terminating medication use without first consulting their physician, how often the participant fully complies with the dosage guidelines on their prescription, how often does the participant take half or less than half of their prescribed medication, and how often is each medication taken on a daily basis. The conditions of compliance were then compared with the non-compliance factors to identify if individual non-compliance factors significantly predicted conditions of non-compliance.

To test the second hypothesis, an independent samples t-test was run to identify if individuals who are prescribed antipsychotics are significantly less compliant with their medication regimen, than individuals who are prescribed antidepressants, anti-epileptics, sedative hypnotics, sedating antihistamines, or anxiolytics.

Finally, to test the last hypothesis, a linear regression was conducted to identify if the number of precluding factors of medication non-compliance increased, would the overall medication non-compliance significantly increase as well.

Results

Participants

A total of 237 participants volunteered to take the survey. Of this total, 42 cases were removed, due to missing values in regard to compliance data. As

compliance behavior was the primary variable of interest, participants who did not disclose this information were removed from the study as well. Therefore, 195 cases remained and were reviewed for this study.

Among the remaining 195 participants, 31.8% male (n=62) and 68.2% were female (n=133). 34% were between the ages of 41-55 (n=69), 29% were between the ages of 26-40 (n=55), 18% were between the ages of 56-65 (n=34), 8% were between the ages of 66-74 (n=15), 5% were between the ages of 18-25 (n=9), and 3% were 75 and above (n=6).

81% of participants indicated a heterosexual orientation (n=156). 8% indicated that they were bisexual (n=16), 8% preferred not to report (n=16), and 2% reported a homosexual orientation (n=4).

The participants were 82.6% Caucasian (n=161), 8.2% African American/Caribbean (n=16), 4.2% Hispanic (n= 8), 1.5% Asian (n=3), 2% American Indian or Native American (n=4), and 1.5% selected other (3).

10.9% of the participants reported having a bachelor's degree (n=21), 4.7% of participants reported having a master's degree (n=10), 20.3% of participants reported having an associate's degree (n= 39), 8.8% attended a trade school (n=18), 43.2% of participants reported having a high school diploma or GED (n=84), and 12% indicated that they did not receive a high school diploma or obtain a GED (n=23).

12% of the participants reported working Full-Time (n=29), 10% of the participants reported working Part-Time (n=24), and 58% of the participants reported being Unemployed (n=138).

Of the participants who chose to respond, 62% indicated that they had been previously hospitalized (n=121) while 38% reported no history of hospitalization (n=74).

Statistical Analysis

Most Salient Factor. A multiple linear regression was calculated to predict medication non-compliance based on Forgetting, Adverse Side Effects, Unsure if Medications are Working, Inconvenience, Instructions too Complicated, History of Addiction, Religious Reasons, and Financial Reasons. No significant regression equation was found F (8,89) = .90, p= .52 with an R_2 of .075.

Participant's medication non-compliance increased as being 0.16 times more likely to be medication non-compliant if they indicated Forgetting as a factor, and 0.29 times more likely to be non-compliant if they indicated Adverse Side Effects as a factor. On the contrary, participant's medication non-compliance decreased 0.25 times if they indicated Financial Reasons as a factor, and 0.04 times if they indicated Religious Reasons as a factor. History of Addiction as a factor decreased medication non-compliance by 0.01 times, whereas Inconvenience decreased medication non-compliance 0.19, Instructions too Complicated

decreased medication non-compliance by 0.29 times, and Unsure if Medications are Working decreased medication non-compliance by 0.004 times.

None of the predictors including Forgetting, Financial Reasons, Adverse Side Effects, Unsure if Medications are Working, Inconvenience, Instructions too Complicated, History of Addiction, or Religious Reasons significantly predicted medication non-compliance. However, it should be noted that both Adverse Side Effects and Forgetting correlated in a positive direction with medication non-compliance, but did not result in a significant finding.

Medication Termination. A simple linear regression was calculated to predict medication non-compliance related to participants who completely stop using their medication without first consulting their physician based on experiencing adverse side effects. A significant regression result was found F $(8,63) = 3.46$, $p<.002$, with an R_2 of 0.31.

This supported the hypothesis in identifying that the experience of adverse side effects significantly impacted the compliance rate of participant medication usage. Participants predicted medication non-compliance due to stop taking their medication without first consulting their physician is equal to $1.34 + 0.88$ times more likely when adverse side effects are indicated. Medication non-compliance due to terminating medication without consulting a physician increased by 88% when experiencing adverse side effects from medication.

Antipsychotics. An independent sample t-test was conducted to compare medication non-compliance in participants who were prescribed antipsychotic medications compared to those participants who were not prescribed antipsychotic medications.

There was not a significant difference between the scores for participants who were prescribed antipsychotic medications and participants who were not prescribed antipsychotic medication ($M = 0.63$, $SD = 0.49$; $M = 0.5$, $SD = 0.58$; respectively).

Number of Factors. A simple linear regression was calculated to predict medication non-compliance based on the number of factors that influence medication non-compliance. A significant regression was not found; $F(1,90) = 0.15$, $p < 0.69$, with an R_2 of 0.002. However, it was found that medication non-compliance increased 2.4% for each added factor, despite not being a significant finding.

Discussion

Impact of Study

As previously suggested, it is imperative to conduct further research to better understand the factors that preclude medication compliance in the general mental health outpatient population. As it is estimated that 50% of US adults will experience mental illness in their lifetime (American Psychological Association, 2019) promoting information that will improve medication compliance throughout

the nation is of great importance. Identifying the factors that preclude medication compliance is of paramount importance as it is only through isolating the obstacles that compensatory measures to overcome can be enacted. This problem of medication non-compliance affects individuals regardless of age (Bosworth, Voils, Potter, & Steffens, 2008), ethnicity (Diz, Woods, & Rosenhack, 2005), or neurological development (Tan et al., 2015).

The Agency for Healthcare Research and Quality (2009) reported that Mood Disorders are the 3rd most common cause of hospitalizations for US individual aged 18-44 years old. Supporting this statement, Sullivan et al. (1995), identified that medication non-compliance amongst mental health patients, as being the most frequent reason for rehospitalization in a mental health facility. It should be noted that rehospitalization contributes to significant distress on the patient, their family, and the mental health treatment provider. Furthermore, the impact of medication non-compliance does not only negatively impact the patients and the mental health care providers, it also has a significant impact on the US economy.

Iuga and McGuire (2014) reported that an estimated 100-300 billion dollars are annually attributed to medication non-compliance in the United States. The National Association of State Mental Health Program Directors Council (2006) reported that adults in the U.S. living with serious mental illness, on average, die 25 years earlier than others; yet another significant finding reported that medication

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non-compliance is also attributed to increased mortality rates and decreased quality of life.

Therefore, identifying the most salient factors that contribute to medication non-compliance will aid to better inform medication providers of potential barriers to patients fully complying with their medication. As a result, they can develop preventative programs to alleviate precluding factors to medication compliance.

This study examined the extent that specific factors preclude psychotropic medication compliance hypothesizing that Forgetting followed by Adverse Side Effects would be the most salient factors. Although the factors were not found to be significant, they did support the hypothesis in reporting that Adverse Side Effects followed by Forgetting were the most salient factors that precluded medication compliance. It is likely that the small sample size of the study had an impact on the significance level. It should also be recognized that the survey utilized was created for this study and therefore the questions may have not been as clear to participants regarding the salience of the factor that influenced their medication non-compliance.

Additionally, it was contrary to the hypothesis in that Adverse Side Effects were more salient in predicting medication non-compliance than Forgetting, rather than Forgetting being the most salient. These results are contrary to the 2010 study competed by Bulloch and Patten (2010), which found that out of 6,201 Canadian

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participants, Forgetting was found to be significantly more salient than any other factor in predicting medication non-compliance, including Adverse Side Effects.

It is possible this occurred because of a smaller sample size, or that with the increase in access to internet and media related to medication, people may be relying on electronic reminders and facts rather than selecting forgetting as the most common influence. Furthermore, method of study may have contributed as this self-report measure may have influenced participants to be more self-reflective, or defensive about forgetting, and instead blaming adverse side effects; while the other study utilized MEMS to obtain a less subjective response.

Further analysis of the data also found that individuals who reported experiencing Adverse Side Effects as a factor in psychotropic medication non-compliance reported to be significantly more likely to terminate their medication usage without talking to their doctor than participants who identified any of the other factors.

This finding is supported by Usher et al. (2012), which looked at eight Australian participants who reported that experiencing adverse side effect, (e.g., weight gain), resulted in all participants prematurely terminating their medication usage, asking their doctor to terminate their medication, or seriously consider terminating their medication. Whereas the study in question utilized a significantly small sample size, it is reassuring to find a commensurate result and further substantiate the impact of adverse side-effects on non-compliance. Future studies

focusing identifying which adverse side effects are most salient in predicting medication on-compliance due to stopping use of the medication without first consulting a physician would further be useful to both patients and providers.

The second hypothesis indicated that participants who were prescribed antipsychotic medications were significantly more likely to be medication non-compliant than participants who were prescribed antidepressants, anxiolytics, anti-epileptics, sedating antihistamines, or sedative-hypnotics. Semahegn et al. (2018), reported that individuals diagnosed with major psychiatric disorders tend to be the most non-compliant with their psychotropic medication. One suspected cause of this is that individuals who suffer from major psychiatric disorders tend to have higher impairments to reasoning skills and insight (Semahegn et al., 2018).

Contrary to the hypothesis, no significant difference was found between individuals prescribed antipsychotic medications in comparison to individuals prescribed other psychotropic medications. These findings are supported in Bulloch and Patten's (2010) study which found that when comparing classes of psychotropic medication, 45.9% of participants were found to be medication non-compliant taking non-antipsychotics, in comparison to 34.6% of participants found to be medication non-compliant taking antipsychotics.

It's difficult to discern the cause for this non-significant result. However, it is reasonable that once again, the small sample size has proved as a limitation for this study. It is also feasible that individuals who are prescribed antipsychotics are

more likely to have their medications monitored or provided to them by caregivers, family members, or injected monthly by their medication providers. Future studies would likely benefit from adding a question into the survey regarding if the individual prescribed antipsychotics takes them daily, or receives monthly injectable. It would also be beneficial for future studies to identify of the prescribed medication was time-released or if it was a single-released dose of the medication. This would be effective in identifying the effect that adverse side effects may be alleviated through this administration of medication resulting in more compliance overall. It is also possible that due to having the individuals complete the surveys at the location of their mental health outpatient care, rather than online, resulted in participants biasing their answers due to fear of repercussion from their medications providers. Although it should be noted that it was stipulated in the informed consent that all survey results would be kept anonymous and there was no way in which to identify the participants who volunteered for the study.

Lastly, the hypothesis indicated that as number of factors that influence medication compliance increases, participants' non-compliance will increase. Contrary to the hypothesis, no significant result was found. However, it should be noted that despite the lack of significance, the pattern of increasing medication non-compliance as factors increased was supported in a positive way. In fact, it was found that for every added factor that precludes medication compliance, there was a 2.4% increase of medication non-compliance in the participants. As one of the

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limitations for the study was the small sample size, it is feasible that had there been more participants, a significant difference would have been found. It is also possible that due to wording on the survey that was developed for this study, the participants did not fully understand that they could identify multiple factors that resulted in medication non-compliance.

Limitations and Areas for Future Research

Small sample size. As previously discussed, the non-significant results obtained within this study may be the result of a lack of power due to a smaller than-desired sample size. A larger sample size may increase the chances of detecting a true effect within the data. As such, future studies may consider increasing the sample size to allow for more reliable results with greater power to detect differences. Obtaining a more globally representative sample among such a diverse population, may have helped achieve a better ability to generalize trends of medication non-compliance.

Validity of the Questionnaire. The questionnaire used was adapted for this study using questions created by the researchers, as well as those adapted from the Drug Use Screening Inventory-Revised adult survey (DUSI-R). As there was no pilot study to establish the validity of the questionnaire for evaluating these factors, there is the potential that the developed questionnaire did not accurately measure the constructs that were set out to measure within this study. As such, future research may wish to utilize a questionnaire, whose validity has been confirmed

and utilized within previous studies. Despite these potential drawbacks in validity of the questionnaire not being established, the authors of this study chose to continue in their utilization of this questionnaire, as there were no other available options of questionnaires developed with established validity measures that provided the information needed to complete this study.

Additionally, as was mentioned by Hendershot and colleagues (2009), and Haddad, Brain, and Scott (2014), the use of subjective self-report measures to identify non-compliance has been shown to have poor validity and a tendency to underestimate rates of non-compliance within the sample. Therefore, more objective measures such as a MEMS system, can be utilized within future research to combat any errors which may occur when using more subjective measures. However, as has been mentioned, financial limitations, in addition to available resources for this study prevented using MEMS systems or other more objective measures. Still, it was believed that viable data could, and was obtained through the use of the self-report measures of substance use and medication compliance.

Participant Bias. The survey asked participants to disclose information about sensitive topics such as drug use and medication taking behaviors. Participants may wish to present themselves, and their behaviors in a more positive light, by underreporting such behaviors. This may increase error in the research data and contribute to the difficulty detecting differences between groups.

Although the experimenters took measures to deter such a bias, such as informing the participants of confidentiality and anonymity within the informed consent, participants may still have responded in ways that present themselves in a more positive light. Future studies may examine the use of other measures, which minimize the potential for social desirability biased responding.

Conclusion

The study was conducted to address the significant gap in the literature regarding medication non-compliance in the general mental health outpatient population. The current study looked to identify which factors were most salient in precluding medication compliance to inform mental health providers in developing preventative programs and structures to alleviate these factors for their patients.

The American Psychological Association (2019) reported that nearly 50% of US adults will experience a mental illness with in their lifetime. This is a salient issue that has not received nearly enough attention in the manner of research regarding the medication treatment of these conditions. Research that will increase the treatment effects for those suffering from mental illness could save the US economy billions of dollars, as well as alleviate significant pain and suffering from those afflicted.

Results obtained in this study highlighted the impact that factors such as experiencing adverse side effects from medication can have on medication compliance. Previous research indicated that factors such as Forgetting, Adverse

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Side Effects, Religious Reasons, Financial Reasons, History of Addiction, Inconvenience, Instructions too Complicated, and Unsure if Medications are Working, have significant impacts on psychotropic medication non-compliance.

As the study did not find support for the antipsychotic medication class to significantly increase medication non-compliance, it is suggested that future research focus on antipsychotic medications non-compliance prevention programs that focus more on Forgetting, Adverse Side Effects, and providing patients with more tools to alleviate the factors that prevent medication compliance.

With this knowledge, medication providers and patients can work together to be more informed in preventing medication non-compliance. This salient issue would benefit from further research to identify more concrete ways in which to alleviate factors that preclude medication compliance and to provide a stronger understanding of mental healthcare in the general outpatient community.

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Table 1

Descriptive Statistics of Participant Demographic Information

Variable	N	Percent
Race and Ethnicity		
African American/Caribbean	16	8.2%
American Indian or Native American	4	2%
Asian	3	1.5%
Caucasian	161	82.6%
Other	3	1.5%
Hispanic	8	4.2%
Age		
18-25	9	5%
26-40	55	29%
41-55	69	34%
56-65	34	18%
66-74	15	8%
75+	6	3%
Educational Attainment		
No High School Diploma or GED	23	12%
High school Graduate or GED	84	43%
Trade School	18	9%
Associates Degree	39	20%
Bachelor's Degree	21	11%
Master's Degree	10	5%
Doctoral Degree	0	0
Sex		
Male	62	31.8%
Female	133	68.2%
Sexual Orientation		
Heterosexual	156	81%
Homosexual	4	2%
Bisexual	16	8%
Prefer Not to Say	16	8%
Employment Status		
Full-Time	29	12%
Part-Time	24	10%
Unemployed	138	58%

Demographics

What is your age: (Check One)

18-25 ☐   26-40 ☐   41- 55 ☐   56-65 ☐   66-74 ☐   75+ ☐

What is your gender: (Check One)

Male ☐   Female ☐   Prefer not to say ☐

What is your ethnicity: (Check One)

Caucasian ☐   African American/ Caribbean American ☐   Hispanic ☐

Pacific Islander ☐   Native American/ American Indian   Asian ☐

What is your highest level of education: (Check One)

Did not complete High School ☐   High School Diploma/ GED ☐   Associates ☐

Bachelor's Degree ☐   Master's Degree ☐   Doctorate ☐

Trade school Certification ☐

What is your current employment status: (Check One)

Full-Time ☐   Part-Time ☐   Unemployed ☐

What is your sexual orientation: (Check One)

Heterosexual ☐   Homosexual ☐   Bisexual ☐   Prefer not to say ☐

What is your marital status: (Check One)

Single/ Never Married ☐   Legally Separated ☐   Divorced ☐   Widowed ☐

Medical History:

Have you ever been hospitalized overnight due to a psychiatric condition: (Check One)

Yes ☐   No ☐

Are you currently prescribed any of the following medications? (Circle any/ and all medications that you are currently prescribed)

Antidepressants	**Anticonvulsants**
Anafranil (Clomipramine)	Neurontin (Gabapentin)
Tofranil (Imipramine)	Klonopin (Clonazepam)
Lexapro (Escitalopram)	Tegretol (Carbamazepine)
Prozac (Fluoxetine	Keppra (Levetiracetam)
Paxil (Paroxetine)	Depakote (Valproic Acid)
Celexa (Citalopram)	
Zoloft (Sertraline)	**Beta Blocker**
Effexor (Venlafaxine)	Ternormin (Atenolol)
Luvox (Fluvoxamine)	Metoprolol (Lopressor)
Desyrel (Trazadone)	**Anti-anxiolytics/Sedative**
Antipsychotics	BuSpar (Buspirone)
Clozaril (Clozapine)	Ativan (Lorazepam)
Thorazine (Chlorpromazine)	Valium (Diazepam)
Haldol (Haloperidol)	Xanax (Alprazolam)
Seroquel (Quetiapine)	Librium (Chlordiazepoxide)
Geodon (Ziprasidone)	

Elavil (Amitriptyline)

Abilify (Aripiprazole)

Risperdal (Risperdone)

Zyprexa (Olanzapine)

Other _____ (Please write in medication)

If you have more than one prescribed medication, please answer for each separate medication in section 1, 2, and 3

Section 1:

Of the medications circled above, and is prescribed daily, (Please write in your medication)
_____, How often do you full comply with the dosage guidelines on the label?
Please circle your answer below:

1	**2**	**3**	**4**
Never	Rarely	Most of the time	Always

Of the medications circled above, and is prescribed daily, (Please write in your medication)
_____, How often do you full comply with the dosage guidelines on the label?
Please circle your answer below:

1	**2**	**3**	**4**
Never	Rarely	Most of the time	Always

Of the medications circled above, and is prescribed daily, (Please write in your medication)
_____, How often do you full comply with the dosage guidelines on the label?
Please circle your answer below:

1	2	3	4
Never	Rarely	Most of the time	Always

Section 2:

Of the medications circled above, and is prescribed daily, (Please write in your medication)
_____, How often do you take half, or less than half of the recommended dosage of this medication?

1	2	3	4
Never	Rarely	Most of the time	Always

Of the medications circled above, and is prescribed daily, (Please write in your medication)
_____, How often do you take half, or less than half of the recommended dosage of this medication?

1	2	3	4
Never	Rarely	Most of the time	Always

Of the medications circled above, and is prescribed daily, (Please write in your medication)
_____, How often do you take half, or less than half of the recommended dosage of this medication?

1	2	3	4
Never	Rarely	Most of the time	Always

Section 3:

Of the medications circled above, and is prescribed daily, (Please write in your medication)
_____, How likely are you to stop taking this medication completely, without first consulting your prescribing doctor?

1	**2**	**3**	**4**
Never	Unlikely	Likely	Highly Likely

Of the medications circled above, and is prescribed daily, (Please write in your medication)
_____, How likely are you to stop taking this medication completely, without first consulting your prescribing doctor?

1	**2**	**3**	**4**
Never	Unlikely	Likely	Highly Likely

Of the medications circled above, and is prescribed daily, (Please write in your medication)
_____, How likely are you to stop taking this medication completely, without first consulting your prescribing doctor?

1	**2**	**3**	**4**
Never	Unlikely	Likely	Highly Likely

Section 4:

Of the medications circled above, and is prescribed daily, (Please write in your medication)
_____, How often do you take this medication on a daily basis?

1	**2**	**3**	**4**
Once	Twice	Three or more	As needed

Of the medications circled above, and is prescribed daily, (Please write in your medication)
_____, How often do you take this medication on a daily basis?

1	**2**	**3**	**4**
Once	Twice	Three or more	As needed

Of the medications circled above, and is prescribed daily, (Please write in your medication)

_____, How often do you take this medication on a daily basis?

1	**2**	**3**	**4**
Once	Twice	Three or more	As needed

Section 5:

Please circle your answer below:

The majority of the time I take the above medication by <u>myself</u>, without assistance or prompting.

The majority of the time a <u>friend or family member</u> encourages, assists, or reminds me to take the above medication in some way.

Section 6:

If you answered less than 4 for any of the above questions, what are sometimes barriers (factors that get in the way) for taking your medication on-time and/or consistently? (Circle all that apply)

Financial issues/Limitations   Forgetting   Religious Reasons

Side Effects (e.g. impact on appetite, nausea, drowsiness)

History of Addiction   Find it to be an inconvenience

Instructions too complicated   Unsure if medications are working

Other_____

Section 7:

Of the above circled, Please rank the top three barriers of medication compliance beginning with the most significant barrier as #1.

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(Please write in answer):

#1 _____

#2 _____

#3 _____

Section 8:

Ordinarily, how many times each month have you used each of the following drugs in the past year? (NOTE: If you have only used a drug a few times over this past year, answer "0 times")

Circle your response:

Alcohol	0 times	1-2 times	3-9 times	10-20 times	More than 20 times
Amphetamines/ Stimulants/ "uppers"	0 times	1-2 times	3-9 times	10-20 times	More than 20 times
Cocaine/Crack	0 times	1-2 times	3-9 times	10-20 times	More than 20 times
Prescription diet pills	0 times	1-2 times	3-9 times	10-20 times	More than 20 times
Heroin/morphine /opiates	0 times	1-2 times	3-9 times	10-20 times	More than 20 times
Methadone	0 times	1-2 times	3-9 times	10-20 times	More than 20 times
Prescription pain killer pills	0 times	1-2 times	3-9 times	10-20 times	More than 20 times
Barbiturates	0 times	1-2 times	3-9 times	10-20 times	More than 20 times
Quaaludes	0 times	1-2 times	3-9 times	10-20 times	More than 20 times
Tranquilizer Pills	0 times	1-2 times	3-9 times	10-20 times	More than 20 times
LSD/Hallucinogens	0 times	1-2 times	3-9 times	10-20 times	More than 20 times
Ecstasy	0 times	1-2 times	3-9 times	10-20 times	More than 20 times
PCP	0 times	1-2 times	3-9 times	10-20 times	More than 20 times

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Marijuana	**0 times**	**1-2 times**	**3-9 times**	**10-20 times**	**More than 20 times**
Glue	**0 times**	**1-2 times**	**3-9 times**	**10-20 times**	**More than 20 times**
Gasoline or other fumes	**0 times**	**1-2 times**	**3-9 times**	**10-20 times**	**More than 20 times**
Smoking Tobacco	**0 times**	**1-2 times**	**3-9 times**	**10-20 times**	**More than 20 times**
Chewing Tobacco	**0 times**	**1-2 times**	**3-9 times**	**10-20 times**	**More than 20 times**
Anabolic Steroids	**0 times**	**1-2 times**	**3-9 times**	**10-20 times**	**More than 20 times**

Which drug causes you the most problems

Which drug do you prefer the most

Informed Consent
Please read this consent document carefully before you decide to participate in this study. The researcher will answer any questions before you sign this form.

Study Titles:
Medication Non-Compliance: Compliance to Psychotropic Medications within Community Mental Health.
The Impact of Illicit Drug Use on Prescribed Psychotropic Medication Adherence.
Purpose of the Study: The purpose of the current study is to identify factors that prevent individuals from fully taking their medications as prescribed. One of the factors that will be investigated further, is the effect of different levels of drug use on the medication taking behavior of individuals who are prescribed psychotropic medications. Participants are chosen on a voluntary basis, and this study is offered to anyone attending outpatient therapy.

Procedures: Participants will be asked to sign this form, as well as complete the short, attached, survey. The survey will ask for some general demographic information as well information about current medications, how often the individual takes half or less than half of the recommended dosage of the medication, and some potential reasons that may prevent the individual from fully taking the medication as prescribed. Additionally, individuals will be asked about their drug use. If drug use if identified, individuals are asked how many times each month have they used, within the past year.

Potential Risks of Participating: Risks to participants are no more than what is experienced in everyday life.

Potential Benefits of Participating: Participation would allow the medication providers, as well as mental health professionals, to identify factors that prevent individuals from taking their medication fully as prescribed. This will help to develop programs to make medication adherence easier for the participants, resulting effective treatment and improved outcomes for patients.

Confidentiality: All information will be kept completely confidential. After it is collected, the informed consent form will be kept separate from the survey form so there will be no way to match a name to the survey and ensure the information provided cannot be connected to the individual. Instead of using any identifying information on the survey, responses will be assigned a code number. The list connecting your name to this number will be kept in a locked file in the Florida Institute of Technology Psychology Department. Your name will not be used in any report. The only individuals who will have access to your responses are the principal investigators and their advisor. When the study is completed and the data has been analyzed, the data will be destroyed.

Voluntary participation:
Your participation in this study is completely voluntary. There is no penalty for not participating. If you wish to not participate, this will not impact your ability to receive your prescribed medications. You may also refuse to answer any of the questions we ask you.

Right to withdraw from the study:
You have the right to withdraw from the study at any time without consequence.

Whom to contact if you have questions about the study:
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Agreement:
I have read the procedure described above. I voluntarily agree to participate in the procedure and I have received a copy of this description.