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Research Article

Antidepressant adherence among outpatients with major depressive disorder

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Abstract

Major Depressive Disorder (MDD) is a global mental health concern, with treatment often involving antidepressant (AD) medications. However, adherence to these medications remains a significant challenge. This study aims to investigate the factors influencing medication adherence among individuals with MDD in Erbil, Iraq. This study was conducted at Erbil Psychiatric Hospital, a leading mental healthcare facility in Erbil city. Participants aged 18 to 65, diagnosed with MDD as per the DSM-5 criteria, were treated with antidepressants. The recruitment of 106 participants was facilitated by their treating psychiatrists at the hospital. Data analysis was conducted using SPSS version 22, standard for social science research. Out of the 106 participants, 64.2% were females, and 35.8% were males. The largest age group was 35–45, comprising 33% of the sample. A vast majority (99.1%) were under regular follow-up, with only 0.9% experiencing relapse. The primary antidepressant used was selective serotonin reuptake inhibitors (SSRIs) (72.6%). Most participants (61.3%) reported very high medication adherence. The notable barriers included treatment duration (13.4%), forgetting to take antidepressants (11.9%), frequent medication refills (17.9%), cultural and religious beliefs (19.3%), stigma (19.3%), travelling issues (42.9%), and lack of hospitals and clinics (30.8%). Healthcare facilitators such as effectiveness of antidepressants (27.5%), patient-provider relationship such as trusting healthcare providers (50.7%), and reminders such as keeping pills in visible places (65.9%) were prominent facilitators aiding adherence. Future research should focus on culturally tailored interventions and collaborative efforts among stakeholders. By addressing socio-cultural nuances and enhancing mental health support, more effective strategies can be developed to tackle medication adherence challenges in Erbil's unique context.

Keywords

Antidepressants, barriers, facilitators, major depressive disorder, non-adherence

Introduction

Major Depressive Disorder (MDD) is a highly prevalent and incapacitating mental health condition that significantly affects individuals' quality of life worldwide (Ustün et al. 2004). It is characterized by persistent feelings of sadness, hopelessness, and a loss of interest or pleasure in activities. MDD is often accompanied by a range of physical and cognitive symptoms, including changes in sleep patterns, appetite, energy levels, and concentration (Chand et al. 2021).The impact of MDD extends beyond the individual affected, affecting their relationships, work, and overall functioning (Kupferberg et al. 2016).

According to predictions by the World Health Organization (WHO), MDD is expected to become the leading cause of burden disease globally by 2030. This is a major change from its previous ranking as the third leading cause in 2008 (Cahn 2006).

In the pursuit of effective management for MDD, antidepressant medications have emerged as a cornerstone of treatment (Harmer et al. 2017). It paved the way for the development of other classes of antidepressant medications, such as selective serotonin reuptake inhibitors (SSRIs), serotonin-norepinephrine reuptake inhibitors (SNRIs), and more. These medications are designed to regulate neurotransmitter activity in the brain, offering promising prospects for alleviating the distressing symptoms associated with MDD (van Servellen et al. 2011).

However, achieving optimal outcomes in MDD treatment is not without challenges. The issue of treatment adherence stands as a critical consideration. The profound impact of consistent adherence on the treatment trajectory of MDD is undeniable. While antidepressants hold substantial potential for symptom relief and improved functioning, their effectiveness is closely tied to consistent adherence (Banerjee and Varma 2013).

A complex and multifaceted problem related to health care is non-adherence to prescribed medication. Adherence refers to how well patients adhere to prescribed treatments. Non-adherence, whether due to missed doses from forgetfulness, lack of knowledge, inappropriate intake of medication, or cost of medicine (Al-Hamzawi et al. 2015; Semahegn et al. 2020)or side effects (Kuehner 2017), can significantly compromise treatment outcomes. People who don't take their medications as recommended are more likely to experience a worsening of their disease, a reduction in their responsiveness to future treatment, and a reduction in the overall effectiveness of their therapeutic regimen (Niemeyer et al. 2019).

This study attempts to identify the distinctive facilitators and barriers that influence outpatients with major depressive disorder's adherence to antidepressant medication. The study aims to provide a thorough knowledge of the complex interplay of factors influencing patients' decisions and actions about their prescribed drug regimens by moving beyond the boundaries of treatment preferences.

The study intends to make a positive impact on the lives of people coping with major depressive disorder in Erbil, Iraq, by providing insights that can guide tailored interventions, ultimately improving adherence rates, treatment outcomes, and the lives of those who are navigating the disorder.

Methodology

Study design

A qualitative research design was used to examine factors that influence adherence to antidepressant treatment among outpatients with MDD in Erbil. A structured questionnaire with open-ended questions was used. The questionnaire comprised 23 questions and was validated by two consultant psychiatrists and two academic professionals. No participant filled out the questionnaire online; all interviews were conducted face-to-face. The questions were clearly explained to the participants who were willing to join the study in their local language. The author (AY) interviewed the patients, with the interviews facilitated by a consultant psychiatrist (NM). The questionnaire was inspired by a study conducted by Seiw and her colleagues on the barriers and facilitators of adherence to antidepressants (SC Ho et al. 2017). This study was approved by Hawler Medical University, Medical Ethics Committee – College of Medicine.

Study setting

The study was conducted at Erbil Psychiatric Hospital, a prominent healthcare facility in Erbil city specializing in mental health services. Participants were interviewed from September 2023 to October 2023.

Study population

In the study, participants aged 18 to 65 years with a diagnosis of Major Depressive Disorder based on the DSM-5 criteria were treated with antidepressants. Study participants were recruited by their treating psychiatrist at Erbil Psychiatric Hospital. Inclusion criteria was that the participant had to be between the ages of 18 and 65 years of age, diagnosed with major depressive disorder according to DSM-5 criteria, and taking antidepressant medication at the time of participation. Exclusion criteria were patients under 18 years and major depression with psychotic features.

Sample size

To determine the sample size for this study, the Daniel formula was used, considering the prevalence of Major Depressive Disorder (MDD) in Iraq, which is approximately 7.4% (Al-Hamzawi et al. 2015). The Daniel formula considers the desired level of confidence, expected prevalence, and precision to calculate the required sample size.

$$n = \frac{Z^2 \cdot P(1-P)}{d^2}$$

With a confidence level of 95% (corresponding to a Z-score of 1.96) and a desired margin of error of 0.05, the formula was applied to yield an estimated sample size of 106 participants. The author asked every patient upon their appointment queue who were eligible for the study until the desired sample size was achieved. All participants were interviewed in the outpatient clinic from Erbil Psychiatric Hospital during the study period. A total of 106 participants were successfully recruited for this study. This final sample size nonetheless provides a substantial dataset for qualitative analysis, enabling a comprehensive exploration of adherence behaviors, barriers, and facilitators in the context of the study in Erbil city, Iraq.

Statistical analysis

For the statistical analysis of social science data, SPSS version 27 software was used. Data were summarized using descriptive statistics, and relationship between variables was examined using correlation analysis.

Results

An overall sample of 106 participants was included in this study. Of these, 64.2% were females (n = 68) and 35.8% were males (n = 38). Most participants were between the ages of 35 and 45, representing 33% of the sample (n = 35). In terms of highest educational level, 33% (n = 35) of respondents were illiterate, while an equal number had completed primary school. In terms of marital status, the majority of participants, 75.5% (n = 80) identified as married, while 19.8% (n = 21) identified as single. Current work status varied, with housewives constituting the largest group at 52.8% (n = 56) of the sample, followed by the unemployed at 24.5% (n = 26) and employees at 17% (n = 18). Participants' monthly income revealed that the majority, 67.9% (n = 72), did not receive a salary. Next in line was the group earning between 600,000 and 800,000 IQD ($458.39 to $611.19), comprising 11.3% (n = 12).

Regarding the 'current status of MDD' for the 106 participants in the study, 99.1% (n = 105) were being followed up for their condition; 0.9% (n = 1) was categorized as having a relapse. An overview of the sociodemographic characteristics of the participants is presented in (Table 1). Most participants (59.4%, n = 63) experienced their longest episode of Major Depressive Disorder (MDD) lasting between 1 to 5 years. Similarly, among these participants, the most common duration for antidepressant use was also 1 to 5 years. Seventy-two point six percent (n = 77) were primarily using selective serotonin reuptake inhibitors (SSRIs), other antidepressants used were serotonin-norepinephrine reuptake inhibitors (SNRIs), SSRIs along with other types, and a combination of SSRIs, tricyclics, and other antidepressants (3.8%, 3.8%, and 17.9% respectively). Concerning other adjunctive medications, in addition to antidepressants, 82 participants were also taking other types of medication. Antipsychotic medications were the most used, taken by 93.9% participants (n = 77), and 6.1% (n = 5) were using benzodiazepines. Concerning co-morbidities, 44 individuals had at least one additional medical condition. The most common was hypertension, reported by 34.1% (n = 15). This was followed by other conditions such as diabetes, hyperthyroidism, rheumatoid diseases, and other unspecified conditions (6.8%, 6.8%, 4.5%, and 47.7% respectively). The last significant finding pertained to medication adherence. A majority of participants, 61.3% (n = 65), reported being very adherent to their medication regimen. Regarding their wishes about MDD, most patients (92.5%, n = 98) wished for a complete recovery, with a small proportion hoping to avoid relapse. (Table 2) summarizes the patient characteristics.

Table 1. Socio-demographic data of the participants.

Variables		No.	%
Gender	Female	68	64.2%
	Male	38	35.8%
	Total	**106**	**100.0%**
Age group	18-25	7	6.6%
	25-35	26	24.5%
	35-45	35	33.0%
	45-55	23	21.7%
	55-65	10	9.4%
	> 65	5	4.7%
	Total	**106**	**100.0%**
Educational level	Illiterate	35	33.0%
	Primary school	35	33.0%
	Secondary school	25	23.6%
	Diploma	9	8.5%
	University or higher	2	1.9%
	Total	**106**	**100.0%**
Religion	Muslim	105	99.1%
	Christian	1	0.9%
	Total	**106**	**100.0%**
Marital status	Single	21	19.8%
	Married	80	75.5%
	Separated	1	0.9%
	Widowed	4	3.8%
	Total	**106**	**100.0%**
Current work	Employee	18	17.0%
	Unemployed	26	24.5%
	Housewife	56	52.8%
	Retired	6	5.7%
	Total	106	**100.0%**
Monthly income	No salary	72	67.9%
	600-800000 ID	12	11.3%
	150-250000 ID	7	6.6%
	350-450000 ID	4	3.8%
	450-600000 ID	2	1.9%
	250-350000 ID	2	1.9%
	>100000	7	6.6%
	Total	**106**	**100.0%**
Educational level	Illiterate	35	33.0%
	Primary school	35	33.0%
	Secondary School	25	23.6%
	Diploma	9	8.5%
	University or higher	2	1.9%
	Total	**106**	**100.0%**
Current work	Employee	18	17.0%
	Unemployed	26	24.5%
	Housewife	56	52.8%
	Retired	6	5.7%
	Total	**106**	**100.0%**
Current phase of illness	Follow up	105	99.1%
	Relapse	1	0.9%
	Total	**106**	**100.0%**

Patient-related barriers to adherence in antidepressant medication were notably highlighted in our study (Table 3). Among these barriers, 9.6% of participants identified misconceptions about MDD itself as a prominent obstacle. This was followed by concerns regarding

the fear of drug dependence, reported by 6.2%. Forgetfulness due to a busy schedule was acknowledged by 7.8%. Forgetting to take antidepressants due to a busy schedule means that patients forget to take their medication because of the demands of their working hours. The workload adds to the burden of remembering to take medication. Patient attitudes, including a dislike for pills, was reported by 11.1% of the participants. Medication barriers, such as side effects, were acknowledged by 9.0% of the participants. Additionally, misconceptions about antidepressants (4.4%), and simply forgetting to take antidepressants (11.9%) (simply forgetting to take their antidepressant, or because of the cognitive impairment as a symptom induced by depression), being away from home (3.1%), the belief that medication doesn't work for them (8.0%), pill burden (5.2%), and concerns about treatment duration (13.4%), and cost (10.3%) were among the patient-related barriers identified.

Table 2. Patient characteristics.

Variables		No.	%
Duration of the depressive illness	<1	15	14.2%
	1–5	63	59.4%
	6–10	18	17.0%
	11–15	6	5.7%
	16–20	4	3.8%
	Total	**106**	**100.0%**
Duration of AD use	<1	18	17.0%
	1–5	63	59.4%
	6–10	16	15.1%
	11–15	5	4.7%
	16–20	3	2.8%
	>20	1	0.9%
	Total	**106**	**100.0%**
Type of the AD used	SSRI	77	72.6%
	SNRI	4	3.8%
	Others	4	3.8%
	SSRI plus Tricyclic AD	19	17.9%
	Tricyclic AD	2	1.9%
	Total	**106**	**100.0%**
Other adjunctive medications	Antipsychotics	77	93.9%
	Benzodiazepines	5	6.1%
	Total	**82**	**100.0%**
Comorbidities	Hypertension	15	34.1%
	Diabetes	3	6.8%
	Hyperthyroidism	3	6.8%
	Rheumatoid diseases	2	4.5%
	Others	21	47.7%
	Total	**44**	**100.0%**
Medication adherence	Very adherent	65	61.3%
	Partially adherent	24	22.6%
	Moderately adherent	15	14.2%
	Not adherent at all	2	1.9%
	Total	**106**	**100.0%**
Insight	Wish for complete recovery	98	92.5%
	Fear of relapse	8	7.5%
	Total	**106**	**100.0%**

Healthcare provision system and its influence on adherence wereidentified (Table 3). Notably, stock problems within the healthcare provision system accounted for 11.8% of the challenges. The debate between brand and generic medications affected 15.6% of respondents. Multiple prescribers posed a challenge for 12.6% of the surveyed individuals. Issues related to communication with healthcare providers due to physician time constraints were highlighted by 5.6% of participants. Moreover, long waiting times at outpatient hospitals and private clinics impacted 10.9% of the surveyed population. Frequent medication refills accounted for 17.9% of the challenges. Twelve point six percent of respondents highlighted the challenge of frequent clinic visits. Additionally, a significant 12.9% reported other unspecified factors impacting adherence, indicating a range of diverse obstacles beyond the specified categories.

Socio-cultural barriers impacting adherence were identified (Table 3). Notably, lack of support from family, spouse, or friends accounted for 13.0% of the challenges. Barriers linked to religious and cultural beliefs were reported by 19.3% of respondents. Stigma surrounding the illness represented another substantial barrier, also reported by 19.3% of participants. Additionally, family economic support (17.2%), lack of family knowledge about the illness (14.1%), and low-income family circumstances (16.9%) emerged as significant socio-cultural factors affecting adherence.

In Erbil City, government-related barriers to healthcare access were identified (Table 3). These include the absence of tertiary hospitals and clinics (30.8%), a shortage of psychotherapists (1.3%), limited availability of psychiatrists (25.0%), and significant challenges related to traveling to distant locations (42.9%).

In Erbil City, several healthcare facilitators regarding antidepressant medication were identified (Table 3). Positive beliefs about antidepressants (23.9%), their perceived effectiveness (27.5%), reducing pill count (17.7%), awareness of adverse effects (8.3%), and understanding the importance of adherence for positive outcomes (22.6%) were identified as significant healthcare facilitators.

In the patient-provider relationship, several key aspects were highlighted (Table 3). Trust in healthcare providers (50.7%) and a desire to please them (47.8%) were prominent. A very small percentage (1.0%) expressed fear of healthcare providers.

Reminders aiding adherence were identified in various forms (Table 3). Keeping medications in visible places significantly supported adherence for 65.9% of participants, while reminders from family members were helpful for 28.5%. Additionally, using pillboxes (3.3%) and having a monitoring calendar (2.4%) were less commonly reported as facilitators for adherence.

To analyze the relationship between barriers and gender, as well as facilitators and gender, a chi-square test was employed on the collected data. The chi-square test is used to determine whether there is a significant association (or independence) between categorical variables. The data was structured into a contingency table, with barriers and facilitators as the categorical variables, and gender as the grouping variable. This statistical test enabled the assessment of whether there was a significant association between gender and the encountered barriers or facilitators (Table 4).

Table 3. Barriers and facilitators among participants.

Patient-related barriers	Responses		Percent of Cases
	N	Percent	
Misconceptions about MDD	37	9.6%	37.0%
Fear of drug dependence	24	6.2%	24.0%
Forgetfulness (having a busy schedule)	30	7.8%	30.0%
Patient attitudes (dislike for the pills)	43	11.1%	43.0%
Medication barriers (side effects)	35	9.0%	35.0%
Misconception about AD	17	4.4%	17.0%
Simply forgetting to take their ADs	46	11.9%	46.0%
Being away from home	12	3.1%	12.0%
Belief that the medication doesn't work for them	31	8.0%	31.0%
Pill burden	20	5.2%	20.0%
Treatment duration	52	13.4%	52.0%
Cost	40	10.3%	40.0%
Total	**387**	**100.0%**	**387.0%**
Health care provision and system barriers	**Responses**		**Percent of Cases**
	N	**Percent**	
Stock problem	40	11.8%	42.6%
Brand vs generic	53	15.6%	56.4%
Multiple prescribers	43	12.6%	45.7%
Problems communicating with healthcare providers (physician time constraint)	19	5.6%	20.2%
Long waiting time at the clinic (outpatient hospital and private clinic)	37	10.9%	39.4%
Frequent medication refills	61	17.9%	64.9%
Frequent clinic visits	43	12.6%	45.7%
Others	44	12.9%	46.8%
Total	**340**	**100.0%**	**361.7%**
Sociocultural barriers	**Responses**		**Percent of Cases**
	N	**Percent**	
Lack of support from family, spouse, or friends	50	13.0%	49.0%
Barriers related to religious and cultural beliefs	74	19.3%	72.5%
Stigma	74	19.3%	72.5%
Lack of family economic support	66	17.2%	64.7%
Family's lack of knowledge about the illness	54	14.1%	52.9%
Low-income family	65	16.9%	63.7%
Total	**384**	**100.0%**	**376.5%**
Government barriers	**Responses**		**Percent of Cases**
	N	**Percent**	
Lack of tertiary hospitals and clinics	48	30.8%	57.8%
Lack of psychotherapist	2	1.3%	2.4%
Lack of specialist (psychiatrics)	39	25.0%	47.0%
Travel issues (far locations)	67	42.9%	80.7%
Total	**156**	**100.0%**	**188.0%**
Healthcare facilitators	**Responses**		**Percent of Cases**
	N	**Percent**	
Positive beliefs about ADs	78	23.9%	75.0%
Effectiveness of the ADs	90	27.5%	86.5%
Reduced number of pills	58	17.7%	55.8%
Awareness about the AD	27	8.3%	26.0%
Importance of adherence and outcomes	74	22.6%	71.2%
Total	**327**	**100.0%**	**314.4%**
Patient-provider relationship	**Responses**		**Percent of Cases**
	N	**Percent**	
Trust in healthcare providers	105	50.7%	100.0%
Desire to please the healthcare providers	99	47.8%	94.3%
Fear of healthcare providers	2	1.0%	1.9%
Total	**207**	**99.5%**	**196.2%**
Reminders	**Responses**		**Percent of Cases**
	N	**Percent**	
Using pillboxes	4	3.3%	3.8%
Reminder from family members	35	28.5%	33.0%
Keeping medications in visible places	81	65.9%	76.4%
Having calendar for monitoring plan	3	2.4%	2.8%
Total	**123**	**100.0%**	**116.0%**

Table 4. Correlations of the Barriers and facilitators.

		Gender				
		Female		Male		p*
		Count	%	Count	%	
Q15	Misconceptions about MDD	25	25.0%	12	12.0%	p>0.05
	Fear of drug dependence	15	15.0%	9	9.0%	
	Forgetfulness (having a busy schedule)	15	15.0%	15	15.0%	
	Patient attitudes (dislike of the pills)	27	27.0%	16	16.0%	
	Medication barriers (side effects)	20	20.0%	15	15.0%	
	Misconception about ADs	11	11.0%	6	6.0%	
	Simply forgetting to take their AD	27	27.0%	19	19.0%	
	Being away from home	7	7.0%	5	5.0%	
	Belief that the medication doesn't work	21	21.0%	10	10.0%	
	Pill burden	12	12.0%	8	8.0%	
	Treatment duration	31	31.0%	21	21.0%	
	Cost	25	25.0%	15	15.0%	
Q16	Stock problem	25	26.6%	15	16.0%	p>0.05
	Brand vs generic	31	33.0%	22	23.4%	
	Multiple prescribers	27	28.7%	16	17.0%	
	Problems communicating with healthcare providers (physician time constrain)	13	13.8%	6	6.4%	
	Long waiting time at the clinic (outpatient hospital and private clinic)	26	27.7%	11	11.7%	
	Frequent medication refills	40	42.6%	21	22.3%	
	Frequent clinic visits	28	29.8%	15	16.0%	
	Others	27	28.7%	17	18.1%	
Q17	Lack of support from family/spouse/friends	37	36.6%	13	12.9%	p<0.001**
	Barriers related to religious and cultural beliefs	46	45.5%	28	27.7%	
	Stigma	44	43.6%	30	29.7%	
	Family economic support	46	45.5%	20	19.8%	
	Family's lack of knowledge about the illness	42	41.6%	12	11.9%	
	Lack of family economic support	43	42.6%	22	21.8%	
Q18	Lack of tertiary hospitals and clinics	33	39.8%	15	18.1%	p>0.05
	Lack of psychotherapist	2	2.4%	0	0.0%	
	Lack of specialist (psychiatrics)	27	32.5%	12	14.5%	
	Travel issues (far locations)	43	51.8%	24	28.9%	
Q20	Positive beliefs about ADs	49	47.1%	29	27.9%	p>0.05
	Effectiveness of ADs	60	57.7%	30	28.8%	
	Reduced number of pills	39	37.5%	19	18.3%	
	Awareness about the AD	16	15.4%	11	10.6%	
	Importance of adherence and outcomes	45	43.3%	29	27.9%	
Q21	Trust in healthcare providers	67	63.8%	38	36.2%	p>0.05
	Desire to please the healthcare providers	63	60.0%	36	34.3%	
	Fear of healthcare providers	2	1.9%	0	0.0%	
Q22	Using pillboxes	3	2.8%	1	0.9%	p<0.001**
	Reminders from family members	14	13.2%	21	19.8%	
	Keeping medications in visible places	57	53.8%	24	22.6%	
	Having calendar for monitoring plan	1	0.9%	2	1.9%	

*Chi-square test is used- **p<0.01.

There is a significant difference in the distribution of responses related to lack of support from family/spouse/friends between females and males (p<0.001). The difference is statistically significant, indicating that gender may influence the perception of support from family/spouse/friends. There is a significant difference in the distribution of responses related to using pillboxes between females and males (p<0.001). The difference is statistically significant, suggesting that gender may influence the likelihood of using pillboxes. In summary, when the p-value is greater than 0.05, it suggests that there is no significant association between the variables being compared, when the p-value. is less than 0.05, it indicates a significant association.

Discussion

A total of 106 individuals participated in this study, consisting of 68 females and 38 males. This gender distribution aligns with the well-established observation that depression occurs twice as frequently in women as in men (Kuehner 2017). Concerning age, 6.6% were within the 18–25 age range in our study. This doesn't match exactly with our expectations, given that the National Institute of Mental Health considers this age group as having the highest prevalence of Major Depressive Disorder (MDD). This difference shows potential local demographic and cultural impacts on MDD recognition and management in Erbil.

Additionally, the majority of study participants had limited educational attainment, a factor associated with an elevated risk of mental health disorders (Niemeyer et al. 2019) Most were also not employed, and a significant portion reported low or no income, a known risk factor for a heightened incidence of depression (Ridley et al. 2020). Most participants were married; research has indicated that marital status is associated with MDD, potentially influenced by age and gender (Bulloch et al. 2017). Research often suggests marriage protects against depression. The high percentage of illiteracy (33%) and the majority being married (75.5%) in our study present a distinct demographic finding compared to studies in Western settings, where patients often have higher educational levels and varied marital statuses (Cohen et al. 2020). A study was done in Bulgaria with the aim of providing information about the level of the participants' awareness and opinions on psychiatric disorders, psychiatric healthcare and the medical staff working in the mental healthcare system. A total of 238 people were surveyed, 75 of whom have relatives with mental illness and 154 who do not. The results show that there was no statistical difference among both groups in the study. However, there was a significant difference in some answers regarding awareness of psychiatric disorders (Dimitrova et al. 2020). Most patients' status indicated follow-up. The primary treatment consisted of SSRIs, which are preferred for their better tolerability and recognized as the first line of treatment (Kendrick et al. 2019). The majority of them were also prescribed antipsychotics, known to reduce depressive symptoms when used adjunctively (Spielmans et al. 2016).

Barriers

Self-reported compliance did not match actual behavior. In most cases, participants claimed compliance with their antidepressant treatment, but further investigation revealed irregularities, including missed doses that spanned weeks. This phenomenon may be explained by a number of factors. A psychiatric disorder like MDD has a tendency to cause cognitive impairments, including forgetfulness, as one of its consequences. This aspect is supported by literature suggesting that cognitive deficits are prevalent in individuals with MDD (Rockell et al. 2008). Furthermore, some participants might miss doses intentionally due to concerns about medication side effects or perceived ineffectiveness. Some people might skip their medication because they worry about its side effects or doubt its effectiveness. Others may only take their medication when they feel down, stopping when they feel better. This on-and-off approach, based on their own judgment rather than following a doctor's advice, makes it hard to treat long-term mental health conditions effectively. In addition, it is important to consider that patients sometimes mistakenly link their bodily symptoms or pains, which may be unrelated, to the use of antidepressants. This misperception can lead them to discontinue their medication even prematurely, assuming these unrelated symptoms are adverse effects of their treatment. This highlights the need for thorough patient education regarding the actual side effects of antidepressants and the importance of open communication with healthcare providers to correctly interpret and address any health concerns that arise during treatment (While 2020). Intentional non-adherence to medication can result from a lack of motivation, influenced by patient beliefs, the stigma attached to certain drugs, or the reminder of illness associated with taking pills (Hugtenburg et al. 2013). Non-adherence due to forgetfulness is a common concern, aligning with consistent findings in previous research on psychiatric disorders (While 2020). Numerous studies have documented instances where patients fail to adhere to their antidepressant medication regimens due to forgetfulness (SC Ho et al. 2017; Shrestha Manandhar et al. 2017). This observation is particularly relevant in the context of our study, where we identified forgetfulness as a notable barrier to medication adherence.

Misconceptions about Major Depressive Disorder (MDD) and antidepressant (AD) medications were also prevalent. The study underscores the profound influence of socio-cultural stigma on mental health in the region. MDD is stigmatized, resulting in isolation, delays in seeking treatment, and a reluctance to acknowledge the disease. The topic of dealing with the stigma of "mental illness" is an actual problem and affects not only the patients, their relatives, general practitioners, specialists working in the field of mental health, but also the whole of society. It is presented as a set of negative beliefs and attitudes that provoke fear, rejection, avoidance and discrimination of the mentally ill. Fears of a psychiatric diagnosis are largely related to rejection by the surrounding environment – family, work or society, as the sense of belonging to a certain group is an important condition for integration and successful functioning in life. Associative stigma, a lesser-explored facet of psychiatric stigma, refers to the stigmatization of individuals who are associated with those already stigmatized due to mental illness. This phenomenon, also known as stigma by association, can impact not only the individuals with mental illness but also their families and mental health professionals (Corrigan and Watson 2002). Cultural norms that favor traditional healing and view medication as a last resort further compound the issue. Cultural factors contribute to misconceptions. Studies conducted in Malaysia have illuminated the impact of cultural beliefs on healthcare-seeking behavior. These cultural beliefs often lead individuals to seek out traditional healing practices instead of conventional medical treatments (Khan et al. 2010; Chong et al. 2013). Tailored interventions that engage local communities, possibly through religious leaders or community elders, could significantly reduce stigma and enhance adherence.

Medication-related barriers, particularly concerns about side effects and costs, featured prominently. The cost of medications constitutes another barrier to adherence, exacerbated by socio-economic factors like low

income and limited employment opportunities. Patients often face financial constraints that hinder their ability to consistently adhere to treatment regimens.

As for health care provision system, frequent medication refills and the choice between brand and generic antidepressants emerged as a noticeable barrier in our study, despite research indicating no significant differences in discontinuation rates between brand and generic antidepressants (Kautzner et al. 2011). Additionally, the challenges of frequent clinic visits, long waiting times at the clinic, and multiple prescribers were identified as barriers that contributed to treatment discontinuation, aligning with findings from previous research (Marasine and Sankhi 2021).

Regarding socio-cultural factors, various factors contribute to non-adherence in mental health treatment. In Delhi, religious and cultural beliefs, such as viewing depression as punishment from God, influence non-adherence (Jugal et al. 2007). Additionally, the stigma associated with Major Depressive Disorder (MDD) can pose another significant barrier for patients. This includes beliefs that they may not need medication treatment, fears of dependency on medications, and embarrassment associated with taking prescribed medications (Shi et al. 2024). This stigma extends beyond just taking medication to broader societal perceptions and discrimination against those with mental illness (Abdisa et al. 2020) . Furthermore, the absence of support from family, spouses, and friends intensifies depression and correlates with higher non-adherence rates, as social support plays a crucial role in predicting depressive symptoms. Together, these factors underscore the complex interplay leading to non-adherence in mental health treatment (Alsubaie et al. 2019).

Governmental barriers, such as the presence of only one psychiatric hospital in Erbil, highlights another barrier challenge. In rural areas, healthcare access is constrained due to a scarcity of facilities and a higher likelihood of health professional shortage areas, making it challenging for residents to find and use services (Dobis and Todd 2022). The scarcity of healthcare resources in the most rural areas compels patients to seek treatment in cities, introducing travel difficulties as a barrier to accessing essential medical care. Transportation challenges in our city, particularly the limited availability and low usage of buses and other public transportation, could impact medication adherence. Individuals with limited transportation options, especially those with low incomes, may face difficulties in accessing healthcare facilities regularly, including the psychiatric hospital.

Facilitators

The majority of participants identified the 'effectiveness of antidepressants' as the primary facilitator for adhering to their treatment. This aligns with findings from a similar study conducted in Malaysia, where 90% of patients continued their antidepressants due to their perceived health benefits in treating Major Depressive Disorder (MDD) (SC Ho et al. 2017). It emphasizes the importance of beliefs and attitudes in influencing treatment adherence. A consistent and positive attitude towards antidepressants has been shown to influence individuals' engagement with their treatment and their recovery through a more proactive use of mental health services (Aromaa et al. 2011).

Additionally, in our study, trusting healthcare providers and a desire to please them were significant facilitators for adherence. Similar findings in the Malaysian study highlighted patients' belief in physicians as experts and a desire to help them by continuing antidepressant treatment, emphasizing the importance of the patient-physician relationship in ensuring adherence to Major Depressive Disorder (MDD) treatment (SC Ho et al. 2017). Furthermore, in our study, it was also reported that participants found keeping their medications visible helped facilitate adherence. Research has shown that strategies that involve contextual cues, such as visible placement, enhance adherence to medication regimens (Stawarz et al. 2016). Moreover, participants reported that family reminders facilitated their adherence. The findings are consistent with those of a study among university students, which showed that reminder apps can be beneficial when it comes to adhering to antidepressant medication regimens (Hammonds et al. 2015).

Interventions tailored to the local context

Customized interventions are vital in Erbil. Community-based educational programs can dispel myths about mental health. Involving religious leaders can help reduce stigma associated with psychiatric medications. Policymakers play a pivotal role in enhancing medication affordability, ensuring accessibility for all. Aligning strategies with Erbil's unique socio-cultural and political landscape is essential for fostering improved mental health support and medication adherence.

Addressing political factors

Political factors, such as conflict and instability, significantly affect mental health and healthcare access in Erbil. These indirect impacts can disrupt healthcare services, cause medication shortages, and increase stress and anxiety among patients, thereby affecting adherence. Acknowledging and mitigating these political effects is crucial for ensuring consistent access to treatment and support for mental health conditions. The military could be a source of help for these patients. The civil-military cooperation ("Civil-Military Cooperation", CIMIC) gives support to the society and the local population in peacetime and during war. The Ministry of Health plays a crucial role in providing medication, medical care, and treatment options for patients. Similarly, civil-military cooperation is vital around medical care for troops, including mental health support. Military doctors must be competent in assisting individuals with mental health issues and offering guidance in this regard (Grigorov et al. 2019).

Interpretation of findings

The study from Erbil finds that cultural attitudes and healthcare issues strongly influence how people follow their antidepressant treatment plans. Stigma, myths about

depression, and traditional healing are big obstacles, in addition to problems like high medication costs and lack of healthcare services. This shows the special situation in Erbil, where cultural beliefs and healthcare access are key to mental health care success.

Limitations

Limitations in our study may include the small group of participants (106), which might not fully show the variety of Erbil's population. Its in-depth, qualitative approach makes it difficult to apply the findings widely. Also, since it relies on self-reported questionnaire, there's a chance they might not fully disclose their struggles with following their treatment due to fear of judgment or misunderstanding.

Implications for practice

The study implies mental health strategies in Erbil should be culturally aligned, targeting stigma reduction, and improving medication access. It stresses the value of good relationships between patients and healthcare providers, and family support, for better treatment adherence.

Conclusion and future directions

In conclusion, this study illuminates the critical factors influencing medication adherence among individuals with MDD in Erbil, Iraq. Medication-related barriers, cultural factors, socio-economic challenges, and psychosocial support networks all play pivotal roles. Future research should explore how awareness programs affect stigma around depression, the impact of education on local beliefs about treatment, and long-term treatment adherence in Erbil's socio-political context. To improve adherence, policies could establish medications for the low-income population, integrate mental health services into primary care for better access, and train healthcare providers in culturally sensitive practices, emphasizing the family and the community's role in mental health care.

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Supplementary material 1

Ethical approval

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