ORIGINAL RESEARCH

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EVALUATING THE IMPACT OF SELECTIVE SEROTONIN REUPTAKE INHIBITORS AND SEROTONIN-NOREPINEPHRINE REUPTAKE INHIBITORS ON SODIUM LEVELS IN OUTPATIENTS OF THE JORDANIAN ROYAL MEDICAL SERVICES DURING 2021

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ABSTRACT

1. Introduction: Selective Serotonin Reuptake Inhibitors (SSRIs) and Serotonin-Norepinephrine Reuptake Inhibitors (SNRIs) are widely prescribed antidepressants known to impact sodium levels in the blood. Understanding how different SSRIs and SNRIs affect sodium levels is crucial for optimizing treatment plans and minimizing risks associated with electrolyte disturbances. This study aims to investigate the influence of SSRIs and SNRIs on sodium levels in outpatients of the Jordanian Royal Medical Services (JRMS) during 2021.

2. Objective: The objective of this study is to quantitatively evaluate the effects of commonly prescribed SSRIs and SNRIs on sodium levels within an outpatient setting at the Jordanian Royal Medical Services during the year 2021. By focusing on a specific patient cohort, this research aims to uncover drug-specific patterns in sodium level alterations, thereby aiding clinicians in making informed decisions regarding antidepressant prescriptions. This study seeks to determine which of these antidepressants are more likely to cause significant changes in sodium levels, thereby influencing drug choice, especially in patients at increased risk of hyponatremia.

3. Methodology: A retrospective analysis will be conducted for 54 patients using data obtained from JRMS outpatient electronic medical records for the year 2021. The dataset will include information on the generic name of the antidepressant, patient demographics (including age and gender), and sodium levels (mEq/L). Descriptive statistics will be employed to analyze sodium levels across different SSRIs and SNRIs, with particular attention to demographic variables such as age and gender. This study provides valuable insights into the real-world impact of antidepressant medications on sodium balance, offering clinician's guidance for safer prescribing practices and enhanced patient care.

Keywords: SSRIs, SNRIs, Hyponatremia, Electrolyte Balance, Jordanian Royal Medical Services, Outpatient, Drug Safety, Antidepressant Side Effects.

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1. INTRODUCTION:

Major depressive disorder, anxiety disorders, and obsessive-compulsive disorder are just a few of the mental conditions for which selective serotonin reuptake inhibitors (SSRIs) and serotonin-norepinephrine reuptake inhibitors (SNRIs) are among the most effective pharmaceutical treatments. Mood, anxiety, and general quality of life are all known to be enhanced by these drugs. Both SSRIs and SNRIs have therapeutic benefits, but they also have adverse effects, some of which can be quite serious[1].

A less well-known but nonetheless significant negative effect of SSRIs and SNRIs is their possible influence on electrolyte balance, namely on blood sodium levels. Numerous physiological functions, such as maintaining fluid balance, conveying nerve messages, and controlling blood pressure, depend on sodium. As a result, changes in salt levels can cause a variety of clinical symptoms, ranging from minor to severe[2].

One known side effect of taking SSRIs and SNRIs is hyponatremia, which is characterized by an excessively low blood salt level. The syndrome of inappropriate antidiuretic hormone secretion (SIADH) is considered to be connected to the pathophysiology of hyponatremia generated by SSRIs and SNRIs. Because SIADH causes the body to retain water excessively, it dilutes sodium and lowers its concentration in the serum[3].

When selecting a suitable treatment plan, clinicians must consider the variations in the incidence of hyponatremia among various SSRIs and SNRIs. This is especially important for populations at risk, such as the elderly or those with pre-existing conditions that may make them more susceptible to electrolyte imbalances[4].

This study intends to examine the effects of five frequently prescribed SSRIs and SNRIs (Citalopram, Escitalopram, Fluoxetine, Sertraline, and Venlafaxine) on sodium levels among outpatients served by the Jordanian Royal Medical Services (JRMS) in 2021, given the clinical significance of this side effect. This study aims to quantify the association between these medications and changes in sodium levels through the analysis of real-world data, providing information that may help prescribers follow safer and more efficient guidelines.

The aim of this study is to enhance patient outcomes and help healthcare practitioners minimize potential hazards associated with psychiatric pharmacotherapy by adding to the greater understanding of medication safety profiles in this context.

2. METHOD:

Study Design and Setting: In order to evaluate the effects of serotonin-norepinephrine reuptake inhibitors (SNRIs) and selective serotonin reuptake inhibitors (SSRIs) on sodium levels in outpatients of Jordanian Royal Medical Services (JRMS) in 2021, this study used a retrospective cohort design. 54 patients (23 men and 31 women) whose ages ranged from 21 to 92 years and who had been prescribed any of the study medications had their data gathered. The JRMS offers complete medical records and covers a broad population, making it a significant source of data for this kind of pharmacological research.

Data Collection: The JRMS's electronic health records (EHR) provided the dataset for this investigation. In order to maintain patient confidentiality and adhere to ethical guidelines, the records contained comprehensive patient data that had been anonymised. The information that was retrieved comprised the following: Age (documented at the time of therapy), Gender (recorded as male or female), Sodium Level (Na level in mEq/L), and Generic Name of Drug (identifying whether the patient was prescribed Citalopram, Escitalopram, Fluoxetine, Sertraline, or Venlafaxine).

Data Analysis: Descriptive statistics were used in the statistical analysis to compile the patients' age and gender as well as their salt levels. The three main variables of interest were: patient demographics (analyzed in order to search for any potential correlations between age or gender and changes in sodium levels), range of sodium levels (identified to evaluate the extent of sodium level variation associated with each drug), and mean sodium levels (calculated for each drug to assess central tendencies).

Ethical Considerations: Ethical standards were adhered to safeguard patient confidentiality and data. Every patient's data was safely saved and anonymized. The relevant institutional review board (IRB) of the JRMS examined and approved the study design and data management protocols.

3. RESULTS:

Demographic Analysis:54 patients receiving SSRIs and SNRIs at Jordan's Royal Medical Services in 2021 made up the study population. Thirty-one were female and twenty-three were male. The patients' ages varied from 21 to 92 years old. The distribution of the various drugs by age and gender is shown below (Table 1 and Table 2).

Table 1: Demographic characteristics of the study participants

Gender	Male	23
	Female	31
Age Distribution	Youngest	21
	Oldest	92
	Average Age	58.15

Table 2: The distribution of the various drugs by age and gender

Drug	Number of Patients	Mean Age (years)	Age Range (years)	Females	Males
Citalopram	26	56.2	21-77	19	7
Escitalopram	7	58.7	49-78	4	3
Fluoxetine	5	41.0	27-52	5	0
Sertraline	11	60.4	21-89	7	4
Venlafaxine	5	64.4	53-92	0	5

There was no statistically significant difference between the male and female individuals (p=0.139), indicating that gender had no discernible impact on the drugs' ability to reduce sodium levels.

Sodium Levels Analysis: Sertraline showed the most variation in sodium levels, with the lowest level in the dataset (113 mEq/L) among the recorded levels, according to the research. This could indicate outliers or a higher chance of serious hyponatremia. In contrast, the sodium levels of fluoxetine exhibited the narrowest variation, which may point to a more consistent pharmacologic profile in terms of electrolyte balance. Overall, a thorough statistical analysis showed that there was no discernible difference between the medications (p=0.082) (Table 3).

Table 3: The distribution of the levels of sodium in study groups

Drug	Number of Measurements	Sodium Levels Range (mEq/L)	Mean Sodium Level (mEq/L)
Citalopram	26	121 to 141	131.5
Escitalopram	7	129 to 134	131.3
Fluoxetine	5	129 to 131	129.8
Sertraline	11	113 to 132	126.9
Venlafaxine	5	125 to 129	127.4
Overall	54	113 to 141	129.87

Interpretation of Findings: These findings show that the effects of various SSRIs and SNRIs on levels of sodium vary. While some medications, such as Citalopram and Escitalopram, tend to maintain sodium levels within a narrower and higher range, others, such as Sertraline, may

predispose patients to more significant fluctuations, potentially increasing the risk of hyponatremia, based on the observed mean sodium levels and their ranges. When administering these drugs, especially to patients who are more likely to experience electrolyte imbalances, health professionals should take these findings into account.

4. DISCUSSION:

Studying how SSRIs and SNRIs affected sodium levels in a cohort of outpatients from Jordan's Royal Medical Services (JRMS) in 2021 brought to light a number of significant pharmacological issues and clinical ramifications.

Variation in Sodium Impact by Medication: Our findings suggest that the effects of various SSRIs and SNRIs on serum sodium vary noticeably. Among the drugs examined, sertraline had the widest range of sodium levels and the lowest recorded sodium level (113 mEq/L), which may indicate that it has a greater tendency to cause hyponatremia than the other drugs. This finding is consistent with earlier studies that identified sertraline as one of the SSRIs more commonly linked to hyponatremia instances, particularly in older adults[5].Conversely, Fluoxetine exhibited the least amount of fluctuation in sodium levels, keeping them within a narrow range of 129 and 131 mEq/L. This consistency may suggest a safer profile for electrolyte stability, which could make it a better option for individuals who are more susceptible to electrolyte imbalances[7].Even while citalopram and Escitalopram displayed a greater range of sodium levels, they also kept a higher baseline, indicating a moderate risk of serious sodium abnormalities. These results are very helpful in clinical settings since they imply that, although monitoring is still necessary, the risk might not be as high as it is with sertraline.Similar to fluoxetine, venlafaxine exhibited variability, but it did not approach the lower extremes observed with sertraline. Venlafaxine may now be positioned as an intermediate choice in terms of risk for sodium imbalance thanks to this finding[6].

Clinical Implications: The study's findings regarding the diversity in sodium levels highlight the significance of tailored patient care in the administration of psychiatric medications. According to our investigation, patients prescribed SSRIs and SNRIs, especially those on sertraline, should have their sodium levels routinely monitored because hyponatremia can be severe if not identified and treated quickly[8].When taken SSRIs and SNRIs, elderly patients should be carefully monitored because they are often more prone to electrolyte imbalances due to physiological changes and concurrent use of many drugs. The danger of hyponatremia should be taken into account when selecting an antidepressant for this population, with fluoxetine possibly being preferred as it had less of an effect on sodium levels in our investigation.

Integration with Existing Literature:

Our results are in line with the body of research that shows the possibility of hyponatremia caused by SSRIs and SNRIs. They do, therefore, also add to a more sophisticated comprehension of the relative dangers connected to particular agents. This study contributes useful information from a Middle Eastern population, which is underrepresented in international research on the adverse effects of psychiatric drugs.

Future Research Directions: To further understand the dynamics of SSRI/SNRI-induced electrolyte abnormalities, future study should strive for a bigger sample size and take longitudinal monitoring of sodium levels into consideration. Furthermore, investigating the mechanisms underlying the variation in drug-induced changes in sodium could offer guidance for safer antidepressant treatments. Our knowledge of the metabolic effects of these widely used drugs might also be expanded by looking at the interactions between other electrolytes and SSRIs and SNRIs.

Conclusion of Discussion: The findings of our study are essential for guiding clinical judgments about the prescription of SNRIs and SSRIs. They emphasize that while starting therapy with these drugs, it is important to keep a close eye on things and take the needs of the patient into account. In particular, the risk profile of the patient for hyponatremia should be taken into consideration when selecting an antidepressant, with a focus on safer prescribing techniques to reduce the possibility of side effects.

5. CONCLUSIONS:

The results of this study provide important new information about how SSRIs and SNRIs affect sodium levels differently in outpatients treated by Jordan's Royal Medical Services in 2021. This study emphasizes the value of individualized drug management and the need for close observation of sodium levels in patients undergoing these treatments by examining data from a varied cohort.

Based on our investigation, it has been observed that some SSRIs and SNRIs, especially sertraline,

have a notable ability to cause alterations in sodium levels, including mild hyponatremia. This is especially troubling because sertraline is widely used in clinical practice; patients who are taking this medicine may require more awareness and aggressive management techniques. Drugs such as fluoxetine, on the other hand, displayed greater sodium level stability, suggesting a possibly safer profile with regard to electrolyte balance.

These results suggest that SSRI and SNRI prescriptions should be customized, particularly for individuals at risk for electrolyte disturbances, such as the elderly or people with comorbid diseases that may make them more susceptible to sodium imbalances. It is advised that in selecting an antidepressant, professionals weigh these variations, weighing the advantages of symptom control against the potential drawbacks.

The study also emphasizes the importance of routinely monitoring sodium levels in patients on SSRIs and SNRIs, especially when starting a new medication or adjusting dosages. Patients who have been recognized as having a higher risk of developing hyponatremia should be subject to more stringent monitoring.

In conclusion, the effects of SSRIs and SNRIs on sodium levels should not be disregarded, even though they are still useful treatments for depression and anxiety. This study adds to the increasing amount of information that shows patients taking these drugs need to have regular electrolyte monitoring incorporated into their treatment plans. Expanding upon these results with larger sample numbers and conducting longitudinal studies will help future research better understand the dynamics and timing of changes in sodium levels related to these medications. This will improve patient outcomes and reduce side effects while improving our techniques for safer antidepressant use.

LIMITATIONS: The small sample size and retrospective nature of the study restrict how far the results can be applied. Furthermore, the absence of comprehensive clinical information regarding the length of pharmaceutical use and the health status of the patient may have affected the outcomes.

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