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Impact of COVID-19 on antidepressant and anxiolytic dispensation: a comparative study in Maringá, Brazil

Impacto da COVID-19 na dispensação de antidepressivos e ansiolíticos: um estudo comparativo em Maringá, Brasil

Verônica Calvo Buzzi Leite[1], Fagner Sutel de Moura[2], Leonardo Pestillo de Oliveira[3], Lucas França Garcia [4*]

[1] PhD student of the Postgraduate Program in Health Promotion (PPGPS) at Universidade Cesumar – UNICESUMAR, Maringá (PR), Brazil,[2] Social Scientist and Data Scientist. Master's in engineering, UFRGS. [3] Psychologist. Doctor of Social Psychology, PUCSP. Professor, Graduate Program in Health Promotion, Unicesumar. ICETI-Unicesumar Productivity Fellow. CNPq Level 2 Research Productivity Fellow,[4] Sociologist and Bioethicist. Doctor of Medicine: Medical Sciences, UFRGS. Professor, Graduate Program in Health Promotion, Unicesumar. ICETI-Unicesumar Productivity Fellow.

***Corresponding author**: Lucas Garcia – *Email*: lucas.garcia@gmail.com

ABSTRACT

Introduction: The COVID-19 pandemic significantly impacted global mental health, increasing anxiety and depression. This study examined its influence on antidepressant and anxiolytic dispensation in Maringá. **Objective:** To analyze variations in dispensation before and during the COVID-19 pandemic. **Methods:** An ecological, exploratory study using data from the Maringá Municipal Health Department compared dispensation patterns between prepandemic (2018-2019) and pandemic (2020-2021) periods. Statistical analyses included normality tests, Student's t tests, Mann-Whitney tests, and ANOVA with Tukey's post hoc test. **Results:** Dispensation of antidepressants and anxiolytics increased significantly during the pandemic. Women and adults had higher usage rates, with notable increases among young people. The frequency of dispensations decreased, but the quantity of dispensed units increased, indicating adaptation to reduce physical contact. Significant gender differences in medication types were observed. **Conclusions:** The pandemic led to significant changes in medication dispensation in Maringá, underscoring the need for adaptive mental health policies and continuous monitoring.

Keywords: Antidepressants. Anxiolytics. COVID-19. Drug Dispensation. Mental Health.

RESUMO

Introdução: A pandemia de COVID-19 impactou significativamente a saúde mental global, aumentando a ansiedade e a depressão. Este estudo examinou sua influência na dispensação de antidepressivos e ansiolíticos em Maringá. **Objetivo:** Analisar variações na dispensação antes e durante a pandemia de COVID-19. **Métodos:** Estudo ecológico, exploratório, utilizando dados da Secretaria Municipal de Saúde de Maringá, comparou padrões de dispensação entre os períodos pré-pandêmico (2018-2019) e pandêmico (2020-2021). As análises estatísticas incluíram testes de normalidade, testes t de Student, testes de Mann-Whitney e ANOVA com teste post hoc de Tukey. **Resultados:** A dispensação de antidepressivos e ansiolíticos aumentou significativamente durante a pandemia. Mulheres e adultos apresentaram taxas de utilização mais elevadas, com aumentos notáveis entre os jovens. A frequência de dispensações diminuiu, mas a quantidade de unidades dispensadas aumentou, indicando adaptação para redução do contato físico. Foram observadas diferenças significativas entre os sexos nos tipos de medicamentos. **Conclusões:** A pandemia provocou mudanças significativas na dispensação de medicamentos em Maringá, ressaltando a necessidade de políticas adaptativas de saúde mental e monitoramento contínuo.

Palavras-chave: Antidepressivos. Ansiolíticos. COVID-19. Dispensação de medicamentos. Saúde mental.

INTRODUCTION

Since the onset of the COVID-19 pandemic in March 2020, there has been a significant impact on all spheres of social life, including a considerable worsening of mental health problems both regionally and globally[1,2]. The health crisis exacerbates disorders such as anxiety and depression, which are driven by social isolation, economic uncertainties, and persistent fear of the disease, leading to a substantial increase in the use of psychotropic drugs, particularly antidepressants and anxiolytics[3–10]. Although these medications have been essential for managing anxiety and depression during the pandemic, the increase in their consumption highlights the need for integrated strategies that not only address the causes of the worsening mental health of the population but also promote the rational use of these medications.

During the pandemic period, significant changes were observed in medication prescription patterns, highlighting the importance of rational prescription, dispensing, and use of medications[11]. This change in prescription patterns reinforces the need for dedicated practices and strategies for the responsible and effective use of medications. Pharmacists, as health professionals who manage the rational use of medications, play a crucial role in implementing behavior change techniques to optimize treatment adherence and prevent harmful health behaviors[12]. This approach is supported by the COM-B model, which identifies capability, opportunity, and motivation as key factors influencing the effective delivery of behavioral interventions in pharmaceutical contexts[13].

Studies conducted in various countries during the COVID-19 pandemic reveal significant patterns in the adaptation of psychotropic medication dispensing practices and underscore the global relevance of mental health during crises. In the United States, analysis of national prescription data showed significant variations in psychotropic use, with a notable increase in the use of telemedicine to ensure continuity of mental health treatment during the pandemic[14]. In Canada, the dispensing of psychotropic medications was also greatly affected, with data suggesting an urgent need for psychological support across various age groups, especially young adults[15]. In Sweden, the pandemic response included the expansion of mental health services, highlighting the importance of effective public policies and a flexible healthcare system to meet emerging needs[16]. In Spain, research indicated an increase in stress, anxiety, and depression levels, reinforcing the need for psychological interventions and a proactive approach to managing mental health during health crises[17,18]. These studies underline the importance of investigating how the pandemic influenced the dispensation of antidepressants and anxiolytics in Maringá, Paraná, Brazil, contributing to the formulation of more effective and adaptive mental health policies.

Drug dispensing constitutes a pharmaceutical act characterized not only by the provision of medications but also by detailed and personalized patient counseling[19]. This process is fundamental to ensuring the safe and effective use of medications and involves a chain of responsibilities that go beyond the mere delivery of products. In this context, the pharmacist acts as a contact point between the healthcare system and the patient, offering advice that may include information on dosage, drug interactions, adverse effects, and strategies for managing side effects[20].

The practice of counseling for the rational and responsible use of medications is particularly important during health crises such as the COVID-19 pandemic, where the pharmacist's role has expanded significantly[21]. During the pandemic, pharmacists were essential not only for maintaining continuity of care in a restricted environment but also for mitigating the risks of virus transmission[22]. With the ability to adapt services to respond to rapid changes in demand and healthcare logistics, pharmacists' drug dispensing helped ensure that patients continued to receive their necessary treatments safely and informly[13].

For the purposes of this study, the dispensing pattern is defined as the set of practices and procedures adopted by pharmacists for the delivery of medications, including the frequency, quantity, and guidance provided to patients, directly reflecting public health practices and accessibility to treatment in different

demographic contexts and health crises[23]. Furthermore, the health promotion and disease prevention are central themes in this context. Ensuring access to mental health services and promoting the rational use of psychotropic medications are crucial for enhancing the well-being, and quality of life of the population. Effective health promotion strategies can mitigate the negative impacts of the pandemic on mental health, emphasizing the need for continuous support and preventive measures. This study aimed to analyze the variations in the dispensing of antidepressants and anxiolytics before and during the pandemic in the municipality of Maringá, PR, Brazil.

METHODOLOGY

STUDY DESIGN

This study consists of an ecological, exploratory, temporal study and therefore addresses data from a group of people rather than individuals over a set period[24]. For the ecological study, the geographical area was defined as the city of Maringá, in the state of Paraná, Brazil, and the data were collected from the database of the Municipal Health Department of the said municipality.

STUDY LOCATION

The municipality of Maringá is located approximately 426 km from the capital of the state of Paraná, Brazil, covering an area of 487.012 km², constituting a medium-large planned city with recent urbanization. In 2010, the municipality had a population of 357,077 inhabitants, with an estimated population of 436,472 in 2021[25].

Access to health services is structured by the organizational arrangements of the Health Care Networks ("*Redes de Atenção à Saúde*" - RAS) through the MS Ordinance No. 4.279 of December 30, 2010, based on services and care linked to primary health care (PHC) offered by the Basic Health Units ("*Unidades Básicas de Saúde*" - UBS), which have a high degree of resoluteness. The municipality has a comprehensive health network, with 34 UBSs encompassing 74 Family Health Strategy ("*Estratégia Saúde da Família*" - ESF) teams, in addition to two 24-hour pharmacies and a mobile pharmacy.

Thus, data on the dispensing of antidepressants and anxiolytics in the municipality of Maringá-PR were analyzed from the units that dispense these medications: Psychosocial Care Center ("*Centro de Atenção Psicosocial*" - CAPS), "Farmácia Móvel", "Hospital Municipal de Maringá", "Policlínica Zona Norte", "Policlínica Zona Sul" e "UBSs Alvorada III", "Iguaçu", "Mandacaru", "Morangueira", "Pinheiros", "Quebec" e "Tuiuti", during the prepandemic (2018-2019) and pandemic (2020-2021) periods.

INCLUSION CRITERIA

All users in different life cycles who withdrew at least one psychotropic drug from the mentioned locations in the municipality of Maringá-PR were considered eligible for the study. The therapeutic classes selected for data collection were antidepressants; tricyclics (ADTs); nonselective monoamine reuptake inhibitors (NSRIs; monoamines); selective serotonin reuptake inhibitors (SSRIs); selective serotonin and noradrenaline reuptake inhibitors (SNRIs); and analgesics – benzodiazepines.

EXCLUSION CRITERIA

Data related to the dispensing of antiepileptics, antiparkinsonians, antipsychotics, psychostimulants, the atypical antidepressant bupropion (used by the Maringá Health Department only for smoking cessation treatment), and data from the UBS Iguatemi, which only started dispensing psychotropic drugs in mid-2020, were excluded. Including this unit's data could bias the increase in psychotropic drug dispensing during the pandemic (2020-2021), as data from 2018 and 2019 would be missing.

DATA COLLECTION

Data were collected at the Pharmaceutical Supply Center ("*Centro de Abastecimento Farmacêutico*" - CAF) of the

"Hospital Municipal de Maringá" through the "Sistema Gestor de Saúde SGS03" and exported in .CSV format using the following parameters: name, age, dispensing date, medication, and quantity dispensed from each dispensing unit. These details were collected in Excel for later processing in R software. As it is a restricted access database, access was granted by a CAF pharmacist who provided anonymized data following approval from the Maringá Health Department and the CEP-Unicesumar.

The data were collected between August and September 2022. The sex of the patients who withdrew medication in Maringá was identified through an API from the IBGE. For those not identified by the API, the information was collected manually from the SGS03 Health Management System.

DATA ANALYSIS

The inference level of this study focuses on the population of Maringá-PR, where the analysis of differences in the dispensing of selected psychotropic drugs by sex, age, period (pre- and pandemic), and dispensing unit was conducted. This study aimed to understand the dispensing of psychotropic drugs among men and women, the dynamics before and during the pandemic, and the profile of different psychotropic drugs concerning the defined daily dose (DDD) recommended by the WHO[26].

For data analysis and normalization, the prescribed daily dose (PDD) and the defined daily dose per inhabitants/day (DDD) were calculated. The PDD provides a theoretical measure of the prescribed dose for each user as an approximation of the WHO-recommended DDD. Through the PDD, it is possible to estimate whether the dispensing of selected psychotropic drugs in the analyzed geographical area exceeds the WHO-recommended values, which in this study's context implies identifying whether the dispensing pattern in Maringá exceeds the WHO-established DDD.

The DHD provides the theoretical percentage of people in the population withdrawing from the medication. Thus, a DHD = 1% indicates that for every thousand people, ten withdraw the considered psychotropic drug.

After normality (Shapiro–Wilk) and homogeneity (Levene) tests, we applied Student's t test or the Mann–Whitney test to compare drug dispensing between the analyzed periods. Analysis of variance (ANOVA) was used to explore differences by age group and sex, with Tukey's post hoc test for multiple comparisons.

ETHICAL CONSIDERATIONS

The project was approved by the Human Research Ethics Committee of UniCesumar under opinion number 5.167.890 and by the Maringá Health Department.

RESULTS

This study investigated the changes in the dispensing patterns of antidepressants and anxiolytics in Maringá, Paraná, during the prepandemic (2018-2019) and pandemic (2020-2021) periods. Data analysis from DATASUS indicated continuous population growth in Maringá, with estimated growth rates of 1.6% in 2019, 1.53% in 2020, and 1.47% in 2021, contextualizing the increased demand for mental health services and psychotropic medications.

During the analyzed period, approximately 6.75% of the population was affected by the use of psychotropic drugs, with the highest prevalence in 2019 (7.36%) and the lowest in 2021 (6.4%). Women constituted the majority of users, with a stable proportion ranging from 71.9% to 72.7%. A reduction in dispensing frequency was observed during the pandemic years (2020 and 2021), likely due to COVID-19 restrictions, although the quantity of dispensed medication units increased, suggesting an adaptation to reduce physical contact and frequent pharmacy visits.

The age group analysis showed that individuals under 20 years old represented the smallest proportion of users, although there was an increase from 1.5% in 2018 to 2.7% in 2021, indicating growing concern about the mental health of young people. In contrast, the proportion of adults using these medications

increased from 51.6% in 2018 to 55.6% in 2021, while older adults showed a decreasing trend from 46.9% in 2018 to 41.7% in 2021, reflecting possible barriers to access during the pandemic.

Table 1. Age Group Distribution

Year	0-19	%	20-59	%	60 or more	%
2018	1.542	1.5%	53.107	51.6%	48.287	46.9%
2019	2.397	2.1%	59.337	52.2%	51.995	45.7%
2020	2.239	2.4%	49.862	53.0%	41.909	44.6%
2021	2.712	2.7%	55.498	55.6%	41.686	41.7%

Fonte: Os autores.

The patient retention rates, detailed in Table 2, showed that 64.8% of the 2018 patients continued treatment in 2019, 59.8% continued treatment from 2019 to 2020, and 63.1% continued treatment from 2020 to 2021. These retention rate variations correlate with the amount of dispensed medication, where years with lower retention rates coincided with reductions in total milligrams dispensed.

Table 2. Patient Retention Rates

Year	Number of Patients	CRR (%)
2018	28633	N/A
2019	31197	64.8
2020	27560	59.8
2021	27946	63.1

Fonte: Os autores.

Significant differences ($p<0.05$) in dispensing patterns between genders were observed: men received higher quantities of clomipramine, amitriptyline, clonazepam, and bromazepam, while women had greater amounts of diazepam, imipramine, fluoxetine, venlafaxine, and nortriptyline. Additionally, Defined Daily Dose per Inhabitants/Day (DHD) analysis revealed varied dynamics among medications, with amitriptyline showing a decreasing trend and venlafaxine showing a notable increase. The prescribed daily dose (PDD) also varied significantly, highlighting an adaptation in dosing strategies in response to changes in public health conditions and clinical guidelines.

Table 3. Defined Daily Dose per Inhabitant/Day (DHD)

Medication	DHD 2018	DHD 2019	DHD 2020	DHD 2021
Clomipramine	1.47	1.6	1.66	1.49
Amitriptyline	4.47	4.83	3.31	3.7
Diazepam	1.64	1.86	1.74	1.71
Imipramine	0.97	1.1	0.95	0.84
Fluoxetine	16.38	17.63	17.13	15.74
Venlafaxine	10.97	13.81	7.78	13.09
Clonazepam	2.42	2.52	2.34	2.23
Bromazepam	0.83	0.88	0.73	0.76
Nortriptyline	0.64	0.78	0.8	0.82

Fonte: Os autores.

Table 4. Prescribed Daily Dose (PDD)

Medication	DDD	PDD 2018	PDD 2019	PDD 2020	PDD 2021
Clonazepam	8	19.37	20.15	18.7	17.86
Diazepam	10	16.42	18.62	17.4	17.14
Bromazepam	10	8.32	8.84	7.29	7.58
Fluoxetine	20	327.52	352.68	342.56	314.86
Amitriptyline	75	335.61	362.35	248.58	277.8
Nortriptyline	75	47.79	58.39	60.36	61.53
Clomipramine	100	147.43	160.01	165.55	149.1
Imipramine	100	96.79	110.26	94.91	84.16
Venlafaxine	100	1096.57	1380.74	777.65	1309.28

Fonte: Os autores.

DISCUSSION

The results of this study reflect a complex dynamic in the dispensing and possible use of psychotropic drugs in Maringá during the study period, showing significant variations influenced by demographic factors, changes in prescribing practices, and the impact of the COVID-19 pandemic. The prevalence of the use of these medications, which is maintained at approximately 6.75% of the population, aligns with global trends. For instance, studies in the United Kingdom[27,28] and the United States[29] reported increases in antidepressant and anxiolytic use in response to elevated stress and anxiety during the pandemic, with women reporting higher stress levels.

The patient retention rate in Maringá highlights the resilience and adaptability of the local health system during the pandemic. These rates showed considerable variation, indicating adaptations in treatment continuity, similar to observations in the United States[29,30], where the initial decrease in psychotropic drug dispensing gradually recovered as health systems adapted.

DHD and PDD analyses revealed notable adaptations in prescribing practices in Maringá. The decrease in amitriptyline DHD and the increase in venlafaxine may reflect changes in clinical guidelines prioritizing medications with better efficacy profiles and fewer side effects. Such adjustments are consistent with trends observed in other regions where prescribing practices were quickly adapted to ensure continuity of care[31,32].

The observed differences in dispensing between men and women, as well as among different age groups, underscore the need for mental health policies that consider these demographic variables. Studies in Portugal[32,33] and the United States[29,30] suggest that women and older adults face specific challenges accessing mental health services, while young adults and men may be less likely to seek help.

The variations in medication dispensing in Maringá highlight the importance of evidence-based practices supported by international studies that demonstrate how the rapid adaptation of medical practices to the best available evidence can significantly improve patient outcomes. Continuous monitoring and adaptation of medical practices are essential to address emerging challenges and prevent mental health crises, especially during high-demand periods such as those experienced during the pandemic[10,28].

The results suggest that the increase in the dispensation of antidepressants and anxiolytics during the pandemic should be accompanied by strategies that promote the rational use of these medications, including educating patients about the risks and benefits, as well as the continuous monitoring of adverse effects. Additionally, the expansion of telemedicine and telepsychiatry services, which proved essential during the pandemic, should be maintained and enhanced to ensure continuous

access to mental health treatment, especially in emergency health situations. Ongoing training of healthcare professionals on dispensing practices and counseling can improve the quality of care and treatment adherence. Finally, this study reinforces the importance of proactive public health interventions that not only respond to immediate crises but also strengthen the resilience of the healthcare system to face future challenges, ensuring an integrated and sustainable approach to mental health promotion.

This study has limitations, including the restriction of dispensing data from Maringá, lack of information on treatment adherence and clinical efficacy of medications, and absence of data on social determinants of health that may influence medication use. These limitations suggest caution in generalizing the results to other populations or contexts.

CONCLUSION

This study identified significant patterns and varied trends in psychotropic drug use in Maringá, highlighting the substantial impact of the COVID-19 pandemic on prescribing practices and medication access. The observed differences in dispensing among various demographic groups underscore the urgency of inclusive and adaptive mental health policies that consider the nuances of gender, age, and other social determinants.

The analysis of DHD and PDD reinforces the need for evidence-based clinical practices. These are essential not only for ensuring the efficacy and safety of treatments but also for promoting the rational use of mental health resources. It is imperative that such practices are continuously updated based on the best available evidence to respond effectively to the population's needs.

The results of this study have direct implications for public health and health promotion, suggesting that health authorities prioritize strengthening mental health services. This includes improving access and quality of care, especially in times of crisis. Implementing continuous monitoring strategies and updating treatment guidelines are essential. Furthermore, it is crucial to develop specific interventions for vulnerable groups to reduce disparities in treatment access and promote greater equity in mental health.

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