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Impact of pharmaceutical care on the follow-up of patients with chronic diseases in a primary health care unit in the city of São Luís-MA

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ABSTRACT

In Pharmaceutical Care, pharmacists collect and evaluate information about the patient, including the identification of possible Drug-Related Problems (DRPs), in addition to encouraging self-care and promoting better pharmacotherapy. The objective was to evaluate the impact of pharmaceutical care on the quality of life of a patient with breast cancer and metabolic syndrome. Pharmacotherapeutic follow-up was carried out for one semester. In the meantime, adherence (BaMQ), degree of depression (PHQ-9) and quality of life (SF-36) of the patient were evaluated before, during and after the interventions. Patient undergoing chemotherapy for breast cancer, undergoing treatment for diabetes, hypertension, dyslipidemia, in addition to practicing self-medication. Before follow-up, he presented drastic fluctuations in blood glucose and blood pressure, poor eating habits, dyslipidemia, sedentary lifestyle and complaints of pain. After the interventions, he showed a relative improvement in the metabolic syndrome linked to better life habits, despite the aggressive treatment of chemotherapy. The interventions carried out during the pharmaceutical follow-up had positive impacts, which reinforces the importance of the pharmacist in satisfactory primary care and health promotion.

Keywords: Chronic Noncommunicable Diseases, Pharmaceutical Care, Breast Cancer, Adherence.

1 INTRODUCTION

The proposal of pharmaceutical care is based on the monitoring of the patient's drug treatment through its orientations and is associated with the provision of quality pharmaceutical care, which helps in the prevention and detection of possible negative results (Menezes, 2000). Firstly, in the pharmaceutical area, the professionals involved should be more active in patient care, aiming to ensure

safer treatment results (Pereira *et al.*, 2008). Therefore, pharmaceutical practice is oriented towards patient care, and the drug is seen as a means or tool to achieve results, no longer being the absolute focus of the process. In addition to the proposed humanization, there are aspects related to care for the care environment in the performance of pharmaceutical care. It is essential that the place of the pharmaceutical consultation is sufficient to provide privacy, well-being and trust to patients, so that follow-up can be individualized and relevant interventions can be made (Vieira, 2007).

In this context, the drug is one of the main therapeutic resources used by people, but its use also presents a high risk of damage to health. In the case of poor medication adherence and failure to monitor the patient's treatment, Medication-Related Problems (PRM's) may be observed, impairing pharmacotherapy (Miranda *et al.*, 2012). Therefore, it is worth noting that the Brazilian Unified Health System follows the principles of universality, equity and comprehensiveness, and requires coping practices that go beyond the medical care model (Mendes, 1996). In recent years, many achievements, such as the National Drug Policy, the National Pharmaceutical Assistance Policy, and the National Primary Care Policy, have maximized the performance of pharmacists in Primary Health Care (PHC). In addition, the World Health Organization has also published documents on the renewal of primary care in the Americas, which includes data on Pharmaceutical Services in PHC (Brasil, 1998; Brazil, 2014).

In this scenario, due to the high incidence of the association of type 2 diabetes and dyslipidemia in patients with metabolic disorders, antidiabetic and lipid-lowering drugs are often used simultaneously, in addition to treatment with different types of drugs for other associated diseases such as osteoporosis, gastritis and hormone replacement, and for bacterial and viral infections, for example. This polytherapy requires adequate pharmacotherapeutic follow-up, since it is one of the main risk factors for the development of drug-related problems (PRM's) (Amaral; Perassolo, 2012).

The role of pharmacists in the monitoring of patients affected by Chronic Non-Communicable Diseases (NCDs) and/or TD (Communicable Diseases) in primary care generates many benefits, as it helps to control chronic diseases, prevent and resolve PRM's, improves quality of life and adherence to drug treatment and promotes user awareness on topics related to health promotion, in addition to encouraging self-care, which strengthens their strategic professional position as the promoter of family and community health (Armando *et al*., 2005; Barros *et al*., 2020).

Therefore, this study developed the follow-up of drug therapy in patients with NCDs, undergoing chemotherapy treatment for grade 3 invasive carcinoma (Nottingham) and polymedicated breast cancer, with the aim of promoting health education and the rational use of medications to obtain good results, since low adherence to treatment is an important public health problem. in addition to the complications associated with the lack of control of these diseases, which can lead to an increase in the number of hospital admissions and the mortality rate (Tavares *et al.,* 2016).

2 OBJECTIVES

To develop pharmaceutical care in a patient undergoing treatment for Chronic Non-Communicable Diseases treated at a Basic Health Unit in São Luís-MA.

3 METHODOLOGY

This is a prospective, exploratory, and quantitative study, with follow-up of a patient with breast cancer and metabolic syndrome, from August 2021 to February 2022. In this scenario, patients aged 25 years or older, diagnosed with Chronic Non-Communicable Diseases (NCDs) and polymedicated were included under the inclusion criteria.

Pharmaceutical consultations were carried out monthly at the patient's home after being collected from the primary health care unit in São Luís-MA. As a strategy to perform the follow-up, the patient was instructed about the care plan, pharmaceutical interventions, the need to measure parameters (blood pressure, weight, height), and obtaining the latest laboratory tests to assess the general situation. The method defined to record the patient's clinical evolution was the SOAP (Subjective, Objective, Assessment, Plan) involving data collection (subjective and objective), evaluation and elaboration of a plan with subsequent analysis of the results (Ramos, 2008).

Validated questionnaires were used, based on the materials adopted by the Unified Health System (SUS), such as the PHQ - 9 questionnaire (Patient Health Questionnaire - 9) to assess the severity of depression; the BaMQ (Beliefs about Medicines Questionnaire) to assess the patient's adherence to treatment; and the MOS SF-36 questionnaire (Medical Outcome Study 36-item Short Form) to assess the patient's quality of life, which were applied at the beginning, halfway and end of the follow-up, to assess the impact of the services performed and the interventions proposed during this period.

The information collected and the proposed pharmaceutical interventions were compared, analyzed, and defined according to the information contained in the scientific literature. This research was approved by the Research Ethics Committee of the Federal University of Maranhão (UFMA) (CAAE No. 34652720.9.0000.5087).

4 RESULTS AND DISCUSSION

4.1 CASE PRESENTATION

A.L.C, female, white, 61 years old, housewife, widow, literate, born in Parnaíba - PI and resident of the city of São Luís - MA since 1978. The patient has been diagnosed with systemic arterial hypertension (SAH) and type 2 diabetes (DM2) both for 16 years, and dyslipidemia for 02 years. In 2006, when she was diagnosed with DM2, she was prescribed metformin hydrochloride and glibenclamide and after 10 years of use, the doctor stopped these drugs and prescribed NPH and

Regular insulins. In addition, hydrochlorothiazide and losartan were also prescribed in 2006 for the treatment of SAH. A former smoker, A.L.C. reported that he had given up smoking and drinking alcoholic beverages for more than 24 years when he was pregnant with his first daughter.

In the first half of 2021, the patient felt a lump in her left breast by chance, and in the same week she sought care in the primary health care network, where an ultrasound was requested, which was performed at a private clinic. After receiving the result, she returned to the service of origin, and then was referred to the hospital specialized in cancer to continue the complementary exams and start chemotherapy treatment, in June of the same year.

In addition, the chemotherapy treatment at the end of the pharmacotherapeutic follow-up, in February 2022, was in its fourth cycle. Same month, after mammography and return to the mastologist, the patient reported that at the end of the expected chemotherapy cycles, she will need mastectomy surgery.

In this scenario, days before the start of chemotherapy, the patient had severe headaches and was taken to an Emergency Care Unit with high blood pressure. Two weeks after this episode, the patient returned to the emergency room with the same complaint and, after imaging tests, she was diagnosed with 36 Cerebrovascular Accident (CVA) and remained on the same prescription for the treatment of SAH after the episode. After the patient's recovery, the oncologist started chemotherapy cycles and the addition of ciprofibrate (100mg, 1 time a day). In the same period, the patient went to a consultation with her neurologist/geriatrician due to anxiety and insomnia, and escitalopram 10 mg (1 time a day) was prescribed at the time. However, the patient did not consider starting the use of escitalopram because she had heard from a family member that this medication would make her "sluggish" throughout the day.

At the beginning of pharmacotherapeutic follow-up in August 2021, the patient was diagnosed with Entamoeba histolytica. However, before returning to the doctor's appointment, the patient reported using pariri leaves, boldo and a box of "creolin pills" obtained at the market to treat her amebiasis. During the interview, she reported being on her third day of using these substances and complained about the bitter taste in her mouth. After she reported this, she was advised to suspend the use of this mixture of unknown composition, because when she returned to the doctor to deliver the tests, she had already received a prescription for Secnidazole 1g in a single dose. Regarding her diet, A.L.C. reported consuming an average of 4 loaves of bread and coffee with a little sugar for breakfast, as she did not like the taste of the sweetener; At lunch and dinner, he said he usually consumes rice, pasta, various proteins and flour.

In October 2021, the patient returned to her neurologist/geriatrician, who prescribed buffered acetylsalicylic acid due to the stroke episode. At the end of October 2021, after consultation with the oncologist, rosuvastatin was added to control dyslipidemia in association with the previously

prescribed ciprofibrate, both administered at night by the patient. She also reported that she had stopped using pantoprazole on her own, as she was already using too much "medication," and in addition, she was not experiencing heartburn or other discomfort from the chemotherapy treatment. During the first pharmaceutical consultations, she stated that she had problems with adherence to pharmacological therapy and had pain in her hands and feet as a general complaint, in addition to being in mourning for the death of her husband.

In November 2022, the Ambulatory Blood Pressure Monitoring (AMM) Report requested by the cardiologist indicated abnormal blood pressure values due to failure to respond to prescribed therapy. Thus, the prescription of antihypertensive drugs was modified to losartan 50mg (2 tablets in the morning), and amlodipine 5mg (two tablets in the evening) was added to the treatment.

In February 2022, after mammography and return to the mastologist, the patient reported that at the end of the planned chemotherapy cycles, she will need mastectomy surgery. At the end of this month, in the last pharmaceutical consultation, the questionnaires were applied, anthropometric data and exams were collected, the necessary guidance was given to the patient, and then the pharmacotherapeutic follow-up was completed.

4.2 PHYSICAL AND LABORATORY EXAMINATIONS

At the beginning of the pharmacotherapeutic follow-up, the patient's laboratory tests performed in 2021 were analyzed, which showed decompensated DM2, with glycated hemoglobin values equal to 10.70%, fasting glucose equal to 71.00 mg/dL, hypercholesterolemia of 214 mg/dL, and hypertriglyceridemia of 290 mg/dL (Table 1). At each follow-up visit, the patient's anthropometric parameters were measured (height: 1.57m; weight: 68kg), which made it possible to analyze the patient's BMI, with the first measurement (BMI= 27.59) classifying the patient as overweight (obesity grade I). In addition, the waist circumference was 101 cm, which indicates a result above the desirable for women, which would be 80 to 88 cm (Table 2) (Negrão *et al.,* 2005).

Table 1. Laboratory tests provided by the patient.

EXAMINATION	AGM /2021	NOV/2021	JAN/2022
GLYCATED HEMOGLOBIN	10,70%	-	7,90%
FASTING BLOOD GLUCOSE	71.00 mg/dL	257 mg/dL	122.05 mg/dL
TRIGLYCERIDES	290.00 mg/dL	401 mg/dL	106.84 mg/dL
TOTAL CHOLESTEROL	214.00 mg/dL	196mg/dL	102.00 mg/dL
HDL-CHOLESTEROL	40.10 mg/dL	38.30 mg/dL	34.70 mg/dL
LDL-CHOLESTEROL	129.28 mg/dL	112.13 mg/dL	48.22 mg/dL
NON-HDL CHOLESTEROL	173.90 mg/dL	157.7 mg/dL	67.30 mg/dL
VLDL CHOLESTEROL	44.62 mg/dL	45.57mg/dL	19.08 mg/dL

Source: Prepared by the authors, 2023.

During the pharmacotherapeutic follow-up, the capillary glucose values both in fasting and postprandial were shown to be quite fluctuating. For example, the postprandial blood glucose level at the first visit was 338 mg/dL (Table 2). Analyzing the results of fasting blood glucose laboratory tests, it can be seen that the values range from 71 to 122.05 mg/dL between August 2021 and January 2022 (Table 1).

Table 2. Anthropometric data

PARAMETERS	AUG/21	DEC/21	FEB/21
POST CAPILLARY BLOOD GLUCOSE PRANDIAL	338 mg/dL	334 mg/dL	305 mg/dL
BLOOD PRESSURE	161x93 Mmhg	139x82 mm Mmhg	130x80 cm Mmhg
HEIGHT	1,57m	1,57m	1,57m
WEIGHT	68kg	66,7kg	63kg
MASS INDEX BODY (BMI)	27,59	27,06	25,56
CIRCUMFERENCE ABDOMINAL	101cm	96cm	92cm
FABRIC	9,2	10,8	8,8

Source: Prepared by the authors, 2023.

4.3 PATIENT PHARMACOTHERAPY, ASSESSMENT OF ADHERENCE, DEGREE OF DEPRESSION AND QUALITY OF LIFE

In August 2021, at the beginning of the pharmacotherapeutic follow-up, the patient was in the first cycle of chemotherapy for the treatment of breast CA (paclitaxel), ondansetron 8mg, metoclopramide 4mg, pantoprazole 40mg, paracetamol, and dexamethasone 4mg (Table 3), in addition to escitalopram oxalate 10mg for anxiety and insomnia prescribed by the neurologist/geriatrician (Table 4).

For the treatment of DM2, the patient used NPH 100 IU/mL and Regular 100 IU/mL insulins, and for the treatment of SAH, she used 25 mg hydrochlorothiazide and 50 mg losartan (Table 4). In October 2021, buffered acetylsalicylic acid 100mg was prescribed by the neurologist/geriatrician due

to stroke. After consultation with the cardiologist in November 2022, the prescription was changed with an increase in the dose of Losartan 100mg and the addition of amlodipine 10 mg (Table 4).

To control dyslipidemia, the patient used only ciprofibrate 100mg prescribed after the beginning of chemotherapy, a broad-spectrum lipid modulator. Therefore, in November 2022 the medical oncologist added rosuvastatin 20mg, which is a statin, to the drug therapy, and withdrew dexamethasone 4mg.

In the first consultation, carried out in August 2021, some questionnaires were applied to the patient, such as the Beliefs about Medicines Questionnaire (BaMQ), which measures the patient's beliefs about the therapy and the trend of adherence to treatment. The result was 2.33 (ideal N/P>1), which indicates that the patient has good pharmacological adherence (Graph 1). However, regarding the use of escitalopram, there was no adherence to treatment, justified by insecurity and fear of adverse effects. The MOS SF-36 questionnaire showed low quality of life in the domains related to physical, social and emotional aspects, pain and vitality (Table 5).

Table 3. Chemotherapy prescription

DRUGS	DOSE PROT	DOSE PRESC	DILUENT	VIA	INTERVAL	INF TIME	HE'S (S)
DEXAMETHASONE 10MG EV 10 MIN	8mg	8mg	Saline 0.9% 100ml	HOME	PRE-QT		d1,d8,15
DIPHENHYDRIN 50MG EV 30MIN	50mg	50mg	Saline 0.9% 100ml	HOME	PRE-QT		d1,d8,15
CIMETIDINE 150MG/ML C/2ML HOME	300mg	300mg	Whey physiological 0.9% 100ml	HOME	PRE-QT		d1,d8,15
PACLITAXEL EV BI LIVRE PVC E FILTER EQUIPMENT 0,2MM	80mg/ m2	135.2mg	Saline 0.9% 250ml	EV	.QT	1h0min	d1,d8,15
SALINE 0.9% EV	100ml	100ml		EV	POS-QT		d1,d8,15

COMPLEMENTARY DRUGS TO TREAT ADVERSE EFFECTS OF CHEMOTHERAPY

DRUG/CLASS	DOSAGE	PRESCRIPTION
Ondansetron 8mg Selective Serotonin Receptor 3 Antagonist	01 tablet at 8 a.m. and 8 p.m., for 3 days in a row after chemotherapy	Yes
Metoclopramide 4mg/ml dopamine blocker, antiemetic and Peristaltic stimulant.	40 drops up to 6 hours if nausea or vomiting	Yes
Pantoprazole 40mg Proton Pump Inhibitor	01 tablet/day at 06h for the entire treatment period	Yes

Paracetamol 200mg/ml NSAID selective for COX 3 (COX 1b)	40 drops up to 6 hours if you have pain	Yes

Source: Prepared by the authors, 2023.

Table 4. Pharmacotherapy of the patient at the end of the pharmacotherapeutic follow-up.

DRUG/CLASS	DOSAGE	PRESCRIPTION
Recombinant Human Insulin NPH antidiabetic	Before Coffee: 30u Before Lunch: 30u 9 p.m.: 30u	Yes
Regular Recombinant Human Insulin antidiabetic	Before Breakfast: 14u Before Lunch: 14u Before dinner: 10u	Yes
Losartan 50mg Receptor Antagonist angiotensin II	02 pills in the morning	Yes
Hydrochlorothiazide 25mg thiazide diuretic	01 tablet in the morning	Yes
Amlodipine 5mg Calcium Slow Channel Blocker	02 pills at night	Yes
Ciprofibrate 100mg Ample Lipid Modulator spectrum	01 tablet at night	Yes
Rosuvastatina 20mg Statin	01 tablet in the morning	Yes
Buffered Acetylsalicylic Acid 100mg Platelet aggregation inhibitor	01 tablet before lunch	Yes
Escitalopram 10mg selective reuptake inhibitors Serotonin	1 tablet in the evening	Yes

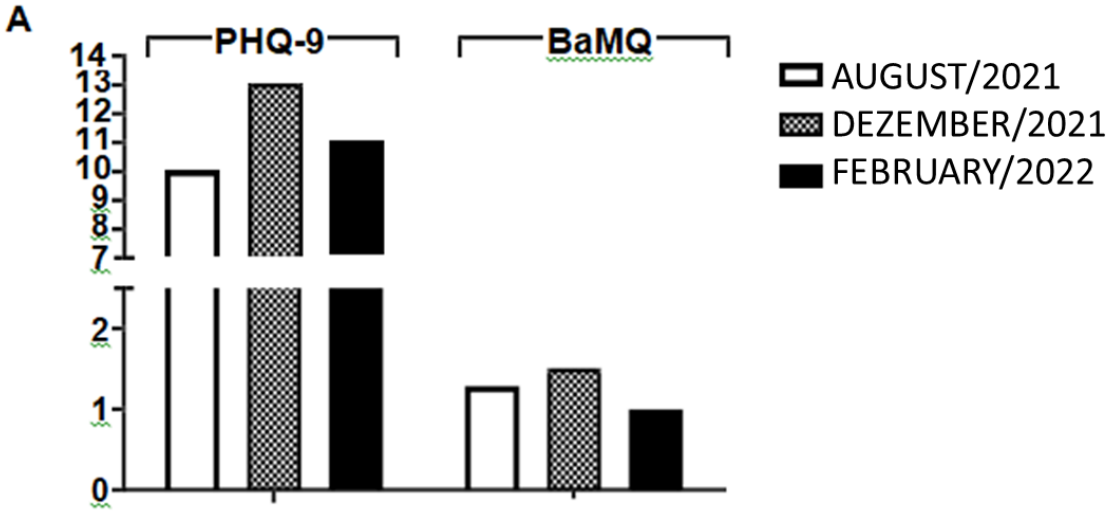
Source: Prepared by the authors, 2023.

Table 5. Quality of Life- MOS SF-36

		Month	
Domain	**August/2021**	**November/2021**	**February/2022**
Functional capacity	15	15	20
Limitation by aspects Physical	0	0	0
Pain	69,5	32	50
General health status	40	67	50
Vitality	45	55	25
Social aspects	50	12,5	12,5
Limitation due to emotional aspects	33	0	0
Metal Health	40	40	44

Source: Prepared by the authors, 2023.

Figure 1. PHQ-9 and BaMQ Charts



Sources: Prepared by the authors, 2023.

Regarding the Patient Health Questionnaire (PHQ-9), an evaluative instrument composed of nine questions that cover items related to depression, the result was 10 (Graph 1) (in an ideal score that should be ≤5), that is, it is suggestive of moderate depression. This may be related to the current context in which the patient finds herself, which involves the treatment of breast cancer and all the uncertainties and afflictions inherent to this condition. In this scenario, since ancient times, cancer has been associated with emotional states, but only recently has this relationship acquired greater clarity, as well as the evident need to link cancer treatment with psychotherapeutic care. For a long time, cancer was seen as a disease linked to resignation and sufferers, either due to the often poor prognosis, limitations and complications intrinsic to the treatment, or due to the lack of clarification about the etiology of the disease (Carvalho *et al.,* 2008; Graner; Cezar; Teng, 2008).

The search for effective treatments for anxiety and depression remains one of the main goals of "Psycho-oncology" [16-17]. The associations between cancer, depression and anxiety are frequent and culminate in a worse clinical outcome and quality of life of patients. The study of depression in oncology has been a challenge for researchers, as many symptoms are mistaken for symptoms of the cancer itself, making its diagnosis complicated and sometimes inaccurate. The diagnosis of depression is made difficult by the mood swings of patients, who feel that their lives are at stake and experience moments of extreme pain and fatigue, especially during the necessary treatment for cancer (Graner; Cezar; Teng, 2008). . Hence the need for the use of escitalopram by the patient, as she had reported difficulty sleeping because 38 was feeling anxious due to her health condition.

4.4 PHARMACEUTICAL INTERVENTION

Adherence to pharmacotherapy is an important factor for the success of any pharmacological treatment, but there are numerous factors that contribute to the lack of adherence, such as the social

and economic factors of the population, factors linked to the health system and the team that makes this machinery work effectively, and factors related to the treatment and the disease itself (WHO, 2003). Thus, it is important to mention that treatment adherence is defined as the degree of agreement between the user's behavior and the guidelines given by the health professional (WHO, 2003; Busnello *et al*., 2001)). Thus, some measures were applied with the aim of improving patient adherence, as the questionnaire applied revealed her to be good adherent, but in practice, there were still gaps. In this sense, it provided guidance accompanied by educational measures, such as the delivery of information leaflets on SAH and healthy eating, a reminder table with the times of administration of all medications, and their correct organization and storage.

Thus, the patient's extensive clinical history and the values measured throughout the follow-up showed overweight (BMI 27.59 kg/m²), high waist circumference (103 cm, high risk of cardiovascular diseases), fluctuating arterial hypertension, hypertriglyceridemia (401.00 mg/dL), presence of insulin resistance (Tyg index: 10.8) (Table 2). This set of data suggests the presence of metabolic syndrome, in addition to favoring the onset of severe cardiovascular events (Zhang; Chen; Ma, 2018).

Metabolic Syndrome (MS) is a complex disorder characterized by a sphere of cardiovascular risk factors, which is commonly concatenated to central fat deposition and insulin resistance. The National Cholesterol Education Program's Adult Treatment Panel III defines MS as the combination of at least three of the following five criteria: Abdominal obesity, with a waist circumference greater than 88 cm in women and 102 cm in men; Arterial hypertension, with systolic blood pressure ≥ 130 and/or diastolic blood pressure ≥ 85 mmHg; Altered blood glucose (≥110 mg/dl) or diagnosis of diabetes; Triglycerides ≥150mg/dl; HDL cholesterol <40 mg/dl in men and <50 mg/dl in women (NCEP, 2001).

Type 2 diabetes mellitus is a metabolic disorder that is rapidly expanding in cases worldwide and highly causes morbidity and mortality, especially in the elderly, but it is also growing among a portion of the young, sedentary and obese population that has unhealthy eating habits (Rao, 2015). This NCD is characterized by pre- and postprandial hyperglycemia, linked to the relative insufficiency of insulin resulting from inadequate secretion of this hormone by the pancreas and its low sensitivity in peripheral tissues. Brazil ranks fourth among the countries with the highest number of diabetics, with about 15 million in 2015 (Lai *et al*., 2019).

Systemic arterial hypertension (SAH) is the most prevalent chronic non-communicable disease in the world. It is estimated that more than 30% of adults have the disease worldwide, and it is more frequent with increasing age. However, the prevalence of the disease varies depending on the site assessed and the measurement methods applied (Mills *et al.,* 2016). SAH is often associated with metabolic disorders, functional and/or structural changes in target organs, and is aggravated by the presence of other risk factors such as dyslipidemia, increased waist circumference, and diabetes

mellitus (Weber *et al.,* 2014). It is a disease characterized by persistently high blood pressure (BP) in the systemic arteries, which is commonly expressed as the ratio of systolic BP (i.e., the pressure blood exerts on arterial walls when the heart contracts) and diastolic BP (the pressure when the heart relaxes) (Oparil *et al*., 2018). Thus, even with the patient's good adherence to the use of antihypertensive drugs, there were oscillations in BP, suggesting PRM-3 (effectiveness), which demonstrated the need 39 for a possible exchange or incorporation of antihypertensive drugs by the prescriber. Thus, during the follow-up, it was suggested to the patient the need for a new consultation with a cardiologist, who requested tests such as M.A.P.A and, after the result, incorporated a new drug (amlodipine) that, combined with the other two drugs already in use, could improve the control of the patient's hypertension.

As a complement to the treatment of DM2, SAH and dyslipidemia, non-pharmacological measures were suggested in order to promote better lifestyle habits, such as the practice of light walks and the importance of complying with the food plan proposed by the nutritionist of the Polyclinic for the Elderly, so that these new eating and physical habits could reduce the patient's initial complaints. Like foot pain, for example.

Healthy food intake and physical activity are two major determinants of energy balance and are considered fundamental in the treatment of diabetic and/or hypertensive patients. Added to this, adequate rest is also important to maintain energy levels and well-being, and all patients should be advised to sleep an average of 7 hours per night (Garber *et al.*, 2016). In this context, there is evidence associating 6 to 9 hours of sleep per night with a reduction in cardiometabolic risk factors, while sleep deprivation aggravates insulin resistance, hypertension, hyperglycemia, and dyslipidemia (Marín-Peñalver *et al.*, 2016). Lifestyle is also a very important factor in the control of DM2, in the sense that eating a low-carbohydrate diet, regular meals, increasing the intake of high-fiber foods, low consumption of high-sodium foods, not consuming alcohol, and achieving a healthy weight are items that should be present in the list of goals of the diabetic person (Park, 2015).

Breast cancer is a multifactorial disease caused by the uncontrolled proliferation of abnormal cells in the breast, which forms a tumor with the potential to invade other organs. There are several types of breast cancer. Some grow fast, others grow slowly. In most cases, if treated appropriately and promptly, the prognosis is good. Breast cancer also strikes men, but it is rare, accounting for only 1% of all cases of the disease. Advancing age is the main risk factor and is related to the grouping of exposures throughout life and to the inherent biological changes in the body with aging (Silva; Silva, 2021; WHO, 2020).

After the pharmacotherapy evaluation, it was found that the patient did not adhere to the pharmacotherapy prescribed for the treatment of anxiety and insomnia, characterizing a PRM-7 of non-adherence in which the individual prefers not to use the medication (Brasil, 2018). During

treatment with anxiolytic drugs, improvement of the condition may not be obtained instantly. After starting treatment with escitalopram, it usually takes 2 weeks for the patient to show improvement, and in some cases there may be increased anxiety at the beginning of treatment, symptoms such as restlessness or difficulty sitting may also occur during the first weeks that disappear over the days (Kirino, 2012). Although there was guidance about the use and particularities of this medication, the patient did not adhere to the treatment (Brasil, 2018). The patient's lack of adherence to drug treatment is considered a public health problem, and has come to be called an "invisible epidemic" (Santa Helena, 2007; Souza; Garnelo, 2008; Bloch; Melo; Nogueira, 2008; Koxma; Reeder; Schulz, 1993). Thus, among the factors that can influence adherence are those related to the treatment itself (duration of treatment, complexity, etc.), to the patient (beliefs, concerns, perception of health status and treatment), social and economic factors (cultural beliefs, fears, lack of access to medications) and factors related to the health system and team (lack of follow-up and guidance of people) (WHO, 2003; Caprara; Rodrigues, 2004; Correr *et al.*,2009; Dean et al., 2010; Gellad *et al.*,2011).

During the second pharmaceutical visit in September 2021, the patient reported that she had stopped taking pantoprazole on her own, because she did not feel any stomach discomfort 40 or heartburn related to the chemotherapy treatment, in addition to considering a high consumption of medications, which also indicates PRM7. Gastric mucosal injury is a frequent event in the natural history of cancer. In this sense, gastroprotection is widely prescribed due to pre-existing or associated conditions. In addition, cancer patients are often exposed to drugs that cause gastric damage such as chemotherapy, steroids, nonsteroidal anti-inflammatory agents (NSAIDs) (Lanza; Chan; Quigley, 2009).

In addition, the use of proton pump inhibitors in the usual doses in combination with antineoplastic drugs such as doxorubicin and ionizing radiation increased the overall survival of patients, in addition to reducing breast cancer recurrence, probably through the inhibition of the fatty acid synthase enzyme (FASN) (Buckley *et al.,* 2017). FASN expression and activity are seen in various human malignancies, such as breast cancer (Chao *et al.,* 2021). FASN is responsible for the endogenous synthesis of long-chain saturated fatty acids and membrane phospholipids and for the expression of the PARP1 gene (poly[ADP-ribose] polymerase 1) which are responsible for the DNA damage repair mechanisms of cancer cells favoring survival, recurrence rates, and metastatic development. Thus, FASN has been an attractive target for the discovery of new adjuvant drugs in the treatment of cancer, such as proton pump inhibitors capable of inhibiting this enzyme (Buckley *et al.,* 2017; Liu; Liu; Zhang, 2010).

Still in the second pharmaceutical consultation, the patient reported that she did not use the insulin pen correctly, a fact proven after demonstrating its application And at this time it was also observed the inadequate storage of insulins, which were placed on the refrigerator door. Thus, the

necessary guidelines were given on its use and correct storage, as well as the disposal of materials used to measure blood glucose.

In this scenario, inadequate storage conditions compromise the quality of insulin, which should be stored in the central part of the refrigerator, between 2 and 10 ºC. Regarding the homogenization of NPH insulin, which is a suspension, it is recommended that it be done subtly, in order to avoid the formation of air bubbles and the dissociation of the molecules, which could alter the stability and efficacy of the medicine. It is necessary that the vial with the contents is homogenized in the palm of the hands, ten to 15 times, slowly (Jehle *et al.*, 1999), with circular movements or pendulum movements; it is also necessary to rotate the application sites, which can be on the back of the arm, abdomen, thighs, or buttocks, as lipodystrophy is avoided (Yokaichiya et al., 2021). In the consultation with the oncologist in November 2021, rosuvastatin was added to control the patient's dyslipidemia, as the tests carried out this month showed the value of triglycerides of 401 mg/dL and total cholesterol of 196 mg/dL.

In the pharmaceutical consultation at the end of the month, the pharmacotherapy was evaluated, and an important drug interaction (PRM 6 – safety) was observed between ciprofibrate and rosuvastatin, with good documentation. It has been revealed that concomitant use of ciprofibrate and hmg-coa reductase inhibitors may result in an increased risk of myopathy or rhabdomyolysis (Zentiva, 2014). The patient did not report symptoms such as muscle weakness, myalgia, or change in urine color, despite the aforementioned interaction. Therefore, it was decided to schedule the two drugs at times far from each other: rosuvastatin in the morning, as it is a long-life statin and can be administered at any time of the day, as long as it is always at the same time chosen (Award et al., 2017; Rosenson, 2022). On the other hand, ciprofibrate was allocated for administration in the evening, after dinner.

Pharmacological treatment associated with guidance on non-pharmacological measures, such as nutritional changes focused on the consumption of foods such as fruits, vegetables, reduction in the consumption of carbohydrates, sodium and fats, reduce BP in hypertensive patients and favor glycemic control in diabetic patients and help improve dyslipidemia

Regarding the episode in which A.L.C was diagnosed with Entamoeba histolytica, amebiasis is an infection caused by this protozoan, being acquired by fecal-oral transmission (Castro et al., 2020). The infection is usually asymptomatic, but symptoms ranging from mild diarrhea to severe dysentery may occur. The disease is treated with metronidazole or secnidazole, for example. Human fecal contamination of contaminated food and water is common, and a problem aggravated by the high incidence of asymptomatic carriers (SBI, 2020). Raw foods, including potentially unsanitized salads and vegetables, and water from dubious sources should be avoided, particularly in developing regions (Neves, 2016). Thus, health education was promoted to the patient, general aspects of the disease, its causes, its treatment and the importance of prevention were explained. it is considered prudent to

explain to the patient the importance of washing food thoroughly before ingesting it, consuming filtered water, always washing hands before putting it in the mouth (WHO, 2004), and how maintaining and sharing these habits with their family members are important measures so that they do not contract Entamoeba histolytica again.

In the first consultation, the patient reported storing the medications in a shoebox, positioned on top of the refrigerator, which is next to the stove. Once drugs have their normal state altered, they can become inactive or even harmful to the user (Valery, 1989). For drugs to be fully effective, that is, their pharmacological action, they must be in adequate conditions of use and within the expiration date (Rocha et al., 2021).

It was proposed that she store the drugs inside their original packaging, as per the guidelines provided by the manufacturer (Yokaichiya et al., 2021). She was given a plastic container with drawers, so that she could better organize the medications, in order not to accumulate fungi and moisture, since every medication has specific physical and chemical properties and microbiological conditions that can be lost due to factors such as temperature, presence of oxygen, sunlight, radiation, humidity and microorganisms (Wells, 2005). Therefore, care must be taken not to damage and destabilize the drugs, because when the drugs are not stored correctly, the stability of the pharmaceutical form is lost, making them unsuitable for use (Yokaichiya et al., 2021; Wells, 2005). The patient should also store the container in another place, such as in her room, as long as there is no direct sunlight at any time of the day, since medications should be stored in places without contact with direct light and that are not hot or humid, such as the bathroom or kitchen, and should always be kept in their original packaging. as these were developed to preserve the physicochemical characteristics of the drug, according to the Center for Drug Studies (CEMED, 2021).

Regarding guidance on healthy eating and physical activity, it is emphasized that obesity is a multifactorial disease and one of these factors is an inappropriate diet. The practice of physical exercise in conjunction with diet tends to promote the reduction of body fat and consequently the attenuation of comorbidities generated by excess fat (Livhits *et al*., 2010). Thus, as a non-pharmacological treatment, the pharmaceutical approach was to guide the visit to the nutritionist. The patient went to see this specialist and received a meal plan aimed at improving DM2 and dyslipidemia.

Improvement in blood glucose control is related to the degree of caloric restriction and weight loss (Henry *et al.,* 1975; Wing *et al.,* 1994). Regardless of weight loss, regular exercise is beneficial for type 2 diabetes. Due to increased insulin reactivity, it may better control blood sugar and may delay the progress of glucose tolerance (Schneider *et al*., 1992). Regular exercise promotes several benefits, such as improvements in anxiety (Stubbs et al., 2017*) and increased cognitive functions (Karssemeijer* et al*.,* 2017).

At the end of the pharmacotherapeutic follow-up, by comparing the questionnaires applied

(PHQ-9 and BaMQ) (Graph 1), it was observed that both the degree of depression and adherence to treatment did not undergo so many changes, remaining practically stable, but not showing significant improvements in the aspects analyzed, also reflecting the little improvement in the patient's quality of life (MOS SF-36) (Table 5). This may possibly be related to the current context in which the patient finds herself, which involves the treatment of breast cancer and all the uncertainties and afflictions inherent to this condition, in addition to mourning for the loss of her husband.

Non-pharmacological interventions were complementary measures that also contributed to the reduction of the patient's initial complaints. Therefore, it is noted that pharmacotherapeutic follow-up reiterates the importance of the pharmacist in the scenario of chronic diseases and polytherapy, helping the patient to be the protagonist of his own story.

5 FINAL THOUGHTS

This case report describes a pharmacotherapeutic follow-up with a patient with metabolic syndrome, breast cancer, and polymedication. It was possible to contribute to the management of a safer and more efficient pharmacotherapy, achieving good adherence, as well as improving quality of life in some aspects. In addition, this study demonstrates the importance of pharmaceutical care in the rational use of medicines and in health promotion.

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