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Article

Evaluation of the pharmacotherapeutic follow-up effectiveness in patients with dyslipidemia in the secondary health care in the Brazilian Unified Health System (SUS)

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Cardiovascular diseases (CVD) are one of the main causes of mortality in the world. Dyslipidemia treatment can reduce the number of deaths caused by CVD, by decreasing the lipid profile. Evaluate the pharmacotherapeutic follow-up effectiveness in patients with dyslipidemia, regarding clinical and laboratory aspects. A quasi-experimental trial was performed in 12 months. The studied population was included patients with dyslipidemia who received a pharmacotherapeutic follow-up, which was evaluated according to the Pharmacotherapy Workup developed by the Brazilian Ministry of Health. Clinical and laboratory evaluations were performed at the baseline, after a 6 and 12-months period. The statistical analyzes were performed with the normality test of Lilliefors, Cramer Von Misses, and Anderson Darling, later the t-paired test. This study demonstrated that after 6-months of intervention, statistically significant results were verified in the reduction of LDL-cholesterol, total cholesterol, increase in HDL-cholesterol, and reduction in the blood pressure. It was observed that for high-risk patients, the achievement of targets in the lipid profile and HbA1C occurred only after 12-months, because, this population needs more aggressive targets and expressive interventions. Pharmacotherapeutic follow-up in patients with dyslipidemia reduced lipid blood levels and promoted positive clinical and laboratory outcomes.

Keywords: Pharmaceutical care. Anticholesteremic agents. Quality of health assistance.

INTRODUCTION

Cardiovascular diseases (CVD) are one of the main causes of mortality in the world. It was estimated that 17,7 million individuals died of cardiovascular disease throughout the world in 2015, which represents 31% of all deaths worldwide (World Health Organization, 2019). In Brazil, CVD corresponds to 37,9% of all premature causes of death in 2018 (DATASUS, 2019). In addition to smoking, Hypertension, and *Diabetes mellitus*, dyslipidemia is classified as the main risk factors for cardiovascular events, including acute myocardial infarction, stroke, and myocardial revascularization. Randomized clinical studies determined that dyslipidemia treatment can reduce the number of events and deaths due to CVD, mainly in decreasing the LDL-cholesterol level (American Diabetes Association, 2016; Brazilian Society of Cardiology, 2017).

The dyslipidemia treatment included pharmacological and non-pharmacological administration (Brazilian Society of Cardiology, 2017). The World Health Organization determines that to prevent cardiovascular events is necessary to adopt these behavioral changes: to stop tobacco use, to have a healthy diet, and practice

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physical activity (World Health Organization, 2018). The 2017 Brazilian Guidelines for Dyslipidemia and Prevention of Atherosclerosis recommended that the pharmacological treatment of dyslipidemia includes drugs of the class of statins like primary health care and if necessary may be associated with other pharmacological classes like fibrates and ezetimibe (Brazilian Society of Cardiology, 2017). The Brazilian Guidelines for Dyslipidemia and Prevention of Atherosclerosis recommends LDL-cholesterol targets through the stratification of cardiovascular risk, that is, it establishes targets that are more aggressive for individuals classified as having a higher risk of developing acute coronary events (Brazilian Society of Cardiology, 2017; Nelson, Rocheleau, Nicholls, 2017; Cesena *et al.*, 2017).

Dyslipidemia treatment in the Brazilian Unified Health System (SUS) is available in primary health care and the secondary health care of pharmaceutical service (Ministry of Health, 2017a). The secondary health care drugs provide medicines of the therapeutic classes of statins and fibrates to treat high cardiovascular risk patients, including the atorvastatin, bezafibrate, ciprofibrate, and fenofibrate (Ministry of Health, 2010, 2017b).

The public health system of Brazil (SUS) includes as its mission the integrality of health care. As a strategy to achieve this mission, SUS was organized in the community networks. Pharmaceutical service in Brazil is organized to guarantee the logistics of medicines, that is, focusing on the medicine and not on the patient. With the implementation of the community networks, this scenario has to change and offer services aimed at health care. The implementation of the pharmacotherapeutic follow-up service aims to attend to this new demand from SUS, which is to guarantee comprehensive care and the resolution of health actions (Ministry of Health, 2015)

This study aimed to evaluate the effectiveness of pharmacotherapeutic follow-up in patients with dyslipidemia, in a Public Secondary Health Care (PSHC) Pharmacy located in the municipality of Irati, Parana State, regarding clinical and laboratory aspects, to respond in an organized and integrated way to the health demands of the Brazilian population given the current stage of development of public health system (SUS).

METHODS

Type of study and setting

This is a quasi-experimental trial (Nedel, Silveira, 2016) performed from July 2017 to August 2018, in a Public Secondary Health Care (PSHC) Pharmacy located in the municipality of Irati, Parana State. In the Brazilian public health system, the PSHC is responsible for providing drugs to high-risk populations and rare diseases. The pharmaceutical service provided in this establishment had included, since 2016, just one pharmaceutical orientation for the first patient access in the service, with the proposition to promote just the correct use of drugs. This pharmaceutical orientation did not check the patient's clinical parameters, the drug-related problems, did not promote pharmaceutical interventions like change in drug therapy, laboratory and non-laboratory monitoring, referral to other professionals or services, and didn't offer review consultations. The other pharmaceutical activities corresponded to dispensing drug and administrative services. This study was approved by the Research Ethics Committee of the State University of Maringa, protocol No. 2.229.691, CAAE 70227117.2.0000.0104.

Participants

On the secondary health care of pharmaceutical service, in Irati-Parana, Brazil, the population of patients using drugs for dyslipidemia was 226. The recruiting period was in the first two months of the study (July to August 2017) when a sample size of 83 eligible patients, convenience sampling, were randomly invited to participate in the pharmacotherapeutic follow-up. This study included patients, who met the following inclusion criteria: ≥18 years of age, in treatment of dyslipidemia using a secondary health care drug, using more than 5 drugs, having at least three health problems, and who did not take part in a pharmaceutical consultation before the study period. The excluded criteria adopted in this study were: pregnant women, psychiatric diseases, alcoholism, who participated in less than three pharmaceutical consultations in a period of 12-months and dropped out

of the study. Out of all the participants, 2 had met the exclusion criteria (due to pregnancy and alcoholism), and 13 had dropped out. Therefore, 68 patients were eligible for the study and took part in the pharmaceutical follow-up, having at least 3 pharmaceutical consultations. All the participants signed the Free and Informed Consent Terms.

Pharmacotherapeutic Follow-Up Program

The pharmacotherapeutic follow-up program was conducted only with a one trained pharmacist, who performed the pharmaceutical consultations, interventions, collected and analyzed the data.

The pharmacotherapeutic follow-up program was performed in a period of 12-months when the patients participated monthly in the pharmaceutical consultation in the first 6-months of the study, and after the subsequent consultations had a longer interval according to the availability of the service and the patient's need.

The collection of the clinical and laboratory data was performed in the 3 periods of the study: at baseline, after 6-months, and after 12 months.

The methodology used in the study was a Pharmacotherapy Workup developed by the Health Ministry of Brazil that was standardized in the pharmaceutical consultations of the service, to register the patient's records, drug-related problems, and pharmaceutical interventions (Ministry of Health, 2015). The pharmacotherapeutic follow-up was developed respecting the patient's individual needs and knowledge of their clinical conditions and drug therapy. The record data were collected by the computerized system utilized in the service.

The pharmacotherapeutic follow-up included the following phases: data collection, identification of drug-related problems, situational analysis, pharmacotherapy review, detection of negative clinical outcomes, elaboration of a care plan, and result analysis (Ministry of Health, 2014a).

The data collected were pharmacological therapy, sociodemographic profile, clinical and laboratory data: systolic and diastolic blood pressure, capillary glycemia, body mass index (BMI) obtained by the ratio: weight/height², waist circumference, fasting glucose, HbA1C, total cholesterol, LDL-cholesterol, HDL-cholesterol, and triglycerides.

Patients were classified according to cardiovascular (CV) risk stratification of the 2017 Brazilian Guidelines for Dyslipidemia and Prevention of Atherosclerosis at very high-risk group, high-risk group, medium-risk group, and low-risk group, with LDL-cholesterol respectively, targets: lower than 50mg/dL, lower than 70mg/dL, lower than 100mg/dL and lower than 130mg/dL (American Diabetes Association, 2016; Brazilian Society of Cardiology, 2017). The targets for the clinical and laboratory parameters comprised the Brazilians Guidelines of Hypertension, Dyslipidemia and Diabetes: blood pressure <140/90mmHg, fasting glucose <100 mg/dL (patients with no diagnosis of diabetes) and <140mg/dL (patients with diagnosis of diabetes), HbA1C <7,0%, triglycerides <150mg/dL, HDL-cholesterol >40mg/dL, total cholesterol <190mg/dL (Brazilian Society of Cardiology, 2017, 2018; Brazilian Society of Diabetes, 2017).

The situational analysis consists of the study of continuous, occasional, and self-administered use of the drugs by the patient and analysis of clinical and laboratory data. After identifying a negative clinical outcome, the pharmacist evaluates the possibility of immediate intervention and/or referral to the physician and other services (Ministry of Health, 2014a).

The pharmaceutical interventions performed consist of alterations in drugs prescribed, suggestions to new drug regimens, treatment monitoring, correct use of drugs, referrals to physicians, and health education. The interventions aimed to guarantee the adherence of pharmacotherapy, by discussing with the patients about their health status, orientation to the correct use of drugs, orientation about the access of drugs, and if necessary, to promote an informative written material to the patient. The non-pharmacological measures adopted in this study were smoking cessation, changes in lifestyle as a stimulus to a healthy diet, the practice of physical exercise, and weight loss (World Health Organization, 2018).

This study did not prioritize only interventions in the lipid profile, but also considered all health problems found in the patients and their biopsychosocial characteristics.

Statistic

The analyses of clinical and laboratory data were determined by comparing the baseline *versus* the 6 months study and the baseline *versus* 12-months period study. Statistical analyzes were performed using the statistical software R (R CORE TEAM, 2020). In all cases, to test normality, the Lilliefors, Cramer Von Misses, and Anderson Darling tests were used and later the t-paired test. In cases in which there was no normality, the Wilcoxon test was applied. To verify the percentage of patients that reached the target recommended by the BSC, the statistical proportion test was applied, in which the proportion level considered was 50%. The limit of significance for all the comparisons was 5%.

RESULTS

Of the patients who initiated this study, only 68 completed the intervention, 2 presented exclusion criteria (pregnant woman and alcoholism), featuring a loss of 15.7%.

The population had an average of 5 (SD=1.45) diagnosed with health problems and 29 patients presented a diagnosis with *Diabetes mellitus* (42.6%), 60 patients presented systemic arterial hypertension (88.2%) and 47 patients presented previous coronary artery diseases (66.2%), such as acute myocardial infarction, coronary angioplasty and/or stent placement, saphenous and breast vein grafts, stroke, cardiac pacemaker placement, and previous catheterization. All the patients were polymedicated using an average of 9.2 (SD=3.34) drugs. The sociodemographic and clinic data of the study group are described in Table I.

TABLE I - Sociodemographic and clinic data collected at the baseline of the pharmacotherapeutic follow-up, of the studied population

Parameters	n - %
Gender	
Male	32 – 47.1
Female	36 – 52.9
Average age (SD)	71 (8.99) -
Smoking patients	14 – 20.6
Access to health service	
Public	62 – 91.2
Private	6 – 8.8
Education	
Elementary Complete	8 – 11.8
Elementary Incomplete	45 – 66.2
Secondary Complete	9 – 13.2
Secondary Incomplete	3 – 4.4
University Incomplete	1 – 1.5
Illiterate	1 – 1.5
Occupation	
Employee	10 – 14.7
Unemployed	13 – 19.1
Retired	45 – 66.2
Cardiovascular Risk	
Very high	36 – 52.9
High	21 – 30.9
Moderate	8 – 11.8
Low	3 – 4.4
Body Mass Index (BMI)	
Obese (>30)	32 – 47.0
Overweight (≥25 and ≤29.90)	18 – 26.5
Regular weight (<25)	18 – 26.

The treatment of dyslipidemia was mainly related to SUS drugs. Atorvastatin was the main agent prescribed in the intervention group, corresponding to 89.7% (n=61) of prescriptions, followed by bezafibrate 47.1% (n=32) and ezetimibe 14.7% (n=10).

During the pharmacotherapeutic follow-up, there were performed 330 pharmaceutical consultations

in a period of 12-months, resulting in 4.9 (SD=1.89) consultations per patient. Ninety-six of the drugs related problems were found during the follow-ups, with an average of 1.4 problems per patient (Table II).

Most of the drugs related problems found of administration and adherence to treatment were related to the self-administration drugs (50.2%), including undue discontinuation of the drug (15.6%), incorrect frequency or administration schedule, without changing in daily dose (13.3%), doses omission (under dosing) by the patient (7.8%), abrupt dose reduction by the patient (6.7%), dose addition (overdose) by the patient (5.6%), and the patient did not initiate the treatment (3.3%). There were also 10 prescription-related problems (10.5%), such as inadequate prescribed dosing, frequency or schedule of administration, drug-drug interaction, and prescription of the contraindicated drug.

A total of 265 pharmaceutical interventions were performed, averaging 3.89 interventions per patient (Table II). There were performed 20 referrals to the physician, those also reported the patients' health conditions, adverse reactions, suggestions for changes in pharmacotherapy, access to SUS drugs, among other drug-related problems.

The interventions performed by the pharmacist in this study were well accepted by the physician, resulting in 80% acceptance of the pharmaceutical recommendation by this professional.

TABLE II - Drug-related problems and pharmaceutical interventions performed in the 12-months pharmacotherapeutic follow-up of patients with dyslipidemia

	n* - %
Drug-related problems	
Problems involving drug selection and prescription	12 – 12.5
Administration and adherence to treatment	53 – 55.2
Dispensing and administration error	3 – 3.1
Discrepancy between levels of attention	7 – 7.3
Problems in drug quality	1 – 1.0
Laboratory and non-laboratory monitoring	6 – 6.3
Ineffective treatment	7 – 7.3
Adverse drug reaction	7 – 7.3
Pharmaceutical interventions	
Health education and counseling	175 – 66.0
Change in drug therapy	34 – 12.8
Laboratory and non-laboratory monitoring	17 – 6.4
Referral to other professionals or services	22 – 8.3
Write educational material	17 – 6.4

*number of episodes found

There was no significant statistical reduction in the medium of drugs prescribed in the study population when compared the values at the baseline and after 12 months of the pharmacotherapeutic follow-up.

The clinical and laboratory values were obtained of the patients that brought the exams in the 3-periods analyzed. Table III shows the clinical and laboratory data of the study population, comparing the values collected at the baseline, after 6-months, and after 12-months of the study. Systolic and diastolic blood pressure data at the analyzed periods presented a significant reduction after the first six months of follow-up. The population in the present study had a significant reduction of 28.3% of LDL-cholesterol and 13.75% of total cholesterol ($p<0.0001$) after 12-months of follow-up. When analyzing the HDL-cholesterol results, a significant increase was observed after the first six months ($p<0.01$) of follow-up, and after 12-months the increase reached 5.4%, which was expected with the statin treatment (Rhee *et al.*, 2019). Triglycerides values did not decrease significantly in the analyzed periods, as did the BMI values ($p=0.8607$).

Analyzing the data of fasting glycaemia and hemoglobin A1C of the diabetic population, a reduction of 1% of hemoglobin A1C was obtained after 12-months of intervention and there was no significant reduction in

the mean values of fasting glycaemia. Of the 29 diabetic patients of the study population, 16 were insulin-dependent.

The interventions promoted to diabetes individuals focus on the correct use and storage of insulin, monitoring the glycemia, strategies about reduction and control the hypoglycemia episodes, the correct use of a glucometer, interpretation of the results of capillary glycemia, and carbohydrate-restricted dietary guidelines.

TABLE III – Clinical and laboratory parameters collected in three periods of pharmacotherapeutic follow-up in patients with dyslipidemia and comparative statistical analysis among the phases of the study

	Baseline (n)	After 6 months of intervention (n)	After 12 months of intervention (n)	*p* valor	
				Baseline *versus* 6 months	Baseline *versus* 12 months
LDL-C	93.5 ± 27.7 (58)	80.9±28.6 (42)	67.0±21.6 (55)	**<0.001**	**< 0.0001**
COL T	173.0±35.4 (59)	155.8±32.7 (42)	149.2±32.0 (56)	**<0.001**	**<0.0001**
TG	149.2±72.8 (59)	132.4±79.7 (43)	127.4±53.2 (56)	0.14	0.3005
HDL-C	50.0±12.1 (59)	50.7±13.9 (43)	52.7±14.6 (55)	**<0.01**	0.06158
SBP	139.3±25.3 (67)	120.5±21.0 (60)	131.8±23.4 (53)	**< 0.0001**	**<0.001**
DBP	79.1±13.7 (67)	71.7±11.2 (60)	72.4±10.0 (53)	**<0.0001**	**<0.0001**
GLY	146.3±56.4 (48)	131.6±49.4 (28)	132.0±59.9 (49)	0.268	0.8308
HbA1C	8.3±2.3 (35)	7.9±2.1 (26)	7.3±1.6 (42)	0.2428	**<0.01**

LDL-C: LDL cholesterol (mg/dL), COL T: total cholesterol (mg/dL), TG: triglycerides (mg/dL), HDL-C: HDL cholesterol (mg/dL), SBP: systolic blood pressure (mmHg), DBP: diastolic blood pressure (mmHg), GLY: fasting glycaemia (mg/dL), HbA1C: glycosylated hemoglobin (%), (n): number of tests. (Mean±standard deviation).

DISCUSSION

This study assessed an intervention strategy to present positive results with improvement in laboratory and clinical parameters. The population in the present study had a significant reduction in LDL-cholesterol, total cholesterol, systolic and diastolic blood pressure levels, and a reduction in hemoglobin A1C in a diabetic population. The triglycerides values had not a significant reduction in the study period, but in the baseline, the values were within the reference values of the Brazilian Guidelines for Dyslipidemia and Prevention of Atherosclerosis (Brazilian Society of Cardiology, 2017).

The reduction of plasma cholesterol is considered as one of the main modifiable risk factors for reducing cardiovascular events, like death from cardiovascular causes, major coronary events, and nonfatal stroke. The IMPROVED-IT study demonstrates that the greater absolute reduction of LDL-cholesterol promotes the greater reduction of the relative risk of cardiovascular events (Ellis *et al.*, 2000).

The pharmaceutical interventions about health education and counseling prioritized actions to promote the patient self-care health, that includes counseling about the patient health condition, non-pharmacological treatment, orientation about self-monitoring, the correct use of a drug, treatment adherence, and orientation about the cardiovascular risk and the lipid target (Federal Council of Pharmacy, 2016; Ministry of Health, 2014a). Thus, the objective of all pharmaceutical interventions was to promote the patient's self-care health, information about his health condition, motivating him to know how to conduct

it, and enabling him to be able to comply with his treatment plan. In addition, promoting interventions to the patient recognizes the warning signs of possible complications and guides him on what actions he should develop to solve them. (Ministry of Health, 2014a; Ministry of Health, 2014b).

The purpose of this pharmacotherapeutic follow-up study was to make the patient feel the center of the care and become the most important factor in his health care. The pharmacist makes the patient more motivated, consciousness and responsible for achieving better clinical results, and consequently, the patient will adhere to the treatment, develop healthy habits, and will present positive clinical outcomes.

In clinical practice, studies showed that 30% of chronic patients in drug treatment do not control their clinical parameters, demonstrating that only access to health systems and health technologies, including medicines, do not provide quality of life, and the pharmacotherapeutic follow-up care should be positively evaluated as exceptional strategies for the formulation of public health policies (Geurts *et al*., 2016).

Studies of adherence also demonstrated the reduction in the clinical and laboratory parameters after a pharmacotherapeutic follow-up in patients with chronic diseases such as hypertension and diabetes (Aquino *et al*., 2018; Obreli-Neto *et al*., 2011). In this study, pharmacological adherence was one the most important strategy to promote clinical control in the cardiovascular risk population, which represents 55.2% of all the drug-related problems found.

Pharmacological adherence is very important in the dyslipidemia treatment because the cardiovascular effects of statins will disappear after one to two days of stopping the administration; in addition, blood LDL-cholesterol level rises again about 2 to 3 months later and reverts to the pre-treatment levels. Therefore, there it is crucial to continue taking the statin drug (Rhee *et al*., 2019).

Regarding the cardiovascular risk of analysis targets of the Brazilian Society of Cardiology for LDL-cholesterol, our results showed that the very high-risk group in this study had difficulty in reducing LDL cholesterol to the <50mg / dL target, but at the high-risk group, the LDL-cholesterol target <70mg / dL was reached.

However, a randomized trial with 10.000 patients that tested low-dose or high-dose statin administration, reduced the cardiovascular risk by about around 22%, in patients with stable angina and with the LDL-cholesterol <130mg/dL, when lowering the LDL-cholesterol level close to 70mg/dL. The preventive cardiovascular effects of statins were greatest when the LDL-cholesterol was reduced to a level <70mg/dL or by >50% of the baseline level (Rhee *et al*., 2019). In this study the medium of LDL-cholesterol was reduced to 67mg/dL, after 12-months of intervention, indicating the effectiveness of the pharmacotherapeutic follow-up in promoting the protection of cardiovascular diseases.

The target of hemoglobin A1C for metabolic control of diabetic patients should be less than 7.0% (Brazilian Society of Diabetes, 2017), and the average of the obtained results of the diabetic population in the intervention group after one year of follow-up is close to it and presented a reduction in 1.0% of the hemoglobin A1C. The UK Prospective Diabetes Study (UKPDS) demonstrated that a 1.0% reduction in hemoglobin A1C represents a significant reduction of complications related to *Diabetes mellitus*, mainly reduction of 37% in the occurrence of microvascular disease and a reduction of 14% in myocardial infarction (Stratton *et al*., 2000).

The interventions result on diabetic patients were very important to achieve positive results in dyslipidemia, since the diabetes patients who have poor glycemic control need an individualized education, to help to control dyslipidemia (Rhee *et al*., 2019).

This study demonstrated through clinical and laboratory data that after 6-months of pharmacotherapeutic follow-up, statistically significant results can be verified in the reduction of LDL-cholesterol, total cholesterol, increase in HDL-cholesterol, and reduction in systolic and diastolic blood pressure, proving the effectiveness in promoting health self-care actions for patients. In the first 6-months, the patients have already empowered themselves with knowledge about their chronic condition, enabling them to develop disease clinical management and to obtain positive results, reducing the symptoms, the complications, and the disabilities. When verifying the achievement of patient's clinical targets, according to

the cardiovascular risk stratification, it was observed that for high-risk patients, the achievement of targets in the lipid profile and HbA1C occurred only after 12-months of follow-up, because, this population needs more aggressive targets and more expressive interventions, so it was needed a longer period of patient monitoring by the pharmacist and the health team.

The pharmacist, a member of the healthcare team, can improve clinical outcomes in the elevated cardiovascular risk population and prevent cardiovascular complications. This service improves complex pharmaceutical interventions, and guarantee reduced levels of total cholesterol, LDL-cholesterol, triglycerides, blood pressure, A1C hemoglobin, fasting glucose in this population (Aquino *et al*., 2018; Obreli-Neto *et al*., 2011). The Improve Study showed that the pharmacist had a positive impact on the clinical management of dyslipidemia, without any increase in costs with the health system (Ellis, *et al*., 2000).

The public health system of Brazil (SUS) has difficulties in maintaining a sufficient number, to meet its real demand, of consultations in the public secondary health care, not guaranteeing integrally access to the public health system (Silva *et al*., 2017). Due to this, the access to the treatment of dyslipidemia in the secondary health care of pharmaceutical service in the SUS, the patient can be referred from both the public and private health system. This study revealed that 91.2% of patients underwent medical care at the secondary health care (cardiology) of the public health system and 8.8% were attended in the private health system, that is, the majority of the study population had access to the service of cardiology by SUS, implying that the offer of this medical specialty, in this health region, has managed to satisfactorily meet the demand of the public service.

The pharmaceutical interventions were well accepted by the physician and the interaction between patient-pharmacist-physician establishes the achievement of therapeutic targets, providing greater safety and effectiveness of the treatment, ensuring drug conformity, and reducing drug-related problems (Sanchez *et al*., 2015).

The positive clinical results of the pharmacotherapeutic follow-up may be related to the greater availability and easy access to pharmaceutical service, being demonstrated by positive clinical studies in which was easier for the patient to be assisted by the pharmacist and consequently spending more time with this than with the physician (Federal Council of Pharmacy, 2016).

The partnership with the physician is fundamental for the success of pharmaceutical clinical care, as the interrelationship of knowledge and professional skills becomes essential in achieving therapeutic success.

The acceptance of pharmaceutical consultations by the health team resulted in the positive referral of the pharmacotherapeutic follow-up service to other patients who did not participate in the study. This positive feedback on the referral of other patients to pharmacotherapeutic follow-up has achieved the implementation of this service and strengthened its continuity.

In this context, due to his ability on offering an advanced level of care the pharmacist occupies a prominent position in assuring efforts to obtain positive clinical outcomes, manage clinical and pharmacological information, and clinical and patient management (Federal Council of Pharmacy, 2016; Ministry of Health, 2014a).

One of the strengths of this work was the implementation of a permanent pharmacotherapeutic consultation and follow-up service at the Secondary level of SUS health care in a region in need of this service, including primary care, which will provide quality of life to the patients attended.

Limitations

A limiting factor of the service was the availability of laboratory tests to evaluate the results at the analyzed periods since the pharmacist was not authorized to request such tests in the SUS. Due to this difficulty some patients did not have data collected at some periods of the study. Another limitation was due to the organization of the local health service, it was not possible to refer the patient to another professional besides the physician. This study did not include a control group, after the beginning of the study, all patients with dyslipidemia who were attended at the service had access to pharmaceutical consultations.

CONCLUSION

Pharmacotherapeutic follow-up in patients with dyslipidemia in secondary health care of pharmaceutical service in the Brazilian Unified Health System (SUS) promoted a reduction in total cholesterol, LDL-cholesterol, systolic and diastolic blood pressure levels, hemoglobin A1C levels, as well as an increase in HDL cholesterol levels after the 12-months of follow-up. This study demonstrated the effectiveness of pharmacotherapeutic follow-up in the study population, through the promotion of positive clinical outcomes and response to the health demands of the Brazilian population because of the current stage of development of the public health system (SUS).

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