Pharmaceutical care in persons with diabetes mellitus using insulin

Cuidado farmacêutico para pessoas com diabetes mellitus em uso de insulina

Atención farmacéutica para personas con diabetes mellitus por uso de insulina

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REVISA

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RESUMO

Objetivo: Identificar o perfil de saúde e farmacoterapêutico dos usuários de insulina cadastrados em uma unidade de saúde; e discutir o plano de cuidados adotado para estes pacientes, fundamentado em método de cuidados farmacêuticos. **Método:** Trata-se de estudo descritivo de abordagem qualitativa, realizado por meio de uma pesquisa de campo, tendo como cenário de intervenção propriamente dito uma Unidade de Saúde da Família, de um município baiano, envolvendo 20 usuários. A pesquisa se dividiu em duas etapas: identificação do perfil de saúde e farmacoterapêutico dos usuários de insulina e definição do plano de cuidados, com base numa adaptação dos métodos Dáder e Pharmacotherapy Workup. **Resultados:** No processo de cuidado farmacêutico, foram realizadas 46 intervenções envolvendo estratégias farmacológicas e de educação em saúde, sendo possível constatar melhoria nos resultados de saúde dos pacientes acompanhados. **Conclusão:** Os resultados apontam o cuidado farmacêutico como estratégia promotora de melhor qualidade de vida a esses pacientes, e também indícios de que, no processo de assistência aos pacientes com diabetes em uso de insulina, nas unidades de saúde, há carências de informações, dificultando a adesão ao tratamento e às práticas de autocuidado.
Descritores: Diabetes Mellitus; Insulina; Cuidados Farmacêuticos.

ABSTRACT

Objective: To identify the health and pharmacotherapeutic profile of insulin users registered in a health unit; and discuss the care plan adopted for these patients, based on a pharmaceutical care method. **Method:** This is a descriptive study with a qualitative approach, carried out through field research, with the intervention scenario itself being a Family Health Unit, in a municipality in Bahia, involving 20 users. The research was divided into two stages: identification of the health and pharmacotherapeutic profile of insulin users and definition of the care plan, based on an adaptation of the Dáder and Pharmacotherapy Workup methods. **Results:** In the pharmaceutical care process, 46 interventions were carried out involving pharmacological strategies and health education, and it was possible to observe an improvement in the health results of the patients monitored. **Conclusion:** The results point to pharmaceutical care as a strategy that promotes better quality of life for these patients, and also evidence that, in the process of assisting patients with diabetes using insulin, in health facilities, there is a lack of information, making it difficult adherence to treatment and self-care practices.
Descriptors: Diabetes Mellitus; Insulin; Pharmaceutical Care.

RESUMEN

Objetivo: Identificar el perfil de salud y farmacoterapéutico de los usuarios de insulina registrados en una unidad de salud; y discutir el plan de atención adoptado para estos pacientes, basado en un método de atención farmacéutica. **Método:** Se trata de un estudio descriptivo con enfoque cualitativo, realizado a través de investigación de campo, siendo el escenario de intervención en sí una Unidad de Salud de la Familia, en un municipio de Bahía, involucrando a 20 usuarios. La investigación se dividió en dos etapas: identificación del perfil de salud y farmacoterapéutico de los usuarios de insulina y definición del plan de cuidados, a partir de una adaptación de los métodos de Dáder y Pharmacotherapy Workup. **Resultados:** En el proceso de atención farmacéutica se realizaron 46 intervenciones que involucraron estrategias farmacológicas y educación para la salud, y se pudo observar una mejora en los resultados de salud de los pacientes monitoreados. **Conclusión:** Los resultados apuntan a la atención farmacéutica como una estrategia que promueve una mejor calidad de vida para estos pacientes, y también evidencian que, en el proceso de atención a los pacientes con diabetes con insulina, en los establecimientos de salud, existe una falta de información, por difícil adherencia al tratamiento y prácticas de autocuidado.
Descriptores: Diabetes Mellitus, Insulina, Atención Farmacéutica.

ORIGINAL

Introduction

Diabetes mellitus is an important and growing public health problem in all countries, and Brazil ranks fourth among the 10 countries with the highest number of people with diabetes, aged between 20 and 79, according to data from the International Diabetes Federation.[1] This organization also warns that developing countries concentrate about 79% of cases, with a greater increase in the coming decades. Thus, he estimated that, if trends persist, there is a projection of over 628.6 million cases of diabetes in 2045. In this context, the Brazilian Society of Diabetes draws attention to the increase in mortality, complications and diseases associated with diabetes.[2]

The treatment of diabetes is complex and requires the intense participation of the patient who needs to be trained for self-care[3] and also the assistance of a team of collaborative and interdisciplinary professionals so that effective results are obtained.[4] In this process, the pharmacist's work in monitoring glycemic control is essential to meet the demands of care through care activities, which is evidence found in several countries.[5-6]

Among these activities, there is pharmaceutical care, which consists of a practice model that guides the provision of different pharmaceutical services directly aimed at the patient, family and community, aiming at the prevention and resolution of pharmacotherapy problems, the rational use of medicines, the promotion, protection and recovery of health, as well as the prevention of diseases and other health problems.[7]

The main purpose of the practice of pharmaceutical care for people with chronic diseases is to improve clinical outcomes, minimize unscheduled health care and contribute to the quality of life of patients. Particularly in relation to the care of people with diabetes, studies have shown the powerful contribution of the pharmacist in providing improvements in the health condition of these patients.[8-9]

Based on this premise, this article aims to identify the health and pharmacotherapeutic profile of insulin users registered in a health unit; and discuss the care plan adopted for these patients, based on a pharmaceutical care method.

Method

This is a descriptive study with a qualitative approach, carried out through field research. The field of intervention itself was a Family Health Unit (USF), in a municipality in Bahia, which has a team of 23 health workers, not including the pharmacist. This intervention was carried out from January 2017 to April 2018, totaling fourteen months.

The participants involved were all users who used insulin in their antidiabetic therapy, making up a quantity of 25 people, who were identified through the Community Health Agents (CHA). Of this total, five people were not found, thus obtaining a total of 20 participants. The meetings with research participants were carried out through home visits accompanied by the ACS.

The research was approved by the Ethics Committee under protocol number 1.842.331 and was divided into two stages: identification of the health and pharmacotherapeutic profile of insulin users and definition of the care plan.

For the first stage, a form was used as a data collection instrument (objective and subjective questions) divided into three categories: socioeconomic data, history of health status and consumption, and attitude towards taking medication. For the second stage, the therapeutic evaluation was carried out and the pharmaceutical care plan was defined, based on an adaptation of the Dáder and Pharmacotherapy Workup (PW) methods.

In the care plan, the glycemic goal adopted by the Brazilian Society of Diabetes (2019) of postprandial blood glucose lower than 160mg/dL and glycated hemoglobin (HbA) lower than 7.0% was established. For the study of possible drug interactions and contraindications, the Drugdex System – Thomsom Micromedex®, Interactions, Drug Interaction Checker - Medscape® databases and the 2010 National Therapeutic Form were used.

The intervention process initially took place through the creation and availability of an individual dosage chart, a form for recording blood glucose measurements and an information booklet on diabetes (authors' elaboration), followed by an oral explanation about the importance of the rational use of medications, the practice of regular physical activity and adequate nutrition for glycemic control. The evaluation of pharmacotherapy was based on the identification of Drug-Related Problems.[10]

Results

From the data collected in the home visits, the pharmacotherapeutic profile of the participants was traced, as can be seen in Table 1.

Table 1 - Pharmacotherapeutic profile of people with diabetes using insulin, registered at a Family Health Unit in a municipality in Bahia (n=20). Bahia, 2018.

Variables	n	%
Sex		
Female	08	40,0
Male	12	60,0
Age	**n**	**%**
<60 years	11	55,0
≥ 60 years	09	45,0
Family history of diabetes	**n**	**%**
Yes	17	85,0
No	03	15,0
Other associated pathologies	**n**	**%**
No	02	10,0
Yes	18	90,0
Hypertension	12	66,7
Others	06	33,3
Body Mass Index (BMI)	**n**	**%**
Overweight (≥25 kg/m²)*	07	35,0
Within normal limits (>18.5 kg/m² ≤ 24.9 kg/m²)*	07	35,0
Underweight (≤18.5 kg/m²)*	04	20,0
Don't know the weight and height	02	10,0
Regular practice of physical activity	**n**	**%**
Yes	09	45,0
No	11	55,0

Laboratory monitoring of glycemic levels	**n**	**%**
Biweekly	01	5,0
Monthly	01	5,0
Quarterly	11	55,0
Biannual	04	20,0
Annual	02	10,0
Every two years or more	01	5,0
Monitoring glycemic levels using the glucometer	**n**	**%**
It does not perform	09	45,0
Performs daily	02	10,0
Performs between two and three times a week	05	25,0
Performs weekly	03	15,0
Performs monthly	01	5,0
Result of the last glycemic measure	**n**	**%**
Within normal ity parameters	03	15,0
Above normality parameters	13	65,0
No record/no remembers	04	20,0
Watch your feet	**n**	**%**
Performs daily	08	40,0
Performs between two and three times a week	06	30,0
Performs weekly	04	20,0
Does not apply (patient with amputated lower limbs)	02	10,0
Diabetes-related complications	**n**	**%**
Amputation of the lower limbs	02	10,0
Renal failure	01	5,0
Stroke	01	5,0
No complications	16	80,0
Adverse reaction to medicines	**n**	**%**
No	06	30,0
Yes	14	70,0
Hypoglycemia	05	35,7
Gastrointestinal discomfort	02	14,3
Other	07	50,0
Application of insulin	**n**	**%**
Apply alone	10	50,0
Assistance from a family member or health service	10	50,0
Rotation at insulin application sites	**n**	**%**
Yes	15	75,0
No	05	25,0
Correct insulin storage	**n**	**%**
Yes	08	40,0
No (refrigerator door)	12	60,0
Lack of adtake in the last fifteen days	**n**	**%**
No	10	50,0
Yes (reasons):	10	50,0
Hypoglycemia	02	20,0
Oblivion	02	20,0

Financial reasons	02	20,0
Guidance for stopping or pausing treatment	01	10,0
Caregiver was not at the time of the application	01	10,0
Made use of alcoholic beverage	01	10,0
He had a laboratory test	01	10,0

* International classification of obesity according to the Body Mass Index (BMI) of the World Health Organization

After the elaboration of the pharmacotherapeutic profile, the pharmacotherapy was evaluated. In total, 28 Drug-Related Problems (MPR) were identified in the 20 patients followed (Table 2).

Table 2 - Classification of Drug-Related Problems with their respective occurrences in the study (n= 28). Bahia, 2018.

TYPE OF DRP	n	%
Necessity		
1. Do not take the medicine you need	01	5,0
2. Take the medicine you do not need	01	5,0
Effectiveness		
3. Take a medicinal product that is not effective for non-quantitative reasons	07	35,0
4. Take a medicine that is not effective for quantitative reasons	01	5,0
Security		
5. Take a medicine that is not safe for non-quantitative reasons	07	35,0
6. Take a medicine that is not safe for quantitative reasons	01	5,0
Adherence		
7. Do not take the medicine you need	10	50,0

Having identified the profile of patients with diabetes in the research scenario, the next step of the research consisted of establishing the patient care plan, according to the consent of these patients to participate in this step. In this case, four of the 20 patients agreed to participate and were followed for six months. In order to preserve their identity, a code was established to name them.

Patient I

J.C.D.S., male, 52 years old, married, literate, retired. Denied use of alcoholic beverages, smoking, practice of physical activity and adequate food for the pathological condition. In addition to diabetes, he has a diagnosis of arrhythmia. It makes continuous use of NPH insulin, 100mg acetylsalicylic acid, 50mg metoprolol succinate, 40mg furosemide, 5mg enalapril maleate, 10mg simvastatin and 25mg amitriptyline hydrochloride.

In the first contact, the patient reported non-adherence to 50mg metoprolol succinate in recent days due to its high cost, and that he does not administer insulin at night when blood glucose is below 100mg/dL (PRM 7). She reported

not needing help to apply the insulin, she practices the rotation and applies it in the proper places. However, when demonstrating how to apply insulin, it was noticed that the administration was being administered via the intramuscular route, a fact that changes its onset and duration of action (PRM 3).

To solve PRM 7, the patient was suggested to interchange the medicine metoprolol succinate 50mg of the reference brand with the generic equivalent, which is cheaper. At the next visit, the purchase of the generic drug was identified, thus favoring adherence to therapy.

Regarding the non-administration of NPH insulin at night for fear of presenting hypoglycemia, the patient was instructed about the time of onset and duration of action of this type of insulin. Regarding hypoglycemia, he was instructed to communicate with the prescriber about this adverse reaction. The prescriber adjusted the dose, reducing it by four units, thus solving the problem of adverse reactions that influenced adherence to therapy.

To solve PRM 3, the technique of subcutaneous insulin administration was taught, emphasizing the importance of "performing the fold" at the site. On subsequent visits, J.C.D.S. was asked about the technique adopted and demonstrated to perform correctly. Laboratory tests performed after this intervention indicated improvement in fasting, postprandial and HbA glucose levels.

From the identification of the drugs used, the study of possible drug interactions and contraindications was carried out. Possible interactions between acetylsalicylic acid and enalapril maleate have been identified, which may lead to decreased renal function, antihypertensive effect and changes in potassium levels; enalapril maleate and furosemide, with possible decreased renal function; acetylsalicylic acid and furosemide, enabling a reduction in the effect of furosemide. Thus, the patient was instructed to routinely monitor blood pressure. With the analysis of tests that assess renal function and potassium dosage, it was observed that they were within normal limits, according to the reference values, as well as blood pressure. Thus, these drugs are likely to be administered concomitantly in this case, despite the interactions reported in the literature, but they require continuous monitoring of renal function and potassium levels by the physician and pharmacist.

As for the contraindication of metoprolol succinate in patients with diabetes, due to the risk of masking the symptoms of hypoglycemia (PRM 5 - potential), the patient was instructed to perform glycemic monitoring using the fingertip test whenever administering the insulin.

Amitriptyline hydrochloride is contraindicated in case of arrhythmia (PRM 5) and the patient used this medication to treat insomnia and pain associated with Chikungunya, even though he no longer had symptoms (PRM2). The orientation was to report the situation to the doctor who decided to suspend use, a fact verified in subsequent visits.

Patient II

E.S.F., female, 74 years old, single, literate, retired. Denied use of alcoholic beverages, smoking, practice of physical activity and adequate food for the pathological condition. In addition to diabetes, he has high blood pressure. Continuous use of NPH insulin, regular insulin, metformin hydrochloride 850mg and enalapril maleate 20mg. She reported that she did not need help to apply the

insulin, rotated it and applied it in the appropriate places, however, she stored it incorrectly, placing it on the refrigerator door.

She was unaware of the main symptoms of hypoglycemia, performed foot care only once a week, claimed to be allergic to the drug diclofenac potassium and did not perform daily blood glucose monitoring. Based on these observations, the intervention process was also carried out through the creation and availability of a folder on allergy to anti-inflammatory and analgesic drugs (authors' elaboration), in order to avoid adverse reactions.

When asked about the dosage of the medications she uses, it was noted that she used metformin hydrochloride 850mg only twice a day, and it was prescribed three times a day (PRM 7). Thus, the patient was instructed to use it correctly, according to the prescription, a fact confirmed in subsequent visits. In order to minimize the gastrointestinal discomfort reported by the use of metformin, administration during or after meals has been recommended. Upon checking the laboratory test performed after the intervention, a reduction in HbA and postprandial blood glucose was verified.

The patient also complained of sweating, tachycardia and blurred vision occasionally after administration of regular insulin. When questioning her, it was noticed that she did not eat after the application, leading to hypoglycemia (PRM 5). Thus, she was instructed to use this medication 15 to 30 minutes before the meal and in the following visits, the disappearance of these symptoms was evidenced.

From the analysis of pharmacotherapy, a possible drug interaction between enalapril maleate + metformin hydrochloride was identified, where there is a risk of developing lactic acidosis and hyperkalemia (PRM 5 - potential). Based on this identification, potassium levels and the possible presence of signs of lactic acidosis were evaluated at each visit, however, no significant clinical finding was identified.

Patient III

L.S.F., female, 51 years old, married, literate, economically active. Denied use of alcoholic beverages, smoking, practice of physical activity and adequate food for the pathological condition. In addition to diabetes, he has high blood pressure. It makes continuous use of NPH insulin, regular insulin, metformin hydrochloride 850mg, enalapril maleate 20mg, simvastatin 10mg and acetylsalicylic acid 100mg. Claimed allergy to dipyrone.

The patient reported needing help to administer insulin for fear of self-administration. However, he refused to ask family and neighbors for help because he did not want to bother, evidencing non-adherence to insulin treatment (PRM 7). In addition, it stored insulin incorrectly, placing it on the refrigerator door. The patient admitted that not administering insulin and incorrect storage could be compromising the clinical results (PRM 3).

Based on these observations, the importance of using insulin for glycemic control was discussed with her and the intervention process was initially carried out through the availability of a folder, prepared by the authors, on allergy to anti-inflammatory and analgesic medications. From the visits, an improvement in adherence was noticed, however, the patient still reported fear of administering insulin. A consultation with the psychologist of the Expanded

Nucleus of Family Health and Primary Care - NASF-AB was suggested, however the patient did not agree, thus not accepting the proposed intervention.

From the analysis of the drugs used, possible drug interactions between acetylsalicylic acid and enalapril maleate were identified, which may lead to a decrease in renal function and antihypertensive effect and changes in potassium levels; enalapril maleate and metformin hydrochloride, favoring the risk of developing lactic acidosis and hyperkalemia (PRM 5 - potential). At each visit, potassium levels, renal function, blood pressure and the possible presence of signs of lactic acidosis were evaluated, however no significant clinical findings were identified.

Patient IV

E.J.G., female, 58 years old, married, literate, retired. Denied use of alcoholic beverages, smoking and adequate food for the pathological condition. He claimed to practice physical activity four times a week. Is overweight according to BMI. In addition to diabetes, he has high blood pressure. Continuous use of NPH insulin, regular insulin, fixed association of losartan potassium + hydrochlorothiazide 50/12.5mg, dapagliflozin 10mg, gliclazide 30mg, simvastatin 20mg and fluoxetine hydrochloride 20mg.

Incorrectly stored insulin by placing it in the refrigerator door. He stated that he had already had a severe adverse reaction from the use of metformin hydrochloride (gastrointestinal discomfort), which was suspended by the prescriber.

E.J.G. reported having replaced on his own the association of losartan potassium + hydrochlorothiazide 50/12.5mg prescribed by the physician (PRM 7) for amiloride hydrochloride + hydrochlorothiazide 5/50mg (PRM 2). His rationale for the switch was his perception that losartan potassium is not effective in controlling his blood pressure. He reported a one-year previous use of amiloride hydrochloride + hydrochlorothiazide 5/50mg and that, at the time, hypertension was under control, so he decided to use this drug again. When asked about how she acquired the drug, she said that she did not have the old prescription and that she only bought it because of the characteristics of the package (green box with red and yellow details).

In view of this situation, the risks of the attitude taken were explained and, on the next visit, the patient presented a box of amiloride hydrochloride + hydrochlorothiazide 5/50mg with the same amount of pills from the previous visit, proving the non-use of the same and adherence to the prescription current doctor.

Insulin preparation and administration technique was also demonstrated, as the patient incorrectly administered NPH and regular insulin at the same time and with a single syringe (PRM 3). The importance of paying attention to the sum of the doses and the time between preparation and application was explained. After the intervention and confirmation of the change in habits, a reduction in fasting and postprandial blood glucose levels was verified.

However, HbA increased, which can be explained by previous decompensation.

In one of the visits, the patient reported not using the prescribed simvastatin 20mg (PRM 7) because she believed that her cholesterol was within normal limits, as she lost weight as a result of the dietary reeducation process she was carrying out under the supervision of a qualified professional. Upon presenting their laboratory tests and the new medical prescription, there was a reduction in the levels of total cholesterol and fractions, but even so, they are above the reference values, with simvastatin 20mg being maintained in the medical prescription. The patient was instructed that the medication should only be suspended by the physician, and she resumed using the medication during the night.

Discussion

As shown in Table 01, the pharmacotherapeutic profile of the monitored patients reveals, as central aspects, situations of adverse drug reactions, need for help in using insulin and difficulties in adherence to treatment. These aspects were found in other studies and that justify the need for pharmaceutical care, as a strategy to promote the quality of life of these patients.[11-13]

Despite accepting to participate in the preparation of the pharmacotherapeutic profile, resistance was noticed by some patients during home visits, from compliance with the recommendations to the presentation of laboratory tests and medical prescriptions. Thus, only four patients continued on to the next follow-up stage for possible interventions to resolve or minimize the identified MRPs.

care plan was drawn up for each individual, according to individual needs, including interventions on how to use medicines, referrals to other health professionals, health education on lifestyle changes related to food, practice of activities physical and rational use of medications. The plan was discussed with the patient, seeking to establish a mutually collaborative relationship.

Each intervention performed was duly registered and, in the following visits, acceptance was analyzed through the evolution/response presented. If the intervention did not reach the expected result, the patient was evaluated again and a new intervention proposal was carried out in consensus with him, thus characterizing the process of pharmaceutical care.

In this sense, Table 2 brings important data about the DRPs identified in this audience, the most frequent being related to adherence, effectiveness and safety. This situation can be explained by several reasons involving the way in which healthcare practices are carried out, in general configured by the medicalization process, without necessarily being stimulated and oriented towards self-care. Furthermore, even though pharmaceutical care is a worldwide practice, it is still not a priority in public or even private health

services in Brazil. It is worth noting that, in the studied scenario, the pharmacist is not part of the health team, even though, at that time, there was this professional in the NASF team.

In the pharmaceutical care process, 46 interventions were carried out involving pharmacological and health education strategies, such as those reported in the case descriptions. It is noteworthy that the interventions related to the health education process aimed to sensitize patients to the practice of self-care. It is known, however, that the acceptance and execution by the patient is something procedural, making it difficult to measure their adherence.

After the interventions, the pharmaceutical care plan was monitored and evaluated in order to verify the pharmacotherapeutic results. Given the data obtained, it can be stated that E.S.F showed 40% reduction in fasting glucose, 67.77% in postprandial and 22.73% in HbA. The patient L.S.F. reduced by 33.69% fasting blood glucose. Regarding HbA, patient J.C.D.S. reduced by 8.7%.

Due to non-adherence to pharmacological therapy (insulin administration), non-pharmacological (inadequate diet) and non-acceptance of follow-up with the psychologist, the patient L.S.F. remained with blood glucose levels above those recommended by the Brazilian Society of Diabetes.

Regarding the glycemic goal initially established, only E.S.F reached at the end of the intervention a postprandial glycemia lower than 160mg/dL. As for glycated hemoglobin, no patient had a value lower than 7%. A study by Nunes et al. (2012) revealed that after three months of pharmaceutical care, 28% of patients reached desirable glycated hemoglobin values (< 7%), while 72% had altered values (> 7%).

Finally, 50% of patients (n=2) showed improvement in blood glucose levels, patient L.S.F. and EJG, despite not reaching the glycemic goal established for postprandial glycemia, were sensitized to self-care through health education actions, and it is important to highlight that this is a slow process, where there must be continuity in the process of care to achieve the expected results.

Conclusion

The results obtained in this research allow us to understand the pharmacotherapeutic profile of insulin users registered in a health unit; and the application of pharmaceutical care to establish a care plan. Moreover, it reveals that, in the process of care for patients with diabetes using insulin there are deficiencies of information, from the moment of prescription to dispensation, which hinder the adoption of treatment and self-care practices. The absence of pharmaceutical services in this process corroborates the understanding that the practice of care has been medicalizing.

Although the research was developed in a specific scenario, it brings elements to reflect on this aspect, from a broader

perspective, because it highlights the benefits of pharmaceutical care in health care, particularly for people with chronic diseases.

It should be considered that the intervention performed had influences of limitations of the service itself, such as: absence of a list of patients with diabetes using insulin, absence of updated information in the patients' medical records, lack of appropriate physical structure for care and material resources (glucometer, lancets and tapes) for the measurement of blood glucose during visits.

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