SANUS.2024;9:e408
DOI: https://doi.org/10.36789/revsanus.vi1.408
www.sanus.unison.mx

PRAXIS

# Case study: Therapeutic education for older adults with type 2 diabetes mellitus and osteoporosis

# Estudo de caso: educação terapêutica para idosos com diabetes mellitus e osteoporose

# Estudio de caso: Educación terapéutica a adulto mayor con diabetes mellitus tipo 2 y osteoporosis

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**Received:** 09/11/2022
**Accepted:** 13/10/2023

ISSN: 2448-6094
Universidad de Sonora

## Abstract

**Introduction**: The nursing process is the method that allows us to administer care to people with chronic diseases through the disease stages, that is, assessment, diagnostic reasoning, nursing care plan and evaluation. **Objective:** Evaluate a nursing care plan for an older adult with type 2 diabetes mellitus and osteoporosis with a focus on therapeutic health education. **Methodology:** Observational, descriptive, and longitudinal clinical case study of a 63-year-old patient with diabetes mellitus and osteoporosis; the Marjory Gordon instrument was used for assessment, and standardized language was used for diagnostic reasoning, planning, execution and evaluation. Under bioethical principles, this is a minimal risk research, and the privacy and data of the elderly are protected. **Results:** Alteration was found in the pattern of perception/maintenance of health, nutritional/metabolic, exercise activity and coping with stress; with the establishment of activities to control glucose, priority was given to prescribed diet, exercise, adherence to treatment and coping with stress. Acceptance of the disease, learning to take capillary glucose and glycemic control was achieved, as well as adherence to the prescribed diet and exercise. **Conclusions:** Therapeutic health education achieved adherence to pharmacological and non-pharmacological treatment, as well as the acceptance of the health status, which allows acquiring self-control of the disease. Continuous and long-term follow-up is important due to the pathological progress, age and general deterioration of the patient.


**Key words:** Nursing process; elderly; diabetes mellitus; osteoporosis; health education **(**DeCS).


## Resumen

**Introducción:** El proceso de enfermería es el método que nos permite administrar los cuidados a personas con enfermedades crónicas a través de sus etapas: valoración, razonamiento diagnóstico, plan de cuidados de enfermería y evaluación. **Objetivo**: Evaluar un plan de cuidados de enfermería a una adulta mayor con diabetes mellitus tipo 2 y osteoporosis con enfoque a la educación para la salud terapéutica. **Metodología**: Estudio de caso clínico, observacional, descriptivo y longitudinal, a paciente de 63 años con diabetes mellitus y osteoporosis; para la valoración se empleó el instrumento de Marjory Gordon, para el razonamiento diagnóstico, planeación, ejecución y evaluación se utilizó el lenguaje estandarizado de enfermería. Bajo los principios bioéticos es una investigación de riesgo mínimo, se protege la privacidad y datos del adulto mayor. **Resultados:** Se encontró alteración en el patrón percepción / mantenimiento de la salud, nutricional / metabólico, actividad ejercicio y afrontamiento del estrés; estableciendo actividades para el control de su glucosa, se priorizó en dieta prescrita, ejercicio, adherencia al tratamiento y afrontamiento al estrés. Se logró aceptación de la enfermedad, aprendizaje de toma de glucosa capilar y control glucémico, además del apego a dieta y ejercicio prescrito. **Conclusiones:** La educación para la salud terapéutica logró el apego al tratamiento farmacológico y no farmacológico, así como la aceptación del estado de salud le permite adquirir el autocontrol de su enfermedad, es importante el seguimiento continuo y a largo plazo por el avance patológico, edad y deterioro general de la paciente.


**Palabras clave:** Proceso de enfermería; Adulto mayor; Diabetes mellitus; Osteoporosis; Educación en salud (DeCS).

## Abstrato

**Introdução.** O processo de enfermagem é o método que nos permite administrar a assistência a pessoas com doenças crônicas por meio dos estágios da doença, ou seja, avaliação, raciocínio diagnóstico, plano de assistência de enfermagem e avaliação. **Objetivo**: Avaliar um plano de cuidados de enfermagem para um adulto mais velho com diabetes mellitus tipo 2 e osteoporose com foco na educação terapêutica em saúde. **Metodologia:** Estudo de caso clínico observacional, descritivo e longitudinal de uma paciente de 63 anos com diabetes mellitus e osteoporose; para a avaliação foi utilizado o instrumento Marjory Gordon para raciocínio diagnóstico, planejamento, execução e avaliação, para raciocínio diagnóstico, planejamento, execução e avaliação, foi utilizada a linguagem padronizada. De acordo com os princípios bioéticos, essa é uma pesquisa de risco mínimo, e a privacidade e os dados dos idosos são protegidos. **Resultados:** Foi encontrada alteração no padrão de percepção/manutenção da saúde, nutricional/metabólico, atividade física e enfrentamento do estresse; com o estabelecimento de atividades para controlar a glicose, a prioridade foi dada à dieta prescrita, aos exercícios, à adesão ao tratamento e ao enfrentamento do estresse. Houve aceitação da doença, aprendizado da medição da glicose capilar e controle glicêmico, além de adesão à dieta e aos exercícios prescritos. **Conclusões:** A educação terapêutica em saúde conseguiu a adesão ao tratamento farmacológico e não farmacológico, bem como a aceitação do estado de saúde, que permite adquirir o autocontrolo da doença, sendo importante a monitorização contínua e a longo prazo da evolução patológica, da idade e da deterioração geral do paciente.


**Palavras-chave:** Processo de enfermagem; idoso; diabetes mellitus; osteoporose; educação saudável (DeCS).

## Introduction

Non-communicable diseases, formerly called chronic diseases, are the result of risk factors, where lifestyle prevails, and claim the lives of 41 million people of all ages, which is equivalent to 74% of all deaths worldwide. The most frequent disease in this group is type 2 diabetes mellitus; approximately 62 million people in the Americas suffer from it, and it claims 244,084 deaths each year. With respect to cases in the Americas, 30 to 40 % of the inhabitants do not have a diagnosis and 50 to 70 % are not under control. Finally, it is estimated that it will reach 109 million by 2040, with overweight, obesity and sedentary lifestyle being the main risk factors [(1)].

Since the Ottawa Charter in 1986, to date, it has not been possible to achieve health for all. The main objective of the Charter was to prevent disease, given that most of the world's population suffers from two of the most common chronic diseases, diabetes and hypertension. Even when

diagnosed, people do not either adhere to treatment or modify their lifestyles, which leads to complications that will have repercussions on their disability.

Chronic diseases continue to be treated under the biologicist model. Unfortunately, there is a deficient communication on the part of health professionals, since in one or two appointments all the information is provided, before the patient has assimilated the diagnosis, treatment and control of the disease. Therapeutic intervention should be planned in advance, emphasizing control, prevention of complications and response to doubts, but above all including the main caregiver who will be with the patient throughout the process of the disease [(2)].

Public health education should focus on empowering the health of the individual, family and community in order to improve the quality of life from multiculturalism and diversity, by means of an interdisciplinary approach, with a focus on public and educational policies that allow decision making for the common good and that use health promotion as a tool with a therapeutic, integrative and individualized approach [(3)].

The nursing process (NP) implements its own methodology, which is part of the competencies of the profession allowing reflective nursing interventions for the solution of individual problems [(4)] in this research of people with chronic diseases. Previously, it was mentioned that the treatment of chronic diseases has occurred in a biologicist system, i.e., focused on the disease and not on the person. However, the NP determines a holistic care, with assertive communication and supports research [(4)]. The NP in nursing allows for a therapeutic approach to health promotion and education that is to say, aimed at non-pharmacological treatment, lifestyle changes, adherence to treatment, and monitoring and control of the disease.

Type 2 diabetes Mellitus (DM2) is one of the most frequent chronic diseases of human beings [(5)] and represents one of the great epidemics of our times [(6)]. It is defined as "a metabolic disorder characterized by chronic hyperglycemia, caused by a reduction in the secretion or effect of insulin

by the pancreas, which causes long-term complications in different organs such as: Eyes, brain, heart, kidneys and peripheral nerves such as diabetic polyneuropathy, defined as the presence of clinical manifestations of peripheral nerve dysfunction in people" [7], coupled with poor adherence to pharmacological and non-pharmacological treatment of the patient, only one third of the affected population reaches their metabolic control goals consistently; perceived non-adherence to pharmacological treatments [6] is one of the main determinants.

Additionally, osteoporosis "is a chronic systemic disease characterized by the deterioration of bone density and/or quality, which predispose to an increased risk of fractures and which requires prolonged treatment over time, and probably for many years" [8]. DM2 and osteoporosis are diseases with increasing prevalence due to the aging of the population, and the presence of factors such as an unbalanced diet, obesity and a sedentary lifestyle, moreover, gender also plays a role, with a greater influence on women [9]. Older adults with DM2 require comprehensive care with therapeutic interventions such as nutritional education, physical exercise, pharmacological education, education to prevent complications, and individual and family psychological support [10].

Both diseases have a pro-inflammatory environment, whose prevention through new therapeutic strategies could prevent their development. There is a scarce number of researches that evaluate the inflammatory profile of osteoporosis in patients with DM2, due to the fact that they present a greater risk of falls, with an increase in the prevalence and incidence of fragility fractures, an important cause of mortality and morbidity [9]. Chronic pathology implies the adaptation of the person and his or her environment to a new lifestyle, hence the need to learn how to manage it autonomously and prevent avoidable complications. Therapeutic education is the series of activities and interventions managed by health care professionals, whose mission is to train the affected person, his family, environment and relationship with the environment in the autonomous

management of the disease and in the prevention of avoidable complications, maintaining and/or improving the quality of life [10]. The essence of nursing is based on care, provided through teaching, research, assistance and management. The relevance of this work lies in communicating how the nursing process is integrated with health promotion and education at home, in order to empower patients and make them responsible for their health and, thus, prevent complications.

Health promotion is a tool that enables a critical reading of the reality we live in [3]. Through health education, training is provided to prevent diseases or maintain health and therapeutic education, which the World Health Organization (WHO) defines as the group of essential educational activities for the management of chronic diseases, conducted by health professionals, created to help the patient or family members to carry out their treatment and prevent avoidable complications, while maintaining or improving the quality of life [11]. The objective of the case study was to evaluate a nursing care plan for an older adult with DM2 and osteoporosis with a focus on therapeutic health education.

**Methodology**

Clinical, observational, descriptive, and longitudinal case research. The nursing care was structured according to the five stages of the NP; for the assessment, the Marjory Gordon Functional Patterns Instrument was applied, which assesses 11 functional patterns; a 63-year-old adult with a medical diagnosis of osteoporosis and DM2 was selected; standardized language was used through the taxonomies of the North American Nursing Diagnosis Association (NANDA) to carry out the diagnostic reasoning, the Nursing Outcomes Classification (NOC) was used to define the expected results and the Nursing Interventions Classification (NIC) allowed the selection of the nursing interventions that were adapted to the patient's lifestyle and priorities. Finally, the patient was evaluated during six months of pharmacological and non-pharmacological treatment with health

education with a therapeutic approach. The information was collected at the elderly woman's home, in collaboration with her three daughters, husband and grandchildren.

Once the patient's assessment was collected, a list of objective data by functional pattern was made, the altered health patterns were identified to continue with the reasoning and identification of NANDA nursing diagnoses and the expected NOC results, to conclude with the care plan establishing the nursing interventions based on the NIC applicable to the patient and involving the family members who showed great interest in participating.

Under bioethical principles, this is a minimum risk research, the privacy and data of the individual research subject were protected at all times, and a letter of informed consent was requested in accordance with the Regulations of the General Health Law on research, Articles 16, 17 and 21 [12].

**Clinical Case Presentation**

In the assessment performed on AHLF, a 63-year-old female, married, Catholic, with no previous illnesses, with a history of three cesarean sections and one miscarriage, was identified. The illness onset was at the end of May 2022, with pain in the joints of her lower limbs. She went for a medical visit to her health clinic of the Mexican Institute of Social Security (IMSS due to its acronym in Spanish), where general laboratory tests and bone densitometry of the hip and spine (scheduled for July 2022) were indicated. In May she decided to have the densitometry and complete blood count study done privately and in June she consulted with a private internist who diagnosed osteoporosis in the spine and osteopenia in the hip, central glucose was found at 220 mg/dL and glycosylated hemoglobin of 12.2 %, so the glucose tolerance curve test was indicated, an investigation that could not be completed since in the two previous attempts the patient presented blood glucose levels of more than 200 mg/dL, so 10 days later she was medically diagnosed with DM2. As for the pharmacological treatment prescribed by the internist, he indicated for DM2: Trayenta duo 2.5/850

mg, one tablet every 12 hours, and for osteoporosis: Fosfonat 150 mg, one tablet monthly, and caltrate D 600 mg, one tablet every 24 hours.

At the beginning of August 2022, the patient showed pain in the lower extremities, burning sensation in the soles of her feet, for which she was diagnosed with diabetic neuropathy, prescribing paracetamol 750 mg, one tablet every 12 hours, pregabalin lyrica 75 mg, one tablet every 24 hours, and vascul flow diosmin hesperidin, one tablet every 12 hours. In the same month she was referred to a nutritionist, who prescribed a diabetic diet for one month specifying a diet with 3 meals a day and two snacks, providing guidance on food and quantities.

Current treatment was prescribed by an internist. It should be noted that at the end of June the same medical diagnoses matched with the control with her general practitioner at IMSS, granting pharmacological and non-pharmacological treatment (nutrition and exercise); however, the person (AHLF) and family members decided to continue with the pharmacological treatment established by the private physician.

The assessment of Marjory Gordon's functional health patterns was conducted in two stages: at the beginning of May 2022, communication was established with the second daughter, who was concerned about the persistent pain in her mother's legs (AHLF) and requested a nursing consultation; upon interviewing them, a densitometry test was suggested, since the IMSS was scheduled for two months later; a complete blood count was performed due to the family history and the considerable drop in weight. And the second moment was at the beginning of June of the same year, when she already had laboratory results; the Margory Gordon assessment instrument was applied, obtaining the following relevant data:

Functional pattern of health perception: when assessing Mrs. AHLF, she showed little interest in her health, mentioning that “if she has a disease she would rather die”, but she changed her mind when she saw the family was worried.

Nutritional/metabolic pattern: food rich in fat, likes to eat pork carnitas tacos, weight 70 kg, height 147 cm and Body Mass Index (BMI) of 32.4, which means that she presented obesity.

Elimination pattern: intestinal and urinary within normal parameters.

Activity/exercise pattern: Older adult without physical limitations, independent, sedentary, refers that “if it is necessary to exercise, she would be willing to do so”.

Sleep and rest pattern: No sleep problems, sleeps an average of 6 to 7 hours a day, with afternoon naps of 30 to 45 minutes.

Cognitive-perceptual pattern: with good cognitive capacity in both basic (memory and attention) and complex (thought, language and intellect) aspects.

Self-perception and self-concept pattern: In the first two visits, the patient was somewhat discouraged; in the third visit, when a medical diagnosis was already established, it was favorable that the seven grandchildren, who are very representative for the lady, were integrated, because thanks to them, she changed her way of seeing life, adopted a positive attitude and improved her lifestyle to cope with the disease.

Role and relationship pattern: She considered herself a person satisfied with her family life, integrated and supported, with a retired husband and daughters who support her financially, covering her personal and emotional needs (she takes painting courses) to feel useful.

Sexuality - reproduction pattern: No data representative of alterations.

Adaptation pattern / stress tolerance: She was somewhat stressed by the recent diagnosis, she showed stress about the way she would manage her disease, and she also showed concern days later when she referred to aspects about the costs involved in her health care, her daughters told her that they would absorb the expenses.

Values/beliefs pattern: She refers that three years before she approached her church's prayer groups, where she has found friendships and a form of emotional and spiritual support.

## Results

Nursing assessment allowed the identification of metabolic instability without clinical data, although osteoporosis did not cause pain, these data confirmed the progression of the metabolic illness with diabetic neuropathy; in addition to pursuing therapeutic education, through the care plan with nursing interventions based on the willingness to improve health self-management, which was effective mainly because there was commitment, responsibility and involvement of the family. With the support network allowed the elderly AHLF to accept the disease and adhere to pharmacological and non-pharmacological treatment, in order to feel well and not show complications in the short, medium and long term, (Table 1).

Nursing Process

Table 1. Nursing interventions to patterns: perception/health maintenance and nutritional/metabolic, 2022.

| Nursing diagnosis [13] | |
|---|---|
| Willingness to improve self-management of health. Manifested by: expresses desire to improve acceptance of condition, improve daily life choices to meet health objectives, and expresses desire to improve inclusion of treatment regimen in daily life. | |
| NOC result [14] | Indicators |
| 1300 Acceptance: health condition | ▪ 130008 Acknowledges the reality of the health situation (Scale value: 5. Always demonstrated)<br>▪ 130017 Adapts to health status change (Scale value: 5. Always demonstrated)<br>▪ 130009 Search for health information (Scale value: 3. Sometimes demonstrated)<br>▪ 130010 Coping with the current situation (Scale value: 4. Frequently demonstrated)<br>▪ 130011 Makes health-related decisions (Scale value: 4. Frequently demonstrated)<br>▪ 130014 Performs self-care activities (Scale value: 4. Frequently demonstrated) |
| NIC Interventions [15] | |
| Self-care assistance | ▪ Verify the patient's ability to exercise independent self-care.<br>▪ Verify a routine of self-care activities. |
| Assessment: AHLF accepted the disease, learned to measure glucose and did so every third day, recognized alarm data and adhered to the diet prescribed by the nutritionist. | |

Source: Own development

Feeling supported by her family, AHLF assumed responsibility for her self-care with great commitment to diet, where in one week she regulated her glucose and maintained it between 90 and 110 mg/dL, measured herself every third day with a glucometer, enrolled in the exercise groups

offered by IMSS, and went to her medical clinic every week for weight and glucose monitoring. During the first three months she went to the internist for private consultations, who considered an ophthalmologic consultation for prevention or detection of eye damage; upon verifying good health control, she made appointments every three months, in August 2023 her glycosylated hemoglobin was at 6.0 %, she continued with appointments with the nutritionist and despite weight reduction with a BMI of 29.2 she stilled showing obesity. It should be noted that the integrated interventions such as the prescribed diet, exercise and capillary glucose measurement reduced the patient's stress, by verifying the weight reduction, pain, and glucose control, with the planned interventions the patient and family members were empowered to control the disease, (Table 2).

Table 2. Nursing interventions for nutritional/metabolic patterns, exercise activity and stress coping, 2022.

| Nursing diagnosis [13] | |
|---|---|
| Risk of unstable blood glucose level. Manifested by: excessive weight loss, inadequate knowledge about disease management with sedentary lifestyle. | |
| NOC result [14] | Indicators |
| 1619 Self-management: Diabetes | ▪ 161901 Accepts diagnosis (Scale value: 4. Frequently demonstrated)<br>▪ 161904 Obtains an eye examination with dilated pupil as recommended (Scale value: 5. Always demonstrated)<br>▪ 161908 Attends the prescribed educational program (Scale value: 5. Always demonstrated)<br>▪ 161911 Controls blood glucose (Scale value: 5. Always demonstrated)<br>▪ 161916 Checking blood glucose in a day-a-day diary (Scale value: 5. Always demonstrated)<br>▪ 161920 Comply with the recommended diet (Scale value: 5. Always demonstrated)<br>▪ 161927 Involved in recommended exercise (Scale value: 5. Always demonstrated)<br>▪ 161932 Applies medication as prescribed (Scale value: 5. Always demonstrated) |
| NIC Interventions [15] | |
| 5510 Health education | ▪ Identify current health knowledge and lifestyle behaviors of the individual.<br>▪ Prioritize identified learning needs based on patient preferences, nurse skills, available resources, and likelihood of success in achieving goals.<br>▪ Involve the family in the planning and implementation of plans aimed at modifying lifestyle behaviors or health respect.<br>▪ Emphasize the importance of healthy eating, sleeping, exercise, glucose testing every third day, which will serve as a model of these values and behaviors for others, especially children. |
| Assessment: AHLF successfully learned capillary glucose measurement and glycemic control. She adhered to the diet prescribed by the nutritionist and performed the prescribed exercise. | |

Source: Own development.

**Discussion**

The purpose of the case study was to evaluate the nursing care plan for an older adult with DM2 and osteoporosis, focusing on therapeutic health education. It was assessed in the initial stage when two medical diagnoses were identified: DM2 and osteoporosis. The diagnostic reasoning was performed to establish the nursing educational interventions that allowed the individual and family to familiarize with the disease and, particularly, how to control it. The aforementioned agreed with a research [10] where it was concluded that the nursing interventions were effective in modifying the level of knowledge of the patient and family members, as well as the health status of the person with DM2.

By implementing therapeutic health education, the objective was accomplished in the patient in one week, through maintenance of blood glucose control and adherence to treatment. DM2 is an extremely complex and multifactorial chronic inflammatory and systemic disease. Clinical evidence shows that the risk of other complications such as osteoporosis increases considerably in these patients [9]. Authors of a research [6] emphasized that pharmacotherapeutics and lifestyle modification, as intervention strategies and the promotion of these components will always be essential in parallel to the implementation of classical and innovative pharmacotherapy, ensuring the best long-term results. This is consistent with the positive results in the management of the disease in the elderly, where the change of diet and exercise were fundamental in the DM2 treatment. Therapeutic education is one of the fundamental aspects of the treatment of people with DM2. It is recommended to perform an integral evaluation, with the purpose of identifying any physical, mental and social problem that may interfere in the educational-therapeutic process [16]; matching with this case research that was performed using the integral evaluation of Gordon's health patterns, which evaluates all spheres of the person. Alterations were identified in the patterns of health maintenance, metabolic nutrition and exercise activity, resulting from the unhealthy

lifestyle. Then, education should be adapted to the subject, emphasizing that it is not "education for treatment" but "education as treatment" [16]; however, a group of researchers [16] mentioned that "the physician is the one who has to perform this function" which differs since the nursing professional has a methodology based on NP through diagnosis reasoning, planning, expected results and nursing interventions, to achieve self-care and guarantee therapeutic adherence that in this clinical case was successfully accomplished, although there were some limitations such as stress due to the financial stress of the patient, since she thought that she would have to pay all expenses, and also the organization of care times, because the family could only meet on weekends.

**Conclusions**

Therapeutic health education is the fundamental pillar of the prevention of complications and adherence to treatment to guarantee self-care and quality of life in patients with diabetes and osteoporosis. Therapeutic education should continue in the long term to be effective in the older person, considering the progression of the disease and age-related deterioration.

The individualized care plan for older adults with two chronic diseases allowed therapeutic education based on self-care to enable the individual to overcome barriers because of her health status, learning to take glucose measurement and control glucose, and adhering to her pharmacological and non-pharmacological treatment (diet and exercise), thus, confirming that both are the key to controlling her disease.

The NP in its five stages, hat is, assessment, diagnosis reasoning, planning, execution and evaluation is feasible and viable to use in both clinical and community settings. In the planning stage, health education and therapeutic education should be included in hospital discharge plans and home visits in the community, especially in those patients with health diagnoses that compromise function or even life.

## Conflict of interest

The authors stated that there is no conflict of interest.

## Financing

The authors stated that there was no financing of any kind.

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**How to cite this article:** Dimas-Altamirano B, Dimas-Altamirano CR, Santana-González CC, Gómez-Ortega M, Bobadilla-Serrano ME, Maciel-Vilchis AC. Case study: Therapeutic education to older adult with type 2 diabetes mellitus and osteoporosis. SANUS [Internet]. 2024 [citado dd mm yyyy];9:e408. Available at: URL/DOI.