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# Effect of a health promotion program on the quality of life and body composition of women with diabetes and hypertension

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## ABSTRACT

### OBJECTIVE

To investigate whether participation in health promotion activities in a Basic Health Unit improves the quality of life of women with hypertension and type 2 diabetes.

### METHODS

This is a longitudinal study. Participants were submitted to a semi-structured interview to record sociodemographic characteristics. Body composition (assessed by bioelectrical impedance) and quality of life (assessed by the WHOQOL-bref questionnaire) were assessed before (PRE) and 9 months after the intervention (POS). The intervention protocol consists of nutritional guidance (1x/week), physical exercises (2x/week) and meetings to guide healthy habits (1x/week). Paired t-tests were performed to test for possible differences between the PRE and POS moments for all dependent variables. The level of significance was set at $P \leq 0.05$.

### RESULTS

The sample consisted of 15 women (53±14 years old). Higher health perception scores were observed in the POS when compared with PRE values ($\Delta$POS-PRE=20 a.u.; P=0.0541). When the quality-of-life domains were analyzed, although all scores increased after the intervention protocol, indicating a better general health status, these changes did not reach statistical significance (all $P>0.05$). Regarding anthropometric and body compositions measurements, there was no statistically significant changes after the intervention.

### CONCLUSIONS

Participation in a health promotion program for 9 months improves the perception of general health status and prevents weight gain in women with hypertension and type 2 diabetes.

### DESCRIPTORS

Quality of life; General health status; Health.

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## INTRODUCTION

The high prevalence of hypertension and type 2 diabetes in Brazil represents a significant public health challenge (1-3). These chronic conditions notably increase the risk of severe complications, including stroke, acute myocardial infarction, kidney failure, blindness, amputations, and premature mortality (4-6). Consequently, managing these diseases not only affects patients' quality of life but also places a considerable burden on the public health system.

Effective management of hypertension and type 2 diabetes is complex and necessitates ongoing monitoring of blood pressure and glycemic levels (7-9). Additionally, factors that can exacerbate these conditions, such as weight gain, should be closely monitored (9, 10). In this regard, the active involvement of multiprofessional teams within Primary Health Care is crucial. These teams focus on health promotion, disease prevention, and treatment of medical conditions, implementing strategies to encourage healthier lifestyles, including reductions in alcohol, tobacco use, balanced diets, and regular physical activity (11, 12).

While it is reasonable to expect that patients with hypertension and type 2 diabetes who engage in health promotion programs would see improvements in their quality of life, this assumption lacks definitive evidence. Therefore, this study aims to examine whether participation in a 9-month health promotion program at a Basic Health Unit affects the quality of life in women with hypertension and type 2 diabetes. Additionally, we assessed changes in body composition throughout the program.

## METHODS

### *Study design and participants*

This is a longitudinal study carried out between May 2022 and January 2023, at the José Pinheiro Esmeraldo Basic Health Unit (Crato/Ceará). Participants were recruited and met the following inclusion criteria: (i) women over 17 years of age; (ii) residents in the city where the study was carried out (Crato/Ceará); (iii) having type 2 diabetes; (iv) arterial hypertension and; (v) having been referred to the UBS by the family health team. The exclusion criteria were: (i) bedridden individuals; (ii) wheelchair users; (iii) comorbidities that prevented the performance of bodily practices.

The participants were submitted to a semi-structured interview to record sociodemographic characteristics (age, marital status, ethnicity, education and family income). In addition, body composition and quality of life were assessed before (PRE) and after 9 months after the intervention (POS).

This study was approved by the local Ethics Committee (approval number: 5.548-.56). All participants signed the informed consent form before entering the study.

### *Intervention protocol*

The intervention protocol consisted of nutritional guidance, body practices and a cycle of lectures to guide healthy habits.

The nutritional orientation activities were developed by the nutritionist once a month and in group. Briefly, these activities involved guidance on dietary re-education based on changes in habits and behaviors and had, as their main objective, to encourage the practice of a healthy and balanced diet.

The physical interventions were carried out in the facilities of the multi-sports court of the assisted community twice a week. The body practices program (stretching and relaxation, walking and guided running, gymnastics, body expression and playful activities) followed the guidelines of the Physical Activity Guide for the Brazilian Population (2021) regarding the amount and intensity of exercises. In short, the participants were encouraged to perform at least 150 minutes of moderate to vigorous physical activity through different activities such as walking the dog, housework, gardening and any playful activity that made the patient increase the respiratory rate. All activities were supervised by the physical education professional. To provide the women with a gradual adaptation to the stress of the physical exercise session, in the first and second weeks, the duration of the work was, respectively, 20 and 30 min. From the third week on, this period was progressively increased until it reached a duration of 60 min, which remained until the end of the experiment. The physical intervention was administered in accordance with the World Heaçth Organization recommendations.

The cycle of lectures and conversation circles were carried out with educational actions of prevention and health promotion that aimed at the acquisition of healthy habits regarding nutrition and physical activity, which were given monthly.

### *Body composition assessment*

Body mass was obtained with the aid of a digital scale (i.e., Filizola, PL 200 kg) and, on this same scale, height will be determined in the standing position, with the aid of a stadiometer. From these measurements, BMI (i.e., weight/height2) was calculated.

Body composition (i.e., fat percentage, lean mass, and visceral fat) was assessed by means of a bioelectrical impedance test using a 4-point bioelectrical impedance device (i.e., hands and feet) (Digital Bioimpedance Scale, OMRON HBF - 514, Omron Healthcare Brasil, Brazil).

### *World Health Organization Quality of Life Questionnaire (WHOQOL-bref)*

Quality of life was assessed using the WHOQOL-bref (13) This questionnaire consists of 26 questions, the first referring to quality of life in general, the second to satisfaction with one's own health and the others divided into the physical, psychological, social and environmental domains. This instrument has been validated for the Portuguese language (14) and has been used for healthy populations and those with chronic diseases (15-17).

### *Statistical analysis*

Data are presented as absolute (n) and relative (%), mean ± standard deviation (SD) frequency. The normality of the data was determined by the Shapiro-Wilk test and visually verified by histograms. Paired t-tests were performed to test for possible differences between the PRE and POS for all dependent variables (Anthropometric [Weight; body mass index]; Body composition [Fat percentage; Percentage of lean mass; visceral fat] and Quality of Life [Perception of health; Physical Domain; Psychological Domain; Social Domain; Environmental Domain. The level of significance was set at P≤0.05. All analyses were performed in the R statistical environment (version 3.5.3; R Core 2020 Team).

## RESULTS

Fifteen women were evaluated. In general, the sample was composed of married women aged 53±14 years. The ethnicity frequencies of the white, black, and yellow participants were 34%, 46%, and 20%, respectively. Only 13% of the participants had 12 or more years of schooling. Table 1 details the sociodemographic characteristics of the women participating in the study.

**Table 01** - Absolute and relative frequency of the sociodemographic variables of the women investigated.

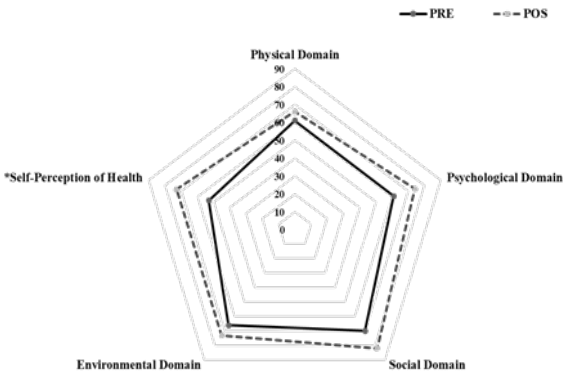
| | |
|---|---|
| ***Age, mean ± SD*** | *53,8 ± 14,9* |
| ***Gender Identity, n (%)*** | |
| Cis Woman | 15 *(100)* |
| ***Marital status, n (%)*** | |
| Married | 15 *(100)* |
| Single | 0 *(0)* |
| ***Ethnicity, n (%)*** | |
| White | *5 (34)* |
| Black | *7 (46)* |
| Yellow | *3 (20)* |
| ***Education, n (%)*** | |
| From 1 to 3 years | *1 (7)* |
| From 4 to 7 years old | *1 (7)* |
| Ages 8 to 11 | 11 *(73)* |

| | |
|---|---|
| Aged 12 and over | 2 *(13)* |
| ***Family income, n (%)*** | |
| More than 1 minimum wage | 4 *(27)* |
| Up to 3 minimum wages | 4 *(27)* |
| Received social benefits | 7 *(46)* |

**Source:** Authors.

Regarding quality-of-life indicators, women have higher health perception scores in the POS when compared to the PRE values (PRE=53±36 u.a.; POS=73±18 u.a.; ΔPOS-PRE=20 a.u.; P=0.0541). When each of the quality of life domains was analyzed, although all scores increased after the intervention protocol, indicating a better general health status, these changes did not reach statistical significance (physical: PRE=61±19 a.u.; POS=66±16 u.a.; ΔPOS-PRE=5 a.u.; P=0.3440; psychosocial: PRE=61±22 a.u.; POS=74±14 u.a.; ΔPOS-PRE=12 a.u.; P=0.1070; social: PRE=70±29 u.a.; POS=82±15 u.a.; ΔPOS-PRE=13 a.u.; P=0.1730; Environmental: PRE=66±18 u.a.; POS=73±13 u.a.; ΔPOS-PRE=7 u.a.; P=0.1020). (Figure 01)

Figure 01

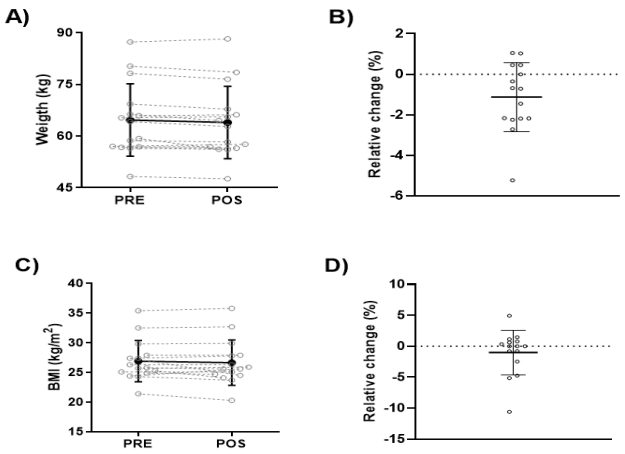


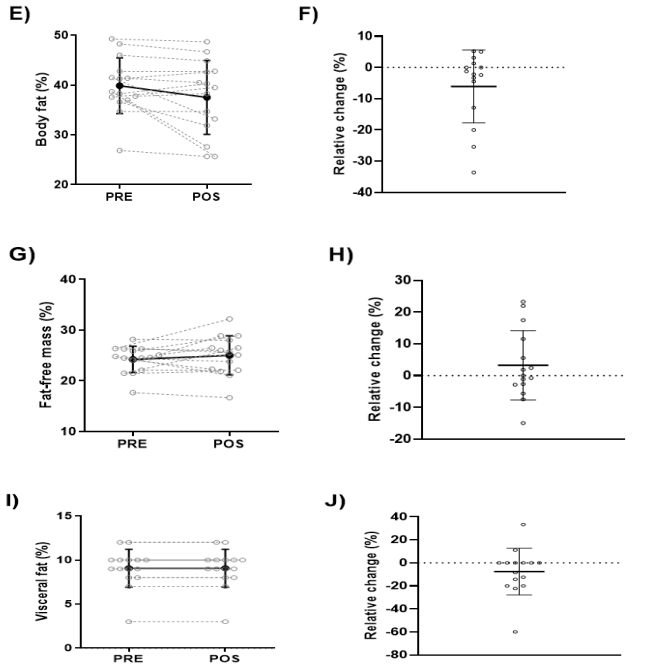

**Legenda**:
Self-perception of health and quality of life for the physical, psychological, social, and environmental domains before (PRE) and after 9 months of intervention (POS). * Indicates P<0.05.

**Source:** Authors.

In respect of anthropometric measurements, the women showed a maintenance of body weight values (PRE=64.6±10.5 kg; POS=63.9±15 kg; ΔPOS-PRE=-1.13 kg; P=0.8512) and body mass index throughout the study (PRE=26.9±3.4 kg/m2; POS=26.7±3.9 kg/m2; ΔPOS-PRE=-1.02 kg/m2; P=0.8544). Similarly, the values of the percentage of fat (PRE=39.8±5.6 %; POS=38.3±6.6 %; ΔPOS--PRE=-4.08 %; P=0.4890), lean mass (PRE=24.2±2.6 %; HCP=25.0±3.8 %; ΔPOS-PRE=3.25 %; P=0.5075) and visceral fat (PRE=9.0±2.1 %; OPS=8.2±2.3 %; ΔPOS-PRE=-7.5 %; P=0.5075) did not show a statistically significant change after the intervention protocol. (Figure 02)

Figure 02




**Legenda**:
Body composition over the course of the study. Panel A: Body weight; Panel B: Change in body weight; Panel C: Body mass index; Panel D: Change in body mass index; Panel E: Fat percentage; Panel F: Change in fat percentage; Panel G: Fat-free mass; Panel H: Change in fat-free mass; Panel I: Visceral fat; Panel J: Change in Visceral Fat.

**Source:** Authors.

## DISCUSSION

The aim of the present study was to investigate whether participation in health promotion program over a period of 9 months in a Basic Health Unit influences the quality of life of women diagnosed with hypertension and type 2 diabetes. In addition, we analyzed changes in body composition throughout the health promotion program. The main results of our study indicate a better perception of health 9 months after the intervention protocol, indicating a better general health status of women with hypertension and type 2 diabetes. In addition, our results did not reveal an increase in risk factors, such as body weight gain, fat percentage, and visceral fat.

The quality of life of women with hypertension and diabetes plays a key role in their overall well-being and the effective management of their health conditions. These chronic diseases require ongoing care and can have a significant impact on patients' daily lives, both physically and emotionally (11, 12) Our results showed that women with hypertension and type 2 diabetes engaged for 9 months in a health promotion program in a Basic Health Unit have an improvement in their perception of health. In addition, although the results in the quality-of-life domains did not show a statistically significant improvement, it is worthnoting that all the parameters analyzed had higher scores than at the beginning of the protocol, which may have clinical relevance for the patient's general health status. However, this assumption should be taken with caution.

A crucial role of Basic Health Units is the coordination of patient care, ensuring that they receive the necessary health services in an integrated and continuous manner. This includes the follow-up of chronic patients, the scheduling of consultations and exams, the issuance of referrals to specialists, and the organization of the local health services (11) Specifically, regular monitoring of chronic patients, such as those evaluated in this study, is essential to prevent the worsening of pre-existing conditions or the emergence of new complications. Our results suggest that a health promotion program was effective in preventing weight gain in women with hypertension and diabetes, which could contribute to further deterioration of their condition.

This study has some limitations, including the lack of a control group, which makes it difficult to attribute the changes observed over time to the intervention. In addition, the limited sample size and the selection of patients in a single region limit the generalization of the results to other geographic regions.

In conclusion, nine-month participation in a health promotion

program improves the perception of general health status and prevents weight gain in women with hypertension and type 2 diabetes. These findings highlight the importance of health promotion initiatives in Basic Health Units to reduce the risks of worsening pre-existing conditions. However, studies with more robust experimental designs are needed to validate these observations.

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