

Treatment of Adults with Obesity Using The Unified Health System: An Interdisciplinary Proposal

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ABSTRACT

Obesity is a multifactorial chronic disease requiring interdisciplinary care. This study aimed to evaluate the impact of a group-based interdisciplinary intervention for adults with obesity using the Unified Health System (SUS). Conducted in Ponta Grossa, PR, from October 2018 to June 2019, qualitative data were gathered through semi-structured interviews with nine participants selected based on significant quantitative outcomes. A clinical and sociodemographic questionnaire supported the data collection. Data were analyzed using Bardin's content analysis and QDAS Nvivo 11 software. The intervention emphasized cognitive restructuring, self-monitoring, gamification, coping strategies, and nutritional education, led by a dietitian, psychologist, and physical educator. Participants reported improvements in self-awareness, behavioral changes, and health literacy. Key themes included enhanced emotional regulation, motivation for lifestyle modifications, and perceived benefits of group dynamics. These findings underscore the potential for replicating low-cost, interdisciplinary interventions in public health systems, offering substantial psychosocial and behavioral benefits in managing obesity.

Keywords: Obesity, Interdisciplinary Intervention, Qualitative Analysis, Behavioral Change, Public Health

Introduction

Chronic non-communicable diseases (NCDs) represent a significant challenge to global public health due to their complexity and difficulty in control, requiring a healthcare model that incorporates health promotion, prevention, and treatment strategies [1]. Obesity, a chronic and multifactorial disease with epigenetic interactions, is a major risk factor for comorbidities such as diabetes mellitus, dyslipidemia, hypertension, cardiovascular diseases, certain cancers, non-alcoholic fatty liver disease, asthma, sleep disorders, mood disorders, and eating disorders [2,3].

Historically, obesity has been recognized since ancient times, with early anti-obesity recommendations focusing on diet, exercise, and lifestyle changes [4]. Today, obesity has become

a global epidemic, imposing a significant burden on society and public health systems due to its association with high morbidity and mortality [5]. Worldwide, it is estimated that by 2025, approximately 2.3 billion adults will be overweight, and over 700 million will be obese. In Brazil, the prevalence of obesity has increased by 67.8% (from 11.8% in 2006 to 19.8% in 2018), highlighting the urgent need for organized healthcare services to address this growing demand [6].

Prevention and control of obesity require integrated actions that support individuals in adopting healthy lifestyles and maintaining or achieving a healthy weight. Health Care Networks (RAS) play a crucial role in optimizing care at micro (individuals and families), meso (health services and communities), and macro (health policies) levels, promoting intersectoral collaboration and interdisciplinary approaches [7,8]. However, traditional unidisciplinary treatments often result in temporary weight loss, underscoring the need for interdisciplinary strategies that address

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the multifactorial nature of obesity and promote sustainable behavioral changes [1,9].

The interest in researching this topic arose from my professional trajectory, where I identified a gap in obesity treatment within primary care. My academic background in Nutrition and work as a nutritionist in the Family Health Support Center (NASF) significantly influenced this research. The simplistic approach of some professionals led me to recognize that obesity care was often individualized, fragmented, costly, and low in resoluteness. This highlighted the need for partnerships to address such a complex and multifactorial disease, as treating obesity unidimensionally would be like "blowing a fan at the tip of an iceberg and expecting it to change direction." Therefore, I sought to develop and implement an interdisciplinary proposal for the treatment of adults with obesity using the Brazilian Unified Health System (SUS).

This chapter focuses exclusively on the qualitative findings of a study that implemented an interdisciplinary group intervention for adults with obesity using the Brazilian Unified Health System (SUS). The intervention, conducted in Ponta Grossa-PR between October 2018 and June 2019, involved nutritionists, psychologists, and physical educators using techniques such as cognitive restructuring, self-monitoring, gamification, and nutritional education. The qualitative analysis aimed to explore participants' experiences, perceptions, and behavioral changes, providing insights into the psychosocial dimensions of obesity treatment. By presenting these findings, this chapter contributes to the development of low-cost, interdisciplinary models for obesity care in public health systems.

Materials and Methods

Study Type

It is classified as a quasi-experimental, non-controlled, mixed-methods study, comparing different indicators of subjects who participated in an interdisciplinary group intervention at two distinct moments: baseline and a follow-up eight weeks after the end of each group.

Sample Definition

The sample was intentionally selected (convenience sampling) due to the need for an intervention focused on Brazilian Unified Health System (SUS) users diagnosed with obesity, experiencing the consequences of the disease, and willing to participate in the research.

Research Stages

The research was developed in two stages: the first, quantitative, and the second, qualitative, both with three phases each. The qualitative stage was conducted after the intervention, following three steps: 1- Interviews with the four participants from each group who showed the best results, 2- Transcription and validation, and 3- Data analysis.

Ethical Considerations

In accordance with the Guidelines and Regulatory Standards for research involving human subjects, as established by Resolution CNS No. 466/2012, this study was submitted to the Research Ethics Committee of the State University of Ponta Grossa and approved under opinion N° 2.910.450.

Semi-Structured Interview

This instrument was chosen because it allows greater interaction between the interviewee and the interviewer, facilitating clarification and deeper exploration of issues related to the research interests. The interview was developed by the author and consists of 14 questions divided into three domains. (behavioral, health, and post-intervention outcomes), addressing topics such as habit changes, self-esteem, and physical activity.

Participants and Research Location

The study participants were users of primary healthcare units who were identified as needing habit and behavior changes. They were referred by physicians, nurses, and community health agents, while some learned about the project through various media channels promoted by the Communication Department of the Municipal Government.

The research was conducted between October 2018 and July 2019 in the city of Ponta Grossa, Paraná, Brazil. Each group was initially composed of 33 individuals, a number determined by the physical space limitations and considering a potential sample loss of 50%, ensuring a still significant sample size. The first group concluded with 16 participants, the second with 17, and the third with 11. Ultimately, due to various reasons, the average number of participants who completed the sessions was 44% of those initially selected. Dropouts occurred due to absences exceeding two meetings, conflicts with the scheduled days and times, travel, new job opportunities, and failure to complete the required laboratory tests.

Research Procedures

First Moment of the 1st Stage- initial questionnaire was applied, and anthropometric and biochemical parameters were collected.

Second Moment of the 1st Stage – the Intervention.

Three groups were formed at different periods, each participating in nine weekly sessions lasting approximately two and a half hours. The intervention was named "New Shape" ("Nova Forma"). Three professionals facilitated the sessions: a nutritionist (the study researcher), a psychologist, and a physical educator. Additionally, nutrition interns and public health residents (pharmacist, nutritionist, physiotherapist, and veterinary doctor) participated in the intervention. The nutritionist, residents, and interns attended all sessions, while the psychologist participated in three sessions and the physical educator in five. The main techniques used during the meetings were: cognitive restructuring, self-monitoring, gamification, coping card, and nutritional education.

First and Second Moment: Post-Intervention

At this stage, a qualitative analysis was conducted, in which the target audience consisted of four participants from each group who showed significant results in the quantitative analysis. Characterized as a purposive sample, this group underwent a semi-structured interview, which was recorded and later transcribed with the participants' consent.

Of the total of 12 participants selected for this stage, 9 took part in the interview—all of them women—resulting in a 25% sample loss. The first group had 4 participants, while the second had 3, as one participant was unable to attend the interview. In

the third and final group, 3 people agreed to participate in the interview, but one of them (the one with the best result) was excluded from the study for not having undergone the required laboratory tests, despite multiple requests.

To validate the interviews, the transcriptions were sent via email or delivered in person to each interviewee. They were given the opportunity to read, confirm their statements, and modify their responses if they deemed it necessary. At the end of this process, all participants agreed with the transcriptions, ensuring the validity of the collected data.

Data Analysis

Qualitative Analysis

The qualitative analysis was conducted using Content Analysis as proposed by Bardin [10]. This method works with words and allows for a practical and objective understanding of what lies behind the discourses. That is, content analysis is a set of techniques aimed at producing inferences from the content of communication in a text, which can be replicable within its social context. In the analysis, the text is a means of expression by the subject, where the analyst seeks to categorize recurring units of text (words or phrases), inferring an expression that represents them. It is a fast and effective technique when applied to direct and simple discourses [11].

For each interview question, the content analysis was conducted following the three phases proposed by Bardin[10]: (I) Pre-analysis, in which, based on the "floating reading" of the texts, initial ideas were organized and systematized, resulting in an analysis plan; (II) Exploration of the material, in which the decisions made were systematically applied, and raw data were categorized; and (III) Data processing and interpretation, in which results were inferred and compared with the theoretical framework used.

For the exploration of the material and data processing, the QDAS NVivo 11 software was used, enabling the calculation of word frequency, construction of word clouds (where the size of the words is proportional to their frequency—larger words are more frequent, and smaller words are less frequent), and, finally, cluster analysis of the themes from question 3 based on the similarity of words and their respective sources. The more clustered the themes are, the more sources they share in common, meaning that the grouped themes are likely repeatedly cited by different individuals.

After the intervention, the analyzed data were classified based on common aspects contained in the information or on the divergent positions that stood out. From these real data, extracted from the testimonies that symbolized the experiences and thought styles of the [12] subjects, the possibility of re-elaborating new, more specific categories emerged, as proposed by Cruz [13]. This adaptation can be better visualized in Table 01.

Table 1: Content Analysis: Adaptation of A Priori and A Posteriori Categorization

A -PRIORI CATEGORIES	B-POSTERIORI CATEGORIES
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A	Starting point – in the reign of consumption, immediate pleasure, and sedentary lifestyle	A	Starting point – in the reign of consumption, immediate pleasure, and sedentary lifestyle
B	Lifestyle changes – primary and secondary gains	B	Lifestyle changes – primary and secondary gains
C	Impact on health and well-being	C	Impact on health and well-being
		D	Support from the team and the group

Source: The Author

After defining the context units, the recording units were established, as presented in Table 2

Table 2: Content Analysis: Definition of Context Units with their Respective Record Units

CONTEXT UNIT	RECORD UNIT
Starting Point – In the reign of consumption, immediate pleasure, and sedentary lifestyle	A- Mental Health
	B- I used to get sick and had abnormal test results.
	C- I felt unwell, tired, unmotivated, and had low self-esteem.
Lifestyle changes– Primary and secondary gains	A- The desire to eat is anxiety.
	B- I modified my menu.
	C- Today I eat more slowly.
	D- I take better care of my family's diet.
Impact on health and Well-Being	A- In diet.
	B- In physical activity.
	C- Yes, I feel much better.
	D- In my appearance and self-esteem.
Support from the team and the group	A- I couldn't do it alone.

Source: The Author

Results and Discussion of Qualitative Data Characterization of the Qualitative Sample

The group of 9 interviewees consisted entirely of women, with two aged between 31 and 40 years, three aged between 41 and 50 years, and four aged between 50 and 60 years. All participants reported weight loss during their participation in the group, ranging from 2.8 to 8.0 kg, with an average weight loss of 6.256 kg. In compliance with the commitment made and documented through the Informed Consent Form (ICF), the identity of the participants was protected. For this reason, the participants were assigned fictitious names: Joana, Maria, Priscila, Caroline, Cleusa, Larissa, Talita, Pamela, and Viviane.

Content and Discussion of the Discourses

After the documentary analysis and the data obtained through content analysis from the perspective of Bardin, the results obtained will be presented in detail below.

Starting Point – In the Reign of Consumption, Immediate Pleasure, and Sedentary Lifestyle

This context unit brought to light the feelings, discomforts, and problems of obese individuals regarding their excess weight, as corroborated by Zottis and Labronici [14], who state that: the obese body, due to low self-esteem, carries a sense of dissatisfaction, a feeling of worthlessness accompanied by self-deprecation and self-reproach—that is, guilt, weakness, rejection, inferiority, and fragility. The recording units presented below emerged from the first question asked to the interviewees, which was about what motivated them to join a weight loss group. This question allowed data to surface regarding feelings of discomfort, physical complaints, and a strong desire for change.

A) Mental Health

Among the issues mentioned were numerous failed attempts to lose weight, feelings of frustration, sadness, guilt, depression, and isolation. The data collected showed that 9 (100%) of the interviewees reported how excess weight affected their mental health, as can be seen in the accounts of Joana and Caroline.

[...] Leaving the house was a suffering for me. I had reached a point where I thought everyone would notice me, everyone would judge me [...] (Joana)

[...] I prayed a lot to God because I wanted a way, a solution, because I didn't know where I was heading anymore. I gained 15 kilograms in 6 months, and my marriage almost ended [...] (Caroline)

In general, individuals with obesity experience various types of treatments for weight loss, and anything offered to them regarding weight loss is accepted without concern for possible side effects, especially if the treatment is an easy method that does not require significant effort. This fact is confirmed in the statement of Viviane:

[...] I tried many times on my own, like at home, with medication, with all those things. Everything I saw others doing, I did the same, and it didn't work. My weight only increased [...] and then I felt really bad (Viviane).

In Joana's testimony, the feeling of low self-esteem and the need for isolation is evident. This statement confirms what Del Priore [15] states: "Anyone who deviates from the 'beauty standard'—formed by white skin, straight hair, light eyes, and a slim, slender body—is susceptible to judgment, rejection, and criticism."

In Caroline's statement, the longing for change is evident. This desire aligns with Kaufman's [16] thinking when he states: "The strong desire for change in individuals with obesity stems from their physical pain and the pain associated with their body image." What becomes clear is that the desire to change or reprogram a specific habit only occurs when there is discomfort and dissatisfaction.

Another issue that emerged from the participants' statements concerns the comorbidities resulting from obesity, giving rise to the second recording unit.

B) I Used to Get Sick and Had Abnormal Test Results

The interviewees' statements regarding health issues confirmed the quantitative data, which indicated a prevalence of hypertension in 56.8% (n=25), followed by dyslipidemia in 18% (n=8) and diabetes mellitus in 11.4% (n=5). The development of comorbidities is an inevitable consequence of obesity. Among the interviewees, 2 (22.2%) stated that hypertension was what drove their desire for change, as can be seen in the statements of Priscila and Talita, respectively:

[...] I went for a consultation, and the doctor said I was pre-diabetic and that my blood pressure was very high, usually 21 over 10 [...] (Priscila).

[...] I thought, if I keep eating like this, I'm going to die because my blood pressure will rise even more [...] (Talita).

The statements of Priscila and Talita are corroborated by Galvão [17] and Sacks [18], who state that individuals with obesity have up to three times the risk of developing hypertension (HTN) and that there is a positive relationship between obesity and the prevalence of HTN. Additionally, it can be observed that 1 (11.1%) of the participants is aware of the effects of excesses on their health, as reported below by Pamela:

[...] I used to get headaches. I overdid it with salt, my blood pressure would rise, I overdid it with food, with junk food. I ate everything daily, overdid it with snacks [...] (Pamela).

The risk factors associated with hypertension (HTN) include inadequate diet, excessive salt intake, abusive alcohol consumption, physical inactivity, excess weight, smoking, and disturbances in glucose and lipid metabolism. Maria mention how their immunity was affected, stating:

[...] This issue of low immunity, because, my goodness, I don't know how many times I... last year I almost died because I got pneumonia, and from pneumonia, I got a kidney infection[...] (Maria).

Since obesity is considered an inflammatory disease, and a diet rich in simple carbohydrates and fats favors intestinal bacterial imbalance, increases insulin resistance, and affects the body's defense systems, it is understood that obese individuals are aware of the gradual deterioration of their health. They understand that they are depleting their physical resources by committing dietary excesses and abuses. However, they need encouragement, support, and opportunities for change. In this sense, interdisciplinary and interprofessional support emerges as a key factor in helping them overcome discouragement and low self-esteem resulting from the physical and emotional impairment caused by obesity.

C) I Felt Unwell, Tired, Discouraged, and Had Low Self-Esteem

This recording unit shows how individuals with obesity struggle to perform simple daily tasks, such as household chores and personal hygiene. Routine tasks become a source of suffering, and losing weight means regaining quality of life, autonomy, and self-esteem—that is, resuming daily activities and reintegrating into their social roles.

In the reports of all 9 participants (100%), it was found that excess weight is fundamentally connected to the appearance

of clinical symptoms and reduced dexterity and motivation for work. Feelings of tiredness, dissatisfaction, low self-esteem, shame, malaise, anxiety, anguish, sadness, and depression are recurrent.

[...] Even cleaning my house was difficult. I felt heavy and tired [...]. (Talita).

[...] I felt so tired, heavy, I didn't have the courage to play with my 6-year-old son [...]. (Pamela).

[...] Everything I felt was bad—fatigue, malaise [...]. (Viviane).

[...] I was feeling bad. I looked in the mirror and didn't feel good about myself. To do my work, my movements, I wasn't feeling well [...]. (Cleusa).

[...] Depression, discouragement—you don't feel like taking care of yourself, you let yourself go, you stop living, really [...]. (Maria).

[...] I felt heavy, bloated, tired, unmotivated. I didn't feel like dressing up or even buying clothes [...]. (Viviane).

[...] You know, I stopped changing clothes in front of my husband [...]. (Joana).

[...] So when you start gaining weight, feeling bad, not even being able to take a shower in peace or file your feet, then you start to think, 'Hey, something has to change' [...]. (Caroline).

Studies by Kasen et al. [19] indicate that women with a BMI of 30 or more have an increased risk of depression, regardless of other risk factors such as age, education, previous depressive symptoms, marital status, chronic illness, low social support, and financial situation. In addition to bearing the weight of their body, obese individuals carry the weight of guilt and responsibility for their obesity.

It is clear that individuals with obesity face difficulties in socializing and making friends, in taking advantage of opportunities, and in participating in group physical activities, leading to increased food consumption. This occurs because society imposes standards of beauty and youth without respecting ethnic and racial differences, promoting a uniform beauty standard that is practically impossible to achieve. In the illustrative discourses, it became evident how their emotional balance was affected by excess weight, as they felt inferior due to their body image, exacerbating their low self-esteem. These data reinforce the importance of interdisciplinary work in the treatment of obesity and highlight the significance of the psychologist's role in the intervention. Self-awareness, behavioral change, and respect for individuality are essential in the transformation process.

Therefore, the changes that occurred during the sessions emerge as a context unit, which will now be analyzed.

Lifestyle Changes – Primary and Secondary Gains

The weight loss process requires lifestyle changes (Lifestyle Changes - LC) and behavioral habits. Behavioral changes only occur when there are cognitive modifications. It is believed that individuals with obesity have dysfunctional beliefs regarding food and weight, which end up generating feelings of guilt, anxiety, helplessness, sadness, and difficulties in interpersonal relationships.

For behavioral change to occur, Burch [20] states that stages of conscious competence in knowledge are necessary, involved

in the process of progress, moving from "incompetence" to the change of competence in a skill. These stages suggest that, first, individuals are unaware of how little they know about their "incompetence," but when they consciously perceive it, they acquire a skill and can use it. Finally, the skill can be employed even without being conscious of the process, that is, when unconscious competence is acquired. The new behavior occurs through its repetition, positive reinforcement, and self-perception about it.

The registration units depicted in the sequence show the process of change of the intervention participants and their respective gains.

A. The Desire to Eat is Anxiety

The act of eating is multifaceted and does not only mean the intake of nutrients but also encompasses a multitude of emotions and feelings. In this sense, countless times, one "eats" symbolically the anguish, nervousness, anxiety, fear, and frustrations of daily life. When some basic needs are not met, such as high stress, few hours of sleep, and food deprivation, emotional eating can also occur.

If we stop to reflect, from a young age, we are taught to eat for emotional reasons, which becomes a habit; emotion becomes the trigger, and the reward is feeling good. If a child eats everything at lunch, they get dessert; if they cry because their parents are away, they get candy. When we become adults, we only change the pretext of the emotions, but the habit is already formed. Due to the fact that eating habits have been adopted for a long time, people often do not even realize that their choices are unhealthy. In other situations, even if they identify the need to change their eating habits, it can be very difficult due to various factors, such as work routines and the fact that they do not give proper importance to food. On the other hand, some people desire change, but family or peer influences can hinder it, or they may simply become dependent on certain foods, making it almost impossible to change this habit.

Eating should be guided by bodily sensations, such as hunger, appetite, and satiety—that is, eating when hungry and not just because food is available. Thus, the first step toward achieving this change is being able to distinguish emotional hunger from physiological hunger.

In this sense, all 9 interviewees (100%) stated that they knew the difference between hunger and the desire to eat. In the statements below, the participants' perception of identifying this feeling is evident, as well as how they used food as a distraction or comfort for anxiety.

[...] "Today I can stop and analyze, you know, is this hunger or anxiety? So I can already identify whether it's stomach hunger or 'that' hunger [...]. (Cleusa)

[...] "The desire to eat is because you're anxious, you want to eat because you're anxious, thinking about a situation you haven't resolved, so you want to kill it with anxiety, so the hunger is a lie [...]. (Talita)

[...] "That hunger hits, and it feels like it even hurts your stomach, but I already see that it's anxiety, so I have to do something to distract myself, and it passes [...]. (Viviane)

[...] "It's like, you see things there, and then, it's not that you're hungry, you just feel like eating. I have my jar of candies, my jar of cookies that I make, covered with icing, super colorful, but today I control myself and can tell the difference [...]" (Caroline)

[...] "Today I know how to deal better with my emotions, right? Sometimes I'm sad, but I don't need to go and eat, eat, eat. I'll eat when I really need to [...]" (Maria)

[...] "I go out, take a walk, I leave the house, go outside, tend to my plants, and I feel that it has passed, so it wasn't hunger to eat, it was 'that' desire [...]" (Cleusa)

[...] "When that crazy desire to eat hits, I have to do something to clear my mind, I'll do something useful [...]" (Joana)

In the statements of Viviane, Cleusa, Joana, and Maria, it became clear that, after identifying the difference between emotional hunger and physiological hunger, they adopted strategies to manage their emotions without resorting to food. These strategies include engaging in activities such as walking, gardening, or doing something productive, which help them cope with anxiety or emotional triggers without eating unnecessarily. It is evident that, after the intervention, the participants were able to identify emotional triggers and seek alternative options instead of turning to food, which made them feel more secure and confident. Studies indicate that recognizing eating in response to hunger, desire, and satiety signals is inclined toward healthier eating habits [21, 22].

In Pamela's testimony, it is clear how the tool used during the meetings—the hunger and satiety scale—helped her regain food autonomy and trust in her body's signals.

[...] "Often, it was eating more out of anxiety, you know, that thing of, 'Is it tasty? I'll eat more.' A compulsive thing. That scale you shared during the meetings helped me understand the difference [...]" (Pamela)

It is evident that the act of eating is closely linked to a person's emotions and how they learned to associate food with filling a void, existential pain, or seeking satisfaction to minimize emotions like fear and anxiety. However, the participants' statements demonstrate that this process can be reversed through learning to differentiate between biological hunger and emotional hunger, as 100% of the interviewees reported a better understanding of their body's signals. In the next registration unit, the focus shifts to analyzing changes in eating habits and how food has become important in their lives.

B. I Modified My Menu

Food preferences have a significant influence on health and well-being, not only physically but also emotionally. What we eat can directly influence how we feel, as our cells are formed by nutrients, which are modifiers and modulators of the human body's response, altering its functioning throughout life. In this registration unit, all 9 participants (100%) reported that after the intervention, they made healthier food choices, replaced or reduced the consumption of certain foods, began reading labels, and made better choices. Most importantly, they recognized the importance of food in their lives and understood that habits and tastes are not unchangeable but rather modifiable.

In the accounts of Talita, Maria and Viviane, it is clear how the stimulus control technique was used when they reported planning

their supermarket shopping to avoid purchasing unwanted foods. This allowed them to modify a situation that could have led to a loss of control over eating.

[...] "You know, I started realizing that I need to plan my shopping, go to the market, and do the shopping myself. I have to do something for myself (...) even processed products, I'm replacing them. It's a pretty radical change [...]" (Talita)

[...] "I try to shop differently now, more fruits and vegetables. I notice and look at other people's carts, and I think, 'Oh my God! I used to do that, right?' Condensed milk? It's been 2 months since I bought any for my house [...]" (Maria)

[...] "It's like, I look around, I walk through the market thinking everything is toxic. It's funny, for those who know, I look at the shelves, read the labels, and make better choices [...]" (Viviane)

In Joana's statement, it is evident that she developed a taste for greens and now eats them with pleasure rather than obligation. This aligns with the thinking of behavioral psychologist Köster [23], who states that "we can only change bad eating habits by making healthy food enjoyable. If we try healthy foods out of obligation—as something that requires effort—they will never be appetizing."

[...] "I didn't like greens, I didn't like them, I ate them because I had to when I was on a diet. Now, greens are the highlight of my plate. Vegetables, greens, I learned to like them. I really miss them when there's no green food for me [...]" (Joana)

Another point worth highlighting is that, in the participants' accounts, it is clear that access to information gave them the self-sufficiency to make better choices, plan, and prepare meals. Food and nutrition education provides information that can support people in decision-making, increase their power of choice, and enable them to exercise their autonomy in opting for healthier food choices. Ultimately, as important as what we eat is how we eat—that is, the scenario surrounding food consumption. Eating in a rush, standing up, alone, or with others are important factors that determine which foods will be consumed and, more importantly, in what quantities. From this context, the next category to be analyzed emerges.

C. Today I Eat More Slowly

One of the most common characteristics observed in our society regarding eating habits is the tendency to rush through meals. The habit of chewing and swallowing food in just a few seconds dates back to the Paleolithic era and is rooted in the goal of protecting food. Unconscious eating is also prevalent, occurring when people eat while simultaneously engaging in other activities—such as using their phones, watching TV, studying, or working on the computer—allowing these activities to compete with the mealtime. In the statements of all 9 interviewees (100%), it is evident that the practice of mindful eating and the tools used during the meetings—such as the set table technique, the chocolate meditation, and the food diary—were decisive in the behavioral change process. The accounts of Cleusa, Maria, and Joana exemplify this:

[...] "Ah, eating slowly, paying attention to what I'm eating, how I'm eating, savoring the flavor. So, the pace of eating has changed [...]" (Cleusa)

[...] "I didn't set the table and ate standing up, rushing, not chewing properly. I always thought I didn't eat much, but when I wrote in the food diary, I realized I was eating way more than I thought [...]" (Maria)

[...] "With the meditation, I learned to savor the taste, put the utensils down, breathe, and eat slowly. This helped me eat less [...]" (Joana)

The practice of increasing attention while eating helps recognize satiety: eating without distractions, focusing on the meal, resting utensils on the plate to evaluate taste and flavor, understanding physical signals, and pausing during the meal. For this, it is important to know that it is okay to leave food on the plate when satisfied or when the food doesn't taste good—and that it's not necessary to stop only when the package or plate is empty. This builds a learning process around choice. Studies by Kristeller and Wolever [24] indicate that more mindful individuals can reduce binge eating in response to emotional stressors.

Chewing also plays an important role in the habit-changing process. When done slowly, hormonal mechanisms are activated, promoting a feeling of satiety. People who eat more slowly tend to have a lower energy intake compared to those who eat quickly. Continuing with the changes observed after the intervention, we now move on to discuss the next registration unit.

D. I Take Better Care of My Family's Diet

In this registration unit, it is evident that the benefits of education regarding healthy eating can extend to the family environment and other social groups of the participants, spreading the knowledge built during the intervention. Since women are often responsible for purchasing and preparing food, they have a significant influence on the eating habits of the entire family.

Family eating habits are often reproduced in adulthood, and this has broader social consequences than one might imagine. Improving the eating behavior of parents, especially mothers—including weight loss—can also positively impact the family's dietary profile. This was no different for most of the interviewees, with 7 of them (77.77%) reporting that their habit changes positively influenced their families, as seen in the accounts of Joana and Cleusa:

[...] "My family is being supportive of me and also changing their lives [...]" (Joana)

[...] "My husband managed to change, not a complete change, right? He wants to have a healthier life, and he also needed to lose weight [...]" (Cleusa)

According to Tyler and Horner [25], behaviors and lifestyles are learned within the family, and interventions involving the family, focusing on supportive relationships, can motivate and develop skills for changing eating behaviors.

However, two interviewees (22.22%) reported that their habit changes did not influence their spouses, as expressed in the statements of Caroline. A possible explanation for this is that, culturally, men are often seen as strong and invulnerable, leading them to worry less about their health.

[...] "My husband doesn't complain. If I make just a salad, rice, and meat, he'll eat it and won't complain. He doesn't ask for anything (...) but what I wanted was for him to cut down on

sweets and soda (...) I tell him that, and he says he won't stop having what he likes. That's fine, I don't drink it, but he does [...]" (Caroline)

It is in this sense that the family stands out with the potential to maintain eating habits or not. It further reinforces that the family can assist the patient with attitudes that serve as an example for them to adopt healthier eating habits. Thus, it is not enough for the family member to give advice to the obese person about what is correct, but they must also get involved in the process, seeking, for example, to accompany them on walks or also modifying their own eating habits. In this aspect, the family constitutes a source of support for promoting changes.

Thus, this analysis allowed us to verify the behavioral changes that occurred after the intervention, where the development of food competencies could be observed, such as planning purchases, healthier choices, reading labels, and differentiating emotional hunger from physiological hunger. The effects on health and well-being that these changes brought about emerged as the next unit of context that we will discuss.

Impact on Health and Well-being

Excess weight has significant repercussions on health, psychological well-being, longevity, and quality of life. The treatment of obesity must go beyond weight loss, focusing on improving overall health and long-term well-being. The registration units shown in the sequence derive from the question presented to the participants, which resulted in the improvement of their lives after the intervention. In this way, this question allowed the identification of data on lifestyle changes and improvements in quality of life.

A. Diet

The association between the eating habits of an individual or population and their health status is already extensively known. In low- and middle-income countries, there is an increase in the availability and per capita consumption of food products with high energy density and poor in nutrients, which contributes significantly to the obesity epidemic.

It is observed that the consumption of processed and ultra-processed foods is relatively high in the diet of overweight adults, contributing to a greater intake of energy, sugars, and unhealthy fats, along with low fiber content. Monteiro and colleagues [25] emphasize that ultra-processed foods contain less than half the dietary fiber, almost six times the number of free sugars, and significantly more sodium and fat.

In the account of Cleusa and Talita, it is possible to see how the consumption of soft drinks, sweets, and other ultra-processed foods was high before the intervention and how they managed to reduce their intake. This type of food has become the foundation of family diets, often replacing fresh or minimally processed foods due to their hyper-palatability, attractiveness, sophisticated packaging, and aggressive marketing campaigns.

[...] I no longer feel that need to always have a soft drink with me. Before, when we went shopping, it seemed like we had to get the soft drink first and then the other household necessities, right? Our shopping habits have changed, yes, they've improved

in quality by about 50%—more vegetables, more greens, and fruits. I didn't have much of a habit of eating fruit before, but today I consume much more. I don't use sugar anymore [...]

(Cleusa)
[...] The habit of eating chocolate and sweets—I go to the store, look at the sweets, and think, they used to relieve my anxiety, but they didn't help me at all, they only made me gain more weight. So today, I look at them naturally; I managed to give them up. Oh, and cookies—if I bought those filled wafer cookies, I would eat the whole package in five minutes [...]

(Talita)
In Viviane's statement, one can see how she felt addicted to consuming these ultra-processed foods and how taste perception can change with the intake of food products rich in salt, sugar, fat, chemical additives, preservatives, and flavor enhancers. Especially when consumed daily, people become accustomed to them and reject milder-tasting foods, such as fresh and minimally processed foods.

[...] I gave up soft drinks, I don't drink juice either, and I have almost completely eliminated sugar. I realized that it is truly addictive. Once you notice, sweets in general are too. Processed canned foods—everything industrialized—I cut them out because of the project, right? It always encouraged us, and now we know what is right and what is not [...]

(Viviane)
For a lifestyle change, modifying eating habits alone will not yield satisfactory results for improving quality of life and weight loss if it is not associated with physical activity. The activities offered during the intervention in this area and their impact will be discussed in the next recording unit.

Physical Activity

Weight reduction also leads to a decrease in problems such as back pain, leg pain, and knee pain caused by the overload of weight on the joints, optimizing the individual's movement and the practice of physical exercise [1]. During the intervention, several locations and free exercise options were made available, as one of the barriers preventing people from exercising is the high cost and lack of an adequate place.

Additionally, participants were constantly encouraged to gradually increase their daily physical activity and to seek exercise modalities that were enjoyable and compatible with their routines. The importance of the physical educator in the interdisciplinary team is highlighted here.

The duration of each activity varied from 20 to 90 minutes, with an average of 43.5 minutes. The frequency of activities ranged from 2 to 7 times per week, with an average of 5 times per week. As observed, 8 out of the 9 interviewees (88.8%) managed to incorporate physical exercise into their routine. The activities cited were highly diverse and chosen according to each individual's preference.

The duration and frequency were sufficient to maintain good health, as, according to Bouchard et al. (2007), 150 minutes of moderate-intensity physical activity per week, distributed throughout the week, are necessary to achieve health benefits. When asked whether physical activity had helped in their transformation process, 7 (77.77%) interviewees reported that it

had. The testimonies of Larissa, Joana, Maria, Talita, and Pamela clearly express their perception of the importance of exercise in the weight loss process, improved energy levels, reduced anxiety, and socialization. This fact is supported by Werneck, Bara Filho, and Ribeiro [26], who state that physical exercise is also important for promoting mental health by improving mood, emotional stability, and reducing anxiety and depression.

[...] Physical exercise is essential. Diet alone, even though I was doing everything correctly, I realized that I was not able to lose weight, I lost a lot of inches, I was even impressed [...]

(Larissa) [...]
[...] After physical activity, we feel more "relaxed," right? More at ease. We feel less rushed because we also become calmer about food [...]

(Joana)
[...] I can't believe I managed to stop being sedentary. My mood improved, and I feel more energetic [...]

(Maria)
[...] I love going to dance class. There, I talk, laugh—it's a moment to unwind and take care of myself [...]

(Talita)
[...] Wow, I've grown, developed my best side—I have an athletic spirit inside me. I wake up and do what I have to do. The word 'laziness' is no longer in my vocabulary. I can walk every day, and it's such a great feeling. My body feels light [...]

(Pamela)
However, 2 (22.22%) of the interviewees, Cleusa and Caroline, mentioned that changing their eating habits was the most important factor, as only after improving their diet did they feel more energized to engage in physical activity. It is well known that a healthy diet is the foundation for achieving optimal health, especially when combined with regular exercise. Likewise, improving health and quality of life can be achieved by transitioning from a sedentary lifestyle and, at the same time, by adopting better eating habits.

As previously mentioned, in addition to comorbidities, obesity leads to emotional, marital, and sexual issues. These matters are closely linked to self-esteem and will be discussed in the next section.

C. My Appearance and Self-Esteem

Body image is shaped by what a person sees in the mirror, forming a mental representation of themselves. This body, perceived uniquely through various senses, can be associated with either a positive or negative self-image, often depending on the approval of others to feel aligned with the "aesthetic standards" imposed by society.

When asked about their self-esteem before participating in the intervention, 5 (55.5%) stated it was low, 2 (22.2%) rated it as average, and the remaining 2 (22.2%) considered it good. In contrast, after the intervention, 8 (88.88%) of the interviewees reported that their self-esteem was excellent, while 1 (11.11%) said it was good.

These findings support what was discussed in Registration Unit 1, item C ("I felt unmotivated, tired, discouraged, and had low self-esteem"), highlighting how an obese person's dissatisfaction with their body image can impact their self-esteem. Moreover, after the intervention and weight loss, self-esteem increased, mood improved, and a sense of pride in their new body emerged. This is confirmed in the testimonies of Pamela, and Cleusa:

[...] My self-esteem improved 100%, there's nothing else to say, right? Girl, I love life, life is wonderful, everything is amazing. My mood improved, and these delicious foods that I didn't even know existed—I can lose weight and still enjoy eating [...]
(Pamela)

[...] I sent some photos to my sisters. Wow, they loved them! They noticed... I sent pictures of me walking around, and they were like, "Oh my God! You look beautiful, you lost a lot of weight, keep it up." It feels so good to see that. I even sent them to my friend in Goiás, and she said, "Oh, girl, send me that pamphlet, that brochure—I need to do this too!" [...]
(Cleusa)

Obese individuals face difficulties in finding fashionable clothing with quality and at affordable prices. This means they do not have the freedom to buy the clothes they want, having to limit themselves to purchasing what fits them, as can be observed in Larissa's testimony.

[...] I was finally able to buy new clothes, and I could choose; I didn't have to buy just what fit. I've already changed my style a little, started wearing things I never used before. You start to feel beautiful, and everything changes. Others begin to say, "Wow, what a difference!" You become an inspiration for other people as well [...]
(Larissa)

In Viviane's testimony, it is evident how excess weight interfered with her perception of her body image and how this affected her marital life.

[...] I didn't feel attractive; now my husband looks at me with desire. For my married life, it has been wonderful. We are women, right? [...]
(Viviane)

When a woman is not satisfied with her body, she cannot feel beautiful or attractive, and she often replaces sexual pleasure with the pleasure of eating, further aggravating the problem. Thus, this analysis allowed us to verify the benefits of the changes that occurred after the intervention, in terms of diet, physical activity, and increased self-esteem.

Support from the Team and the Group

Group interventions are alternatives that allow the exchange of experiences, where participants share their achievements and challenges. This creates an encouraging environment, fostering a sense of companionship, solidarity, and motivation. In this context, participants' opinions regarding the support of the interdisciplinary team and the importance of the group in this process of change can be observed.

A. I couldn't do it alone

Being part of a group that brings together people with common goals provides an experience that can create an environment of great therapeutic value. It can help participants overcome barriers caused by feelings of isolation, mainly by offering them the opportunity to receive feedback and positive suggestions from others who are going through the same challenges [27, 28].

All nine interviewees (100%) stated that the group and the interdisciplinary team were fundamental in the process of change. In Larissa's testimony, she emphasizes how the participation of

various professionals working together made a difference in the process, reiterating the importance of the interdisciplinary team.

[...] It adds more knowledge because you didn't just gather us to ask how our week was; you gathered us, made a schedule, gave a lecture, talked to us, and besides you, there was the psychologist, the physical educator, the residents... it's a lot. So, for those who truly want it, they take advantage of everything, even the testimony of a colleague. [...]
(Larissa)

In the statements of Talita, Joana, and Pamela, it is evident that socializing with people who share a common goal makes the process lighter, creating an atmosphere of companionship, mutual support, and motivation, which strengthens group cohesion.

[...] Even the testimony of a colleague. Because then you look and say: Wow! You think you're the only one there, alone in the crowd, and suddenly you start seeing (...) "Wow, there are people in the group much thinner than me," but everyone has their own problem—one has diabetes, another has a knee problem. And you realize it's not easy; it's not a miracle. [...]
(Talita)

[...] I think I wouldn't have achieved this alone; I had tried several times before, and the group helped a lot. [...]
(Joana)

[...] This group of yours, this process you follow, is better than Facebook, better than just following things on the internet. You can't miss sessions because you don't want to lose anything. I think the fact that it's in person makes a difference—you see the food, you talk face to face. [...]
(Pamela)

When asked whether the activities developed in the group provided them with the support to continue on their own, 8 out of 9 participants (88.88%) said yes. The statements of Viviane, Priscila, Maria, and Larissa reveal that they feel motivated and understand that the process continues—that just because the group meetings have ended, it doesn't mean they will return to old habits.

[...] Definitely. I want to follow this for the rest of my life, even after I reach my desired weight. I will keep going, no doubt about it. As they say, obstacles will always come our way, so we have to be prepared to face them. [...]
(Viviane)

[...] I ask God never to let me forget anything I've learned because I don't intend to abandon the habits I developed. Otherwise, I'd be going backward, right? So, in my mind, I don't want to stop doing anything I've learned. [...]
(Priscila)

[...] Oh, I want to keep this forever. You have to have a focus, right? Since I feel good today, I want to continue feeling good tomorrow. [...]
(Maria)

[...] Ah, I feel a lot, very much, a lot to continue always for the rest of my life.

It's no use stopping halfway because everything goes back, it's no use, it's forever [...]
(Larissa)

One of the interviewees (11.11%) reported having the "impression that if she had continued in the group, she would have achieved a bit more" (Talita), although the same interviewee stated that she believes she will be able to continue on her own. Out of the total interviewees, 5 (55.55%) mentioned the virtual WhatsApp group, which keeps them in touch, will provide support to continue with the new habits.

These contributions demonstrated the importance of the activities developed during the intervention for the behavioral change of the study participants, the improvement of self-esteem, the abandonment of the diet mentality, intuitive eating with respect to hunger and satiety sensations, the practice of physical activity with pleasure, and the motivation to continue alone.

Among the limitations of this work are the absence of an experimental design with a control group and the lack of follow-up with participants in a follow-up format, which is another point worth highlighting. In future studies, it is recommended that follow-up sessions be conducted to help participants maintain the skills they have acquired.

Another aspect that should be considered in future interventions is the increase in the intervention's workload, lasting more than 9 sessions, as studies with a higher number of sessions found results indicating that the duration of the group is directly related to its effects, especially in anthropometric and biochemical parameters. New studies can also expand the field of research in intervention groups, identifying the difficulties and limitations faced by those who did not achieve significant results, i.e., the worst outcomes. Finally, it is emphasized that the importance of this study lies in offering a ready-to-replicate intervention model for the public health network, with significant social impact and low implementation cost.

Conclusion

The group intervention proposal and its results demonstrated that the interdisciplinary approach was a key factor in achieving satisfactory outcomes in changing eating behavior. This was evidenced in the exemplary statements, which highlighted the recognition of emotional and physiological hunger, changes in habits, greater autonomy in food choices, and lifestyle modifications, confirming the effectiveness of the intervention. The treatment of complex diseases, such as obesity, requires comprehensive patient care and, therefore, an interdisciplinary approach. It has been observed that the concept of interdisciplinarity is increasingly accepted, but in practice, some challenges remain, such as the lack of team spirit, difficulty in sharing information, and insufficient communication techniques that foster empathy and bonding. Many professionals are still not fully prepared to deal with the complexity of health problems, particularly in populations facing various emotional, cultural, and socioeconomic vulnerabilities. These difficulties are largely due to the training of health professionals, which is still linked to pedagogical programs and curricula that are mostly focused on a hospital-centered approach, misaligned with Public Health concepts that consider human beings in their complexity and entirety.

Based on the results and discussions presented in this study, some practical interventions should be encouraged in health education actions within the SUS, such as continuous support for interdisciplinary rather than merely multidisciplinary practices, the training of Nutrition professionals with an emphasis on the use of various tools and strategies that can facilitate behavioral change—rejecting the diet mentality and prioritizing a more compassionate approach to nutrition—the support of municipal and state public management for interdisciplinary actions, the organization of discussion groups on obesity within family

health teams, and the promotion of collective and public spaces for physical activity.

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