

Associated factors and comorbidities of obesity in adults from the 24 de Mayo parish, Ecuador

Factores asociados y comorbilidades de la obesidad en adultos de la parroquia 24 de Mayo, Ecuador

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ABSTRACT

Obesity is a chronic and multifactorial disease with a high global prevalence and significant impact in Ecuador. It is associated with various comorbidities that affect quality of life. The objective was to identify the main factors associated with obesity and the most common comorbidities in adults from the parish of 24 de Mayo. A descriptive, observational, cross-sectional study with a mixed-methods approach was conducted. A non-probabilistic convenience sample consisted of 50 individuals over 18 years of age with a diagnosis of obesity. An in-person, individual questionnaire was applied. The results of the study revealed that obesity is present in 70% of those surveyed. Type I obesity was the most frequent. Family history (22.9%), sedentary lifestyle (20%), and unhealthy diets (17.1%) were the main associated factors. Hypertension (28.6%), type 2 diabetes mellitus (25.7%), and dyslipidemias (22.9%) were the most prevalent comorbidities. Obesity is a prevalent issue in the community, associated with genetic and modifiable behavioral factors. A strong link with chronic non-communicable diseases is confirmed. It is essential to implement health promotion and prevention strategies at the primary care level aimed at modifying lifestyles and controlling weight.

Keywords: adult obesity, risk factors, associated diseases, public health, Ecuador.

RESUMEN

La obesidad es una enfermedad crónica y multifactorial, con una alta prevalencia a nivel mundial y en Ecuador. Su impacto se extiende a diversas comorbilidades, afectando la calidad de vida. El objetivo fue identificar los principales factores asociados a la obesidad y las comorbilidades más comunes en personas adultas de la parroquia 24 de Mayo. Se realizó un estudio descriptivo, observacional, de corte transversal con enfoque mixto. La muestra fue no probabilística por conveniencia, compuesta por 50 personas mayores de 18 años con obesidad. Se aplicó un cuestionario presencial e individual. Los resultados del estudio revelaron que la obesidad está presente en el 70% de los encuestados. El tipo I fue el más frecuente. Los factores con mayor incidencia fueron la herencia familiar (22.9%), el sedentarismo (20%) y las dietas poco saludables (17.1%). Las comorbilidades predominantes fueron la hipertensión arterial (28.6%), la diabetes mellitus tipo 2 (25.7%) y las dislipidemias (22.9%). La obesidad es un problema prevalente en la comunidad, asociado a factores genéticos y conductuales modificables. Se confirma su estrecha relación con enfermedades crónicas no transmisibles. Es imperativo implementar estrategias de promoción de la salud y prevención en el primer nivel de atención, orientadas a modificar los estilos de vida y controlar el peso.

Palabras clave: obesidad en adultos, factores de riesgo, enfermedades asociadas, salud pública, Ecuador.

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INTRODUCTION

Obesity is mainly manifested as an increase in body mass index (BMI), defined as a BMI equal to or greater than 30 kg/m², which translates to an excess of body fat. According to several authors, it is considered by many to be the epidemic of the 21st century. This excessive accumulation of adipose tissue is generally accompanied by mild chronic systemic inflammation. Recently, it has been recognized as a chronic, recurrent disease of multifactorial etiology, characterized by an energy imbalance due to a sedentary lifestyle, excessive energy consumption, or both (Cano et al., 2020). In addition, frequent consumption of foods of low nutritional quality and high energy density has been associated with dietary patterns that favor weight gain and the appearance of metabolic disorders (Gallardo & García, 2024).

In addition to high-energy-density foods, the regular consumption of beverages high in free sugars is a significant factor in the development of excess weight, as they provide readily available energy with a low satiety value. In this regard, the nutritional quality of beverages is an important component of dietary patterns, since replacing water with sugary drinks can lead to higher total energy expenditure and disrupt metabolic balance. Furthermore, some beverages designed for specific contexts, such as isotonic drinks, have formulations aimed at replenishing fluids, carbohydrates, and electrolytes during prolonged physical activity; however, their consumption outside of these contexts can represent an additional source of sugars and energy that should be considered in a comprehensive dietary assessment (Ruiz & García, 2022). These differences highlight the importance of analyzing not only the quantity of beverages consumed but also their purpose, composition, and the context in which they are consumed.

Obesity is the result of a complex interaction between genes and the environment, where changes in diet and lifestyle that accompany urbanization and societal development have favored the expression of genes that predispose to obesity and, in turn, have modified the health and disease patterns of populations, increasing morbidity and mortality; in addition to causing those who suffer from it problems in different areas of their lives (Kaufer & Pérez, 2022).

Obesity and some of its comorbidities make up metabolic syndrome, which is a risk factor for cardiovascular disease and type 2 diabetes mellitus. Furthermore, it is associated with the development of a series of metabolic diseases and other conditions, such as cancer. It is also

associated with sleep apnea-hypopnea syndrome (SAHOS), osteoarticular problems, and reproductive issues, among others. Additionally, people with obesity frequently suffer from psychological problems, including anxiety and depression, and are often affected by the stigmatization of their condition, which often comes from poorly informed healthcare personnel lacking preparation to address people with obesity (Brosio et al., 2024).

Obesity contributes to the appearance of multiple comorbidities that affect health to a greater or lesser extent; however, the nature of some of these relationships is not yet well understood. It is not always easy to distinguish between obesity that is the cause of a given condition and obesity that constitutes a phenomenon that accompanies it or is its consequence, as in the case of depression (Rubino et al., 2020). What is clear is that in populations where obesity has a high prevalence, the risk of morbidity and mortality from a wide variety of diseases is increased (Staurini et al., 2022).

Obesity is not simply a cosmetic problem; it must be accepted as a disease in itself, which in turn precedes or is even an etiological factor for various chronic diseases. One of the advantages of recognizing obesity as a disease is that it has increased its visibility and has favored those efforts and actions being directed both in public policy and in healthcare to prevent and treat it in such a way as to help control the "epidemic" that a large number of countries, including Ecuador, are currently facing. The Ministry of Public Health of Ecuador determined that obesity affects 14.8% of children aged 5 to 11 years, 7.04% of adolescents aged 12 to 19 years, and 23.38% of people between 20 and 59 years of age (MSP, 2025).

Manabí has a high prevalence of overweight and obesity, with 29.17% of adults with obesity in the 2018 National Health and Nutrition Survey (ENSANUT), positioning it as one of the provinces with the highest rate in the country. Women have higher rates of obesity than men. Factors such as inadequate diet and lifestyle influence these public health problems (Instituto Nacional de Estadística y Censos, 2018). The objective of the present study was to identify the main factors associated with obesity and the frequent comorbidities in the parish of 24 de Mayo.

METHODOLOGY

A descriptive, observational, cross-sectional study with a mixed-methods approach (predominantly quantitative with an exploratory qualitative component) was conducted in the

parish of 24 de Mayo, belonging to the Santa Ana canton, province of Manabí, Ecuador, during the period from April to September 2024. The study population consisted of habitual residents of the 24 de Mayo parish during the research period. A non-probabilistic convenience sample was selected, composed of 50 individuals previously diagnosed with obesity, who were recruited in their homes after voluntarily agreeing to participate. This sampling strategy responded to the criteria of operational feasibility and community accessibility, given the rural context and limited resources.

Inclusion criteria were: individuals aged 18 years or older, with permanent residence in the 24 de Mayo parish, a prior diagnosis of obesity ($\text{BMI} \geq 30 \text{ kg/m}^2$), and who had provided written informed consent. Those who did not habitually reside in the community, those with a BMI within normal ranges (normal weight, $\text{BMI} < 25 \text{ kg/m}^2$), and those unable to complete the questionnaire due to health or cognitive reasons were excluded.

A structured questionnaire of 10 questions, designed ad hoc for the study, was applied as the data collection instrument. This instrument gathered sociodemographic information (age, sex, educational level, and occupation), family and personal history (presence of obesity in first-degree relatives and previous diagnosis of chronic diseases such as hypertension, type 2 diabetes mellitus, and dyslipidemias), lifestyle-related factors (frequency and type of physical activity classified as sedentary, moderate, or intense according to WHO criteria; dietary habits including consumption of fruits, vegetables, and ultra-processed foods, as well as meal frequency; and tobacco or alcohol use), psychosocial factors (presence of stress, anxiety, or depression assessed through self-administered questions based on the adapted DASS-21 scale), and pharmacological treatment (use of medications that could influence weight, such as antidepressants and corticosteroids). Additionally, direct measurement of weight and height was performed using a digital scale and a portable stadiometer, following WHO standardized techniques. BMI (kg/m^2) was calculated, and participants were classified according to WHO criteria: type I obesity ($\text{BMI} 30\text{--}34.9$), type II ($35\text{--}39.9$), and type III (≥ 40). For the identification of comorbidities, both self-report and review of medical records (when available) were used, verifying previous medical diagnoses.

The questionnaire was administered in-person and individually at participants' homes, following a clear explanation of the study's purpose, the voluntary nature of participation, and the guarantee of confidentiality. Each session lasted approximately 20 to 30 minutes. A pilot test was

conducted with 5 individuals with similar characteristics to adjust the wording and comprehension of the questions.

Quantitative data were entered into an Excel database and subsequently analyzed using SPSS version 26 statistical software. A descriptive analysis was performed: categorical variables were presented as frequencies and percentages, and continuous variables as means and standard deviations. No inferential statistical tests were applied due to the descriptive design of the study. The qualitative component consisted of open-ended questions about perceptions of obesity and barriers to health care, whose responses were analyzed using thematic content analysis.

The study was conducted in accordance with the bioethical principles of the Declaration of Helsinki and Ecuadorian regulations (Organic Health Law). It was classified as minimal-risk research, as it did not include minors or collect personally identifiable data. Written informed consent was obtained from all participants, and the confidentiality of the information was guaranteed through alphanumeric coding of the data and restricted storage in limited-access files under the custody of the principal investigator.

RESULTS AND DISCUSSION

Seventy percent of those surveyed are obese according to their nutritional status, while the remaining 30% maintain a weight within normal ranges. A clear predominance of obesity is evident in the community, representing a significant public health problem, especially in a rural context where modifiable risk factors may coexist. This situation may be related to multiple determinants, including genetic, environmental, and socioeconomic factors; inadequate dietary habits; low levels of physical activity; psychological conditions; hormonal or metabolic alterations; and the use of certain medications. Nationally, various studies indicate that overweight and obesity combined exceed 60% in adults, being more prevalent in women (30.9% obesity) than in men (20.3%). The provinces with the highest rates are Galápagos and El Oro (Sinchiguano et al., 2022).

In relation to these data, the studied community exhibits a high rate of obesity, demonstrating that this problem is also present at the local level and constitutes a significant risk factor for the development of chronic non-communicable diseases, such as diabetes, hypertension, and cardiovascular disease. These findings highlight the importance of strengthening strategies to

promote healthy lifestyles, including nutritional education, the encouragement of physical activity, and regular monitoring of nutritional status at the primary care level.

Figure 1 classifies individuals previously diagnosed with obesity according to its different types. The WHO's international classification of obesity for adults, based on body mass index (BMI), indicates that normal weight corresponds to a BMI between 18.5 and 24.9 kg/m², while a BMI of 25 or higher is considered overweight. Within this group, overweight or pre-obesity encompasses a BMI of 25 to 29.9. Grade I or moderate obesity is classified between 30 and 34.9, Grade II or severe obesity between 35 and 39.9, and finally, Grade III or morbid obesity corresponds to a BMI of 40 or higher. Therefore, Table 1 shows the distribution of different degrees of obesity within the analyzed community (Moreno, 2020).

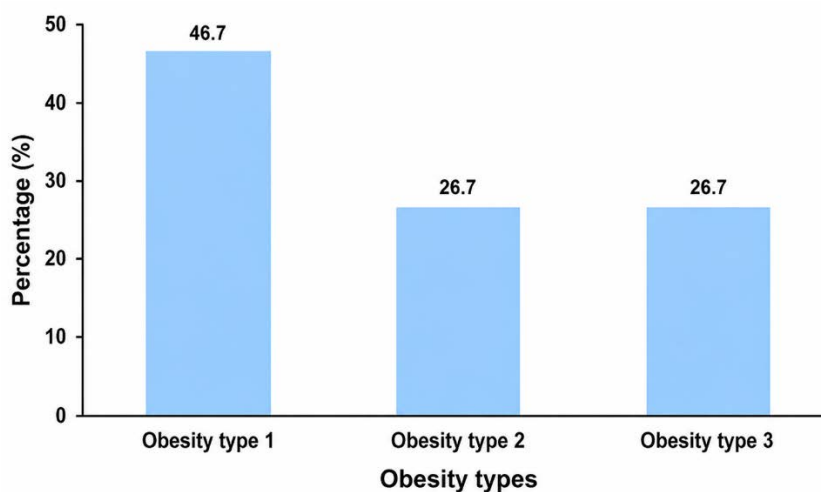


Figure 1. Distribution of participants according to obesity type.

It is evident that type 1 obesity is predominant; on the other hand, the percentage of people with type 2 and type 3 obesity is equal. It is important to note that, due to the lack of updated studies both nationally and in the province of Manabí, it is not possible to compare these results with official data or previous research. This lack of information limits the contextual analysis and highlights the need to develop local studies that allow for a more precise understanding of the magnitude and characteristics of obesity in the region.

Figure 2 presents the main factors that predispose the population to develop obesity. According to Salazar et al. (2020), these factors encompass biological, behavioral, and contextual

elements, including family history, the adoption of unhealthy diets, sedentary lifestyles, the presence of diseases or the use of certain medications, age, and other additional factors. Identifying these causes allows us to understand the multifactorial nature of obesity.

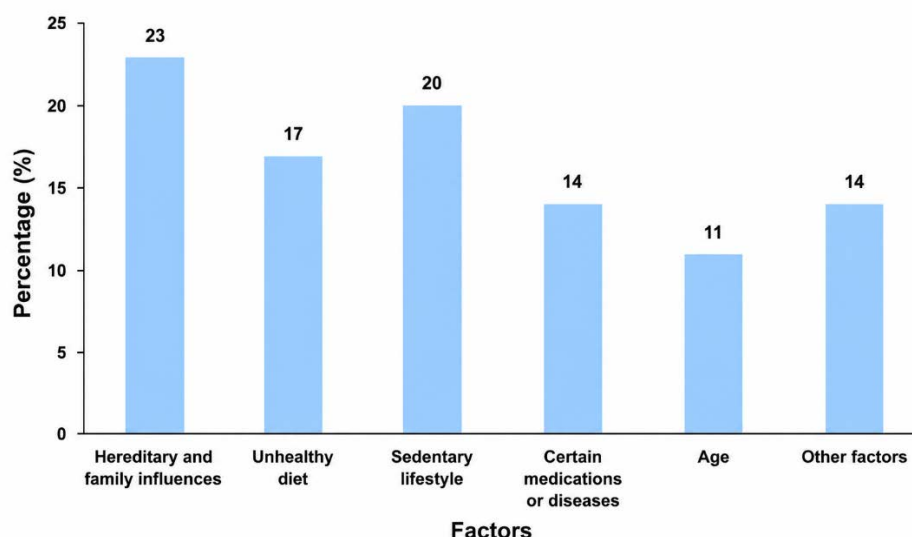


Figure 2. Factors that predispose to obesity.

The most prevalent factor among obese individuals in the community is heredity and family influences, representing 22.9%. This is followed by sedentary lifestyles at 20% and unhealthy diets at 17.1%. Other factors identified include hormonal disorders, the use of certain medications, psychological factors (such as stress or anxiety), and metabolic conditions, which together account for 13.4%. Finally, age represents 11.4%, an element that can also influence the development of obesity due to metabolic changes and decreased physical activity over time. In specific populations, the energy composition of traditional foods and cultural consumption patterns can influence diet quality and nutritional risk (Alvarado et al., 2021).

Obesity is a multifactorial disease in which metabolic, inflammatory, and behavioral alterations converge. In this context, the imbalance between energy intake, diet quality, and the antioxidant capacity of consumed foods can promote a state of oxidative stress associated with the low-grade chronic inflammation characteristic of this condition. Forbes-Hernández et al. (2020) highlight the importance of evaluating the total antioxidant capacity of the diet as an indicator

related to redox balance, since a diet with a lower intake of antioxidant bioactive compounds could contribute to the alteration of the physiological mechanisms involved in metabolic health.

Furthermore, in recent years, the role of the gut-brain axis in the interaction between metabolism, inflammation, and mental health has been recognized. Obesity can be associated with modifications in the composition of the gut microbiota (dysbiosis), alterations in intestinal permeability, and changes in the production of metabolites with potential influence on inflammatory and neurobiological processes. In this regard, Barcia, García, and Tejedor (2024) point out that the gut microbiota and probiotics are relevant elements in understanding the relationship between intestinal alterations and major depressive disorder, due to the bidirectional communication between the gut and the nervous system. Therefore, a comprehensive approach to obesity should consider not only traditional dietary and metabolic factors, but also those related to the gut microbiota and its potential implications for psychological well-being.

Furthermore, obesity constitutes a significant public health problem due to its close relationship with the development of multiple diseases. To better understand the impact of this condition on the studied population, the frequency of the main comorbidities in individuals previously diagnosed with obesity was identified. Figure 3 shows the distribution of these diseases, as proposed by Ashish et al. (2024), which include hypertension, type 2 diabetes mellitus, and dyslipidemia, as well as other associated disorders.

The results show a significant presence of chronic diseases associated with obesity within the studied community. Hypertension is the most prevalent at 28.6%, followed by type 2 diabetes mellitus at 25.7%, reflecting the close relationship between excess weight and the development of cardiovascular and metabolic disorders. Both conditions are currently two of the leading causes of morbidity and mortality worldwide, making their presence in the community a significant public health concern.

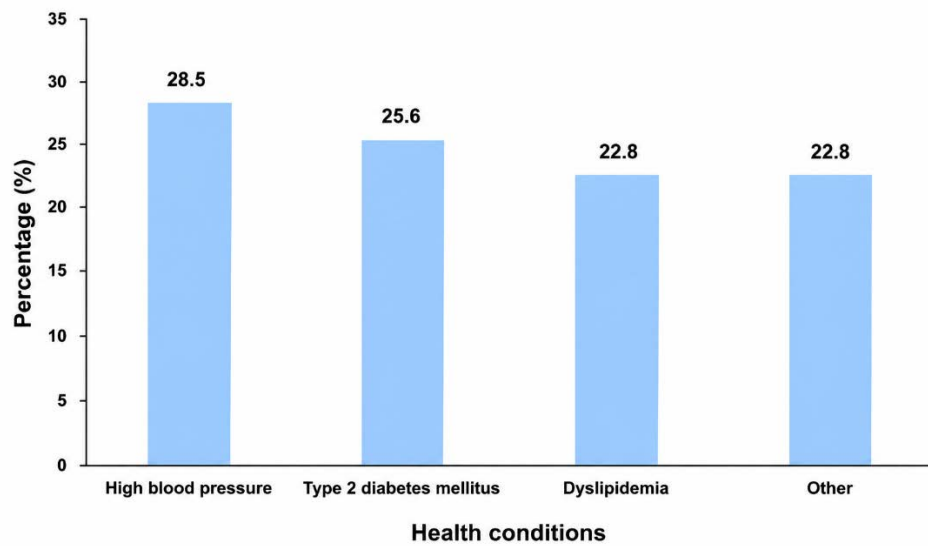


Figure 3. Diseases and health conditions affecting individuals diagnosed with obesity in the community.

Dyslipidemia and other associated pathologies reached 22.9%, which demonstrates the coexistence of multiple risk factors in the same population. These conditions are often part of the same pathophysiological process related to insulin resistance, inadequate dietary habits, and decreased physical activity. These findings show that obesity is not an isolated problem, but rather a contributing factor to the development of various metabolic comorbidities. Therefore, it is essential to strengthen community-based health promotion and prevention strategies, primarily focused on improving lifestyles, encouraging physical activity, and promoting a balanced diet, to reduce the risk of chronic diseases and improve the population's quality of life.

CONCLUSIONS

The study conducted in the 24 de Mayo parish confirms that obesity is a significant public health problem—with a prevalence of 70% in the sample and a predominance of type I—and is multifactorial in nature, involving genetic factors (family history) and modifiable behavioral factors (sedentary lifestyle and inadequate diet), the latter being the main targets for future interventions. The high frequency of hypertension, type 2 diabetes mellitus, and dyslipidemia demonstrates the metabolic and cardiovascular impact of obesity, highlighting the need for a

comprehensive and early approach at the primary care level. These findings underscore the urgency of strengthening health education, promoting healthy lifestyles, and conducting longitudinal studies to establish causality and evaluate interventions, especially given the lack of updated local data to guide public policies in this region of Ecuador.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

AUTHOR CONTRIBUTIONS

Conceptualization: Rosa M. Chavarría and Carlos R. Alejandro. **Data curation:** Rosa M. Chavarría and Tiffany A. Castro. **Formal analysis:** Marco A. Delgado and Arlet Y. Quintero. **Investigation:** Rosa M. Chavarría, Marco A. Delgado, Tiffany A. Castro, and Arlet Y. Quintero. **Methodology:** Rosa M. Chavarría and Marco A. Delgado. **Project administration:** Rosa M. Chavarría. **Resources:** Rosa M. Chavarría and Carlos R. Alejandro. **Software:** Rosa M. Chavarría and Marco A. Delgado. **Supervision:** Denisse Vega and Carlos R. Alejandro. **Validation:** Marco A. Delgado, Denisse Vega, and Carlos R. Alejandro. **Visualization:** Arlet Y. Quintero and Rosa M. Chavarría. **Writing – original draft:** Rosa M. Chavarría. **Writing – review & editing:** Marco A. Delgado, Tiffany A. Castro, Arlet Y. Quintero, Denisse Vega, and Carlos R. Alejandro.

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