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TEMA:

Circunferencia de Pantorrilla como posible predictor de malnutrición en mujeres postmenopáusicas de sectores urbano-marginales de Guayaquil

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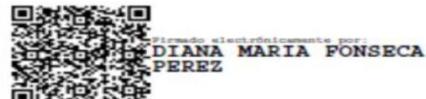
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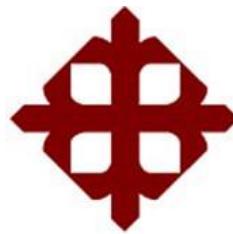
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RESUMEN

INTRODUCCION: The world's population is increasing in people within the last decades of their life, especially those over 60 years of age, and the WHO states that this number will increase to 1.2 billion by 2025. Malnutrition as a consequence of overweight and obesity is seen in 35-40% of older adults in low-income or third world countries like ours.

MÉTODO: El estudio descriptivo transversal tuvo como objetivo analizar la asociación entre circunferencia de pantorrilla y malnutrición en mujeres posmenopáusicas de sectores urbano-marginales de Guayaquil, Ecuador. Se usó un dinamómetro marca Jamar para medir la fuerza prensil. El cribado nutricional MNA. Además una balanza (Seca 813) y un estadiómetro (Seca 213).

RESULTADOS: Las mujeres con mayor circunferencia de pantorrilla tenían mayor fuerza prensil. Las mujeres post menopáusicas con mayor circunferencia de pantorrilla tenían una desnutrición (18,7%), las mujeres que tenían menor circunferencia de pantorrilla tenian un riesgo de desnutrición (14,7%) y las mujeres con circunferencia en rangos normales no tenían riesgos ni desnutrición.

CONCLUSIÓN: La desnutrición es un problema que afecta a la mayoría de adultos mayores, especialmente mujeres por esto es importante utilizar las herramientas como el MNA, fuerza presión y circunferencia de pantorrilla para diagnosticarlos a tiempo

Palabras Claves: Circunferencia de pantorrilla, Fuerza presil, malnutrición, mujeres post menopáusicas, cribados nutricionales, adultos mayores

ABSTRACT

INTRODUCTION: The world's population is increasing in people within the last decades of their life, especially those over 60 years of age, and the WHO states that this number will increase to 1.2 billion by 2025. Malnutrition as a consequence of overweight and obesity is seen in 35-40% of older adults in low-income or third world countries like ours.

METHOD: The descriptive cross-sectional study aimed to analyze the association between calf circumference and malnutrition in postmenopausal women from urban-marginal sectors of Guayaquil, Ecuador. A Jamar brand dynamometer was used to measure grip strength. The MNA nutritional screening was performed. In addition, a scale (Seca 813) and a stadiometer (Seca 213) were used.

RESULTS: Women with larger calf circumference had greater grip strength. Postmenopausal women with larger calf circumference were malnourished (18.7%), women with smaller calf circumference were at risk of malnutrition (14.7%), and women with circumferences in the normal range were not at risk or malnourished.

CONCLUSION: Malnutrition is a problem that affects most older adults, especially women, which is why it is important to use tools such as MNA, grip strength and calf circumference to diagnose them in time.

Keywords: Calf circumference, grip strength, malnutrition, postmenopausal women, nutritional screening, older adults

INTRODUCCIÓN

The world population in countries is increasing in the group of persons in the latest decades of life, especially people over 60 years old. The World Health Organization states this group will increase to over 1.2 billion by 2025 (1). Like the rest of Latin America, our country is experiencing this epidemiology transition, increasing the inhabitants of middle-aged and older people. Recently, the National Institute of Statistics and Census (INEC) published an increase from 6,2 to 9% population projection for the elderly population in our nation(2). Therefore, this exponential rise has increased the need for more hospitals and health care for these populations.

Malnutrition is understood as excess, imbalance, or lack of one or a variety of nutrients that can have a quantifiable negative impact on body composition with poor clinical outcomes (3). In the relationship between nutrition and aging; protein-energy malnutrition, particular or general, vitamin and/or mineral deficiencies or obesity is a condition reported between 35-40% of the elderly population was cited by the WHO report (4). Malnutrition, as a result of being overweight and/or obese, is more prevalent in low-income countries in our region (5).

Mini Nutritional Assessment, is an easy and evaluated tool to assess the nutritional status of the elderly population in different settings including the community (6). Because of this, researchers continue to concentrate on the nutritional diagnosis and management of this population (7). Malnutrition in aged individuals must be a concern due to its prevalence worldwide, which ranges from 23 to 46% (8). (9). Older people are more vulnerable to disease-related weight loss, loss of muscle mass and strength, and frailty syndrome because age is a major risk factor for the development of chronic disease (10).

Sarcopenia is known as a muscle disorder, which is understood as reduced muscle mass, strength, and physical performance (WHO) (11) It's more prevalent in aged adults and it can affect the life's quality (12). The global prevalence is 10% of community-dwelling aged adults around the world (13). Regarding the great ponderance, it's important to have an early diagnosis.

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A systematic review and meta-analysis evaluating cross-sectional evidence and several recent cross-sectional studies (14) regarding the risk of malnutrition revealed that older adults at risk of malnutrition—primarily ascertained by the mini-nutritional assessment (MNA)—also had an increased risk of developing sarcopenia (15). Regarding to MNA screening, it's important to measure the calf circumference which can predict nutritional stage, sarcopenia and loss of muscle mass (16). Additionally, hand grip strength (HGS), is a basic metric for evaluating muscle function and general physical capabilities and it's considered necessary to diagnose sarcopenia (17).

The objective of this research is to validate the calf circumference and MNA screening to predict sarcopenia and malnutrition.

DESARROLLO

1.1 DISCUSIÓN

In the present study it was found that 44,6% of the sample had risk of malnutrition and 14.9% had malnutrition, using the MNA screening, which is a validated tool. According to research made in Finland among 462 community-dwelling adults, the 11% of the sample had decreased nutrition status. Although, the study was applied in both sexes, women participants were less participants comparing to men, the percentage of malnutrition on females was higher (12.7%) and men was 8.6% (22). Vidaña-Espinoza et.al also found that individuals who are at risk of frailty or sarcopenia are more likely to have poor nutritional status, which es compared to other studies (23).

Sarcopenia is a geriatric syndrome, which prevalence on community-dwelling aged adults ranges from 9.9 to 40.4% (24). In our study the mean handgrip strength was 14.94 kg, which is considered low on women (EWGSOP2) (25). It can influence in quality of life, which increments the need of particular care and more dependent individuals. Therefore, the muscle seems to be a protective factor.

We also evaluated the body max index among the participants, where overweight was more prevalent (40%), then obesity grade I (22.8%) and the others in less proportion. According to Qun Cheng et al. underweight older adults are more likely to have malnutrition and a higher risk of developing sarcopenia, whereas higher fat mass individuals may have a higher protein intake that protects against sarcopenia (26).

The fact that this study was conducted in just one Ecuadorian city is a fundamental drawback. Nonetheless, the study discovered that normal calf circumference and normal handgrip strength can be a protector to prevent sarcopenia among old adults. Several investigations conducted in different areas produced findings that were comparable. This study may be used with a sizable portion of the nation's population.

DESARROLLO

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1.1 METODOLOGÍA

1.1.1 Participantes

A cross-sectional study was performed between November 2019 to December 2020. The population was community-dwelling postmenopausal women who reside in urban-marginal areas of Guayaquil.

Inclusion criteria: Women 50 years and above who agreed to collaborate in the study and were able to perform all the tests that were needed after signing an informed consent. Exclusion criteria: women who did not agree to the informed consent and weren't able to accomplish all tests, institutionalized people, dementia or a severe cognitive diagnosis, functional dependence, an ongoing cancer, chronic obstructive pulmonary disease, and hand functional limitations like osteoarthritis or osteoporosis.

The data was obtained in urban-marginal community medical facilities: Isla Trinitaria (Nuestra Señora de la Visitación), Cooperativa 25 de Julio, and Mapasingue (Fundación Obra de Dios).

The Reproductive Aging Workshop's stages defined the postmenopausal condition as the persistent cessation of menstrual cycles and approximately a year of amenorrhea without the presence of any other medical conditions (18).

1.1.2 Colección de data

Some demographic variables were studied such as: marital status (single, married, divorced, common law), ethnicity (mestizo, afro-ecuadorian, Caucasian, indigenous), education (illiterate, primary, secondary, university), residence zone (urban, marginal, urban-marginal).

Anthropometric variables were measured, such as weight (kg) and height (cm), where the body mass index was applied. Among the materials, Lufkin measuring tape, a scale (Seca 813), a height meter (Seca 217). The cut-off point for calf circumference (CC) is <33 cm for women according to NHANES population

sample (19). The person stayed sitting while CC was measured with the steel measuring tape. On the right calf, the greatest CC was measured to the closest 0.1 cm on a plane perpendicular to the long axis.

Additionally, with the dynamometer (Jamar), we asked the participants to bend their elbow at a ninety-degree angle, holding their arm while squeezing as hard as possible. It was measured the handgrip strength of the dominant side (20). The weight was taken using the scale and the height was taken with the height meter. These last two were correlated to obtain the BMI.

The Mini Nutritional Assessment (MNA) is a screening conformed by 11 multiple optional questions that evaluate the nutritional status of aged adults. Each option has a punctuation, which summatory reveals if the patient has good nutritional stage (24 to 30 points), malnutrition risk (17 to 23.5) or malnutrition (<17) (21).

1.2 RESULTADOS

The study's sample has 175 postmenopausal women. The average age of the participants was 72.3 (SD12.2) years. Table 1 provides a summary of the sociodemographic features. The majority, 69.7% (n=122), described themselves as mestizo; 53.1% (n=93) of them were single; 54.9% (n=97) of them were married; and 62.3% (n=93) of them were from urban or marginal areas. Regarding MNA screening, it was found that 40.6% (n = 71) of the women were within the normal range, 44.6% (n = 78) were at risk of malnutrition and 14.9% (n = 26) have malnutrition.

In the graphic 1 is presented that major calf circumference associates with higher handgrip strength. Also, in graphic 2 it can be observed that women with a larger calf circumference are those who present malnutrition (18.27) and women with a smaller calf circumference are those who are at risk of malnutrition (14.08), which is presented in graphic. However, the women with calf circumference within the normal range, didn't present malnutrition.

Tabla 1. Características sociodemográficas y antropométricas de la población

	Total	Mean (M)	Standard deviation (SD)
Age	175	72.34	12.26
Ethnicity	Mestizo	122 (69.7%)	
	Afroamerican	24 (13.7%)	
	Caucasian	16 (9.1%)	
	Indigenous	13 (7.4%)	
	Montubio	0 (0.0%)	
Civil Status	Single	48 (27.4%)	
	Married	45 (25.7%)	
	Widow	50 (28.6%)	
	Divorced	18 (10.3%)	
	Unmarried union	14 (8.0%)	
Education level	Illiterate	45 (25.7%)	
	Elementary school	97 (55.4%)	
	High school	28 (16.0%)	
	University	5 (2.9%)	
	Degree	0 (0.0%)	
Procedence	Urban	57 (32.6%)	
	Marginal	9 (5.1%)	
Weight		63	14.1
Height		1.4	0.08
Dx IMC	Desnutrición severa	1 (0.5%)	
	Desnutrición moderada	2 (1.1%)	
	Desnutrición leve	18 (10.2%)	
	Normopeso	24 (13.7%)	
	Sobrepeso	70 (40%)	
	Obesidad grado I	40 (22.8%)	
	Obesidad grado II	16 (9.1%)	
	Obesidad	4 (2.2%)	

	grado III		
Handgrip measurement	Low	116 (66.2%)	
	Normal	59 (33.7%)	

Tabla 2. Resultados del Test de Mini Nutritional Assessment (MNA).

Diagnose	Frequency	Percentage
Malnutrition	26	14.9%
Risk of malnutrition	78	44.6%
Normal	71	40.6%

Tabla 3. Promedio de fuerza prensil en mano.

Total	Mean	Standard deviation (SD)
175	14.94	6.14

Figure 1 shows the association between calf circumference and handgrip strength (p<0.001).

Correlación de circunferencia de pantorrilla y fuerza prensil

$y = 0.2891x + 5.1836$
$R^2 = 0.0668$
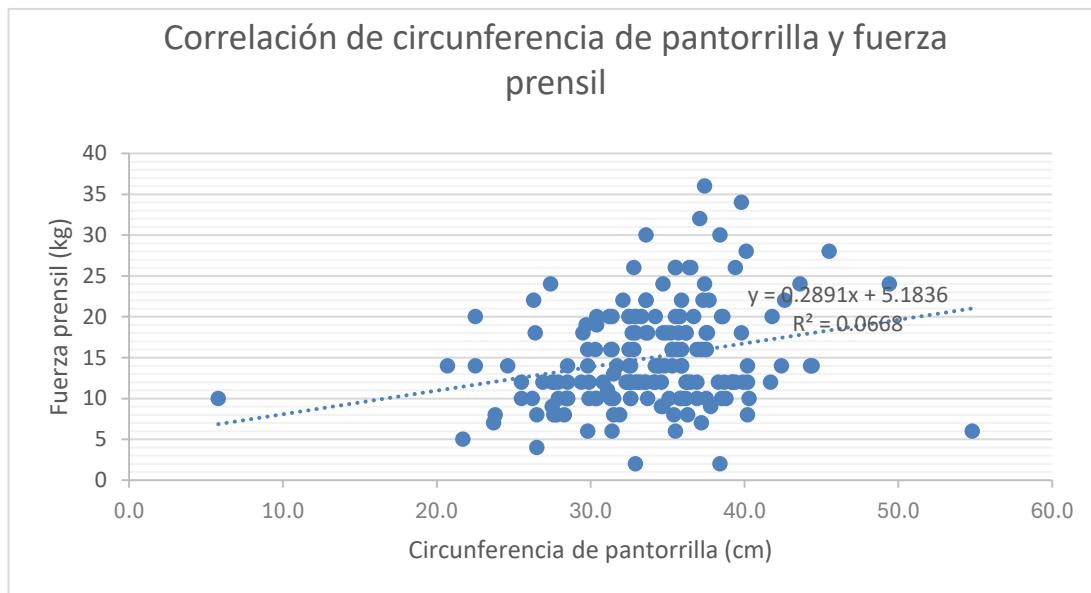
Gráfico 1. Correlación entre el circunferencia de pantorrilla y fuerza prensil.

Figure 2 shows the correlation between MNA and calf circumference (p<0.001).
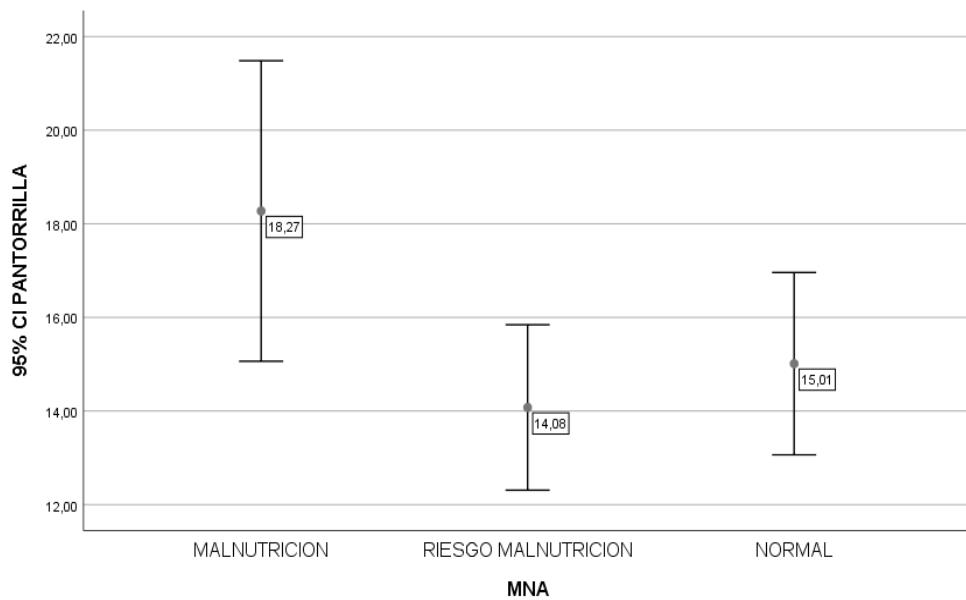
Gráfico 2. Correlación entre el MNA y circunferencia de pantorrilla.

CONCLUSIONES

Malnutrition is highly prevalent on old adults, especially on women. It should be prevented by using tools like MNA screening, which is a quick evaluation to determine the nutritional status. Additionally, the calf circumference is a easy way to identity the weight loss and should be evaluated globally. The muscle mass is important for its protective factor against diseases. The sarcopenia can be detected if the handgrip strength is evaluated as a vital sign. Therefore, this study can be replied on a major population in order to suggest the nutritional treatment.

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REPOSITORIO NACIONAL EN CIENCIA Y TECNOLOGÍA

FICHA DE REGISTRO DE TESIS/TRABAJO DE TITULACIÓN

TEMA Y SUBTEMA:	**Circunferencia de pantorrilla como posible predictor de malnutrición en mujeres postmenopáusicas de sectores urbano-marginales de Guayaquil**		
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RESUMEN/ABSTRACT (150-250 palabras):

La población mundial en los países está aumentando en el grupo de personas en las últimas décadas de la vida, especialmente en las personas mayores de 60 años. La Organización Mundial de la Salud afirma que este grupo aumentará a más de 1.2 mil millones para el año 2025. Al igual que el resto de América Latina, nuestro país está experimentando esta transición epidemiológica, aumentando la población de personas de mediana edad y mayores. Recientemente, el Instituto Nacional de Estadística y Censos (INEC) publicó una proyección de aumento de 6,2 a 9% para la población adulta mayor en nuestra nación. Por lo tanto, este aumento exponencial ha aumentado la necesidad de más hospitales y atención médica para estas poblaciones.

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