Diabetes, Metabolic Syndrome and Obesity

Dovepress
open access to scientific and medical research

Open Access Full Text Article

ORIGINAL RESEARCH

Effect of the Healthy Dish Method to Reduce Waist Circumference in Teachers with Abdominal Obesity of a Peruvian University

María Dolores Mondéjar Barrios[1], Matilde Anais Matos Inga[1], Karem Justhin Rodas Trujillo[1], Sandra Lisseth Mori Díaz[1], Juana Olga Espíritu Aguirre[2], Luis Alberto Cabanillas-Chirinos[1]

[1]La Libertad, Universidad César Vallejo, Trujillo, Perú; [2]Áncash, Universidad Nacional del Santa, Chimbote, Perú

Correspondence: María Dolores Mondéjar Barrios, La Libertad, Universidad César Vallejo, Avenida Antenor Orrego W3 lote 16. Urbanización Covicorti, Trujillo, Perú, Email mmondejarba@ucvvirtual.edu.pe

Video abstract

Point your SmartPhone at the code above. If you have a QR code reader the video abstract will appear. Or use: https://youtu.be/RruwbSUFU-o

Introduction: Obesity has increased steadily in recent decades, becoming a worldwide pandemic.

Objective: To determine the effect of the "Healthy Dish" method to reduce waist circumference in teachers with abdominal obesity in a Peruvian University.

Methods: Quasi-experimental, prospective study in 43 teachers, divided into 21 in the control group and 22 in the experimental group, who received a two-session workshop on abdominal obesity and the "Healthy Dish" method. The latter was applied for 2 months, monitored 5 days a week, the waist circumference of both groups was measured at one month and at two months and compared. For the statistical analysis, descriptive and inferential statistics or nonparametric statistics were applied (Mann–Whitney *U*-test, according to the assumption of normality).

Results: The predominant age range was 40 to 49 years, women, married, overweight, with a family history of hypertension, cancer and diabetes mellitus. After the intervention, 40.9% of teachers in the experimental group decreased their waist circumference and 54.5% normalized it, while the control group decreased it by 23.8% and 47.6% normalized it. Only 4.54% of teachers in the experimental group showed no change in their waist circumference, compared to 19.0% in the control group, and 9.52% of teachers in the control group increased their waist circumference.

Conclusion: The healthy dish method has a positive effect on decreasing waist circumference in teachers with abdominal obesity.

Keywords: healthy eating, abdominal obesity, teachers, waist circumference

Introduction

Obesity has been on the rise in recent decades, and has become a worldwide pandemic.[1] It is considered the most prevalent metabolic disease in the world, resulting in increased morbidity and risk of death.[2] About 30% of the world's population is overweight and obese, a trend that is on the rise.[3] In Mexico, 36% of adults are obese.[4] In Peru, according to a report on non-transmissible and transmissible diseases, in 2019 the prevalence of obesity was 22.3%.[5] In obesity, non-modifiable risk factors (RF) have been identified, such as genetic predisposition, and modifiable factors such as physical inactivity, poor eating habits, plus socioeconomic factors, which in a coordinated and interactive manner cause an imbalance between input and energy expenditure, which ceases to respond to body adjustments, triggering a significant long-term gain in fat mass and body weight.[6]

There are different anthropometric indicators to evaluate the presence of obesity, including body mass index (BMI), but it does not define whether it is lean mass or body fat.[4] However, waist circumference, waist circumference/height ratio (WC/H) and waist/hip circumference (WC/H) are also measured.[7]

Received: 9 February 2024
Accepted: 16 March 2024
Published: 30 April 2024

Waist circumference is a simple, very useful and inexpensive measure that has a close relationship with visceral fat and cardio-metabolic risk[4] because visceral adipose tissue releases pro-inflammatory cytokines, tumor necrosis factor alpha (TNF-α), interleukin-6 (IL6) and less quantity of mediators with anti-inflammatory action such as adiponectin, which implies resistance to insulin, which plays an essential role in the pathogenesis of endothelial dysfunction and the appearance of atherosclerosis.[7]

During the COVID 19 pandemic, studies in hospitalized patients showed that those with abdominal obesity presented more severe courses and mortality, and that the levels of inflammatory markers correlated with visceral adiposity.[8–10]

The best way to prevent chronic diseases is through a healthy eating plan. A few years ago, the nutritional pyramid was used, but it did not describe the proportions in which foods should be consumed. However, the Healthy Dish or Harvard Dish Method, which originated in 2011 at the Harvard School of Public Health by nutrition researchers, is currently very popular. It is useful, simple and illustrative so it is easy to understand, consisting of certain proportions of food on the dish represented by 50% of fruits and vegetables and the other half, 25% is protein and the other of carbohydrates preferring whole grains as several studies have shown that it is associated with a lower chance of obesity. Regarding fats, olive oil is suggested, avoiding partially hydrogenated fats. Dairy products should be consumed once or twice a day, sugar consumption should be reduced and water should be prioritized as a beverage, in addition to being physically active.[11,12]

The American Diabetes Association (ADA) adapted the Harvard healthy dish method, which consists of dividing the dish into three sections with 50% vegetables, 25% protein and 25% carbohydrates.[13]

In recent decades, much importance has been given to community health as an approach in which strategies aimed at intervening in the health-disease process in specific communities must be implemented, the latter being the most important for the development, implementation and follow-up of the strategy used that considers the needs and participation of the community.[14]

In the nutritional counseling of the obese persons, it should be achieved that they modify certain eating and/or behavioral habits so that they become protagonists of their state of health.[15]

Therefore, the main objective of this research is to determine the effect of the healthy dish method to reduce waist circumference in teachers with abdominal obesity in a Peruvian university.

Materials and Methods

Type of Research: Applied

Research design: quasi-experimental, longitudinal and prospective.

Pre and post-test with two groups (experimental group and control group).

Independent variable: "Healthy dish" method (consisting of nutritional counseling).

Taking into account the model adapted by the American Diabetes Association (ADA), which is characterized by dividing the dish into three sections where 50% is vegetables, 25% protein and 25% carbohydrates (American Diabetes Association, 2020).

Cause X_____Y Effect

(Independent variable) (dependent variable)

Population: 61 teachers from the School of Psychology

Time: July to November 2023

Sample: 43 teachers

Type of sampling: non-probabilistic (by convenience)

Inclusion Criteria

- Teachers with abdominal obesity who gave their consent to participate.
- Those who had academic load in semester 2023- I.

Exclusion Criteria

- Those taking corticosteroids for a prolonged period of time due to chronic disease; pregnant women.

Collection of Information

Information was collected individually in a clinical history at the doctor's office.

Data Collection Technique and Instrument

Observation by clinical examination; it was individual in a clinical history.

Instruments

Centimeter, Questionnaire, duly validated and reliable.

Conceptualization and Operationalization of Variables

Dependent variable: waist circumference.

Waist circumference: The measurement of the distance around the abdomen at the level of the navel used to diagnose abdominal obesity.

According to the Latin American Diabetes Association, abdominal obesity exists when the abdominal circumference is greater than or equal to 94 cm in men and greater than or equal to 88 cm in women.

Once the informed consent was signed, patients with abdominal obesity were identified by measuring waist circumference.

To measure waist circumference, a tape measure was used, taking into account its measurement at the midpoint between the lower costal border and the iliac crest at the level of the mid-axillary line, at the end of an expiration on 2 occasions and with the individual standing.

Of 46 participants with abdominal obesity who started the project, 3 withdrew, leaving 43 teachers. They were divided into two groups, control (21) and experimental (22), comparing both to see that there was no statistically significant difference between them.

Demographic data such as age, sex, marital status and other data from the medical record were collected through the clinical history.

The height in cm and weight in kg were also measured (scale and measuring rod) and the BMI will be obtained with the formula: Weight (Kg)/Height m^2 to evaluate nutritional status.

Underweight: less than 18.5 kg/m^2

Normal weight: 18.5 to 24.9 kg/m^2

Overweight: 25 to 29.9 kg/m^2

Obesity Type I: 30–34.9 kg/m2; Type II: 35–39.9 kg/m2 and Type III: 40 or more kg/m^2

The experimental group was given a two-session workshop, one online to deepen their knowledge of abdominal obesity and the other in person on the Healthy Dish Method, which was very didactic where the teachers demonstrated their know-how by building their own healthy dish, which they applied to their diet, with daily follow-up by the researchers.

For this purpose, the teachers were divided into 4 teams included in their respective WhatsApp group, each one led by a researcher who was in charge of collecting evidence of their daily meals through photos 5 days a week (Monday to Friday) for two months. After the first month, their waist circumference was measured and again after two months to evaluate the effect of the intervention.

Statistical Analysis

For the statistical analysis, descriptive statistics (statistical tables and graphs), inferential statistics (Student's *t*-test for independent samples, as long as the data met the assumption of normality), and nonparametric statistics were used (Mann–Whitney *U*-test, if the assumption of normality was not met).

Table 1 shows that there was a predominance of patients between 40 and 49 years of age with abdominal obesity, representing 46.5%, of whom 34.8% were women. Table 2 shows that a larger number of teachers were married, representing 53.4%. Table 3 indicates the family pathological history of the teachers studied, 67.4% had a family history

Table 1 Patients with Abdominal Obesity According to Age Group and Sex

Age Group (Years)	Sex				Total	
	Male		Female			
	N°	%	N°	%	N°	%
30–39	7	16.2	10	23.2	17	39.5
40–49	5	11.6	15	34.8	20	46.5
50–59	5	11.6	1	2.3	6	13.9
Total	17	37.7	26	60.4	43	100.0

Note: Data collection instrument.

Table 2 Patients with Abdominal Obesity According to Marital Status

Marital Status	N°	%
Single	16	37.2
Married	23	53.4
Divorced	4	8.8
Widow/er	0	0.0
Total	43	100.0

Note: Data collection instrument.

Table 3 Patients with Abdominal Obesity According to Family Pathological History

Family Pathological History	N°	%
Diabetes mellitus	24	53.3
Arterial hypertension	29	67.4
Cardiopathy	5	11.1
Cancer	26	60.4
Thyroid disease	8	18.6
Overweight or Obesity	5	11.1
Others	13	28.8
None	3	6.6

Note: Data collection instrument.

of hypertension, followed by cancer (60.4%), diabetes (53.3%), other diseases (28.8%), Thyroid disease (18.6%), Cardiopathy and Overweight or Obesity (11.1%). Table 4 shows that 62.7% of the participants were overweight followed by obesity in 30.2%. Table 5 shows that taking into account the patients with abdominal obesity according to waist circumference before and after the intervention, it was observed that before the application of the intervention, the experimental group was made up of 22 teachers with abdominal obesity and the control group of 21 teachers with the same characteristics. After the application of the healthy dish method, 40.9% of the teachers in the experimental group had reduced their waist circumference, but without normalizing it, while 23.8% of the control group had reduced their waist circumference. 54.5% of teachers in the experimental group normalized their waist circumference and 47.6% of the control group also normalized it. Only 4.54% of teachers in the experimental group had no change in their waist circumference, maintaining the same level as that obtained one month after the intervention, while in the control group,

Table 4 Patients with Abdominal Obesity According to Nutritional Status by BMI

Nutritional Status by BMI	N°	%
Underweight	0	0.0
Normal weight	3	6.6
Overweight	27	62.7
Obesity	13	30.2
Total	43	100.00

Note: Data collection instrument.

Table 5 Patients with Abdominal Obesity According to Waist Circumference Before and After the Intervention

Waist circumference	Experimental Group				Control Group			
	Before		After		Before		After	
	f	%	f	%	f	%	f	%
Decrease in waist circumference without normalization	0	0.0	9	40.9	0	0.0	5	23.8
Decrease in waist circumference to normal	0	0.0	12	54.5	0	0.0	10	47.6
No change in waist circumference	0	0.0	1	4.54	0	0.0	4	19.0
Increase in waist circumference	22	100.0	0	0.0	21	100.0	2	9.52

Note: Data collection instrument.

19.0% did not change their waist circumference, and 9.52% of teachers in the control group increased their waist circumference. Therefore, there is a difference in the effect of the Healthy Dish method to reduce waist circumference in teachers with abdominal obesity. In the comparison of the probability obtained in the test with the significance level proposed, the significant of the test was $0.021 < 0.05$, the research hypothesis is accepted.

Discussion

In the research on teachers with abdominal obesity, the predominance was in women between 40 and 49 years of age, coinciding with the study conducted by Pajuelo et al, where it was more frequent in women over 40 years old who resided on the coast in urban areas.[16]

Similar results were obtained by Hidalgo et al, in their research conducted in the State of Pernambuco, Brazil, with a prevalence of abdominal obesity in women of 80.7%.[17]

For their part, Menecier et al, carried out their study of adult women where 9 out of 10 women presented abdominal obesity.[18]

In their research, Aranceta et al, found a higher prevalence of abdominal obesity in females than in males, and that this also increases with age.[19]

Considering the marital status, there was a predominance of married people, coinciding with the research of Zapata et al, on the prevalence of overweight/obesity and abdominal obesity, which turned out to be higher in married women.[20] Similar results were presented by Teachman, where his married respondents tended to have more body weight than those who lived without a partner, since they performed social activities in union such as food consumption, physical exercise or sedentary lifestyle.[21]

Garcia and Viera found that abdominal obesity (AK) in women increased with age and being married or cohabiting.[22]

Analyzing the family pathological history of the patients, a greater number of them had first- and second-degree relatives with arterial hypertension.

The hereditary history of arterial hypertension favors the risk of suffering from hypertensive disease, together with abdominal obesity, as evidenced by Araujo et al, in their study, whereby the risk of hypertension increased three times and they reported that 50.6% of the total population had a family history of arterial hypertension.[23]

When calculating the body mass index (BMI), we found that most of the subjects were overweight, which is similar to the study by Pérez et al, where those identified as having abdominal obesity had a BMI of 25–29 kg/m^2.[24]

Likewise, Hernandez et al concluded in their research that the participants were overweight and centrally obese.[25]

When comparing the experimental and control groups, we observed that in both groups there was a decrease in waist circumference in most of the participants, since in the control group general recommendations were given regarding a low-calorie and low-fat diet. The experimental group decreased the abdominal perimeter to a greater extent after two months and a greater number of them even normalized it.

In a study conducted by Noriega, they applied nutritional counseling with the "Healthy Dish" Method to type 2 diabetic patients, which had a favorable effect on the reduction of weight, abdominal perimeter and BMI.[26]

In a study carried out by Hassan, the participants who received the intervention with diet and exercise had a greater decrease in weight than the subjects in the control group, coinciding with our study.[27]

Ortega et al, studied whether it was possible to stop having obesity (by normalizing the body mass index, abdominal perimeter and/or body fat percentage), showing that after 2 years, what was most normalized was the body fat percentage and thus the excess body fat; then the abdominal perimeter and thus abdominal obesity, and finally, the body mass index and thus general obesity.[28]

Subero et al, evaluated the design of a healthy dish and the participants' perceptions, concluding that the results were satisfactory and positively appreciated.[29]

The limitation of this research is that since initially the teachers with abdominal obesity were not known, it was necessary to measure waist circumference to identify them, because not all subjects were likely to participate, so there is no randomization and the sample is smaller, not useful to generalize the results.

Conclusions

The healthy dish method has a positive effect on decreasing waist circumference in teachers with abdominal obesity and was statistically significant ($0.021 < 0.05$).

Recommendations

The "Healthy Dish" Method would be useful as a didactic strategy for health promotion and primary prevention activities in order to reduce the frequency of abdominal obesity in teachers and the rest of the population. In addition, educational intervention studies should be carried out with larger samples and in the counseling of patients in the work of healthcare professionals.

On the other hand, taking into account that the control group decreased waist circumference, although to a lesser extent, it shows that even if they are minimal changes being healthy, they also have a positive impact on the quality of life.

Data Sharing Statement

Requests for the data set analyzed for this study can be made by contacting the corresponding author.

Ethical Considerations and Consent Statement

The Nuremberg Code, the Declaration of Helsinki and the UNESCO Universal Declaration on Bioethics and Human Rights were considered as the legal basis. For this research, the patients were informed of the objective of the study and the request for acceptance through informed consent. The study was approved by the ethics committee of César Vallejo University School of Medicine.

Acknowledgments

Thanks to all the teachers who participated in the study and to the microbiologist Juan Miguel Alva Sevilla for his collaboration in taking and processing the samples in the laboratory of the Faculty of Health Sciences, Trujillo, and to the staff of the Medical Center of the Universidad César Vallejo.

Funding

This study was financed by the research support fund of the Universidad César Vallejo, Peru.

Disclosure

All authors have declared no conflicts of interest in this work.

References

1. Enríquez R. Obesidad: epidemia del siglo XXI y su relación con la fertilidad [Obesity: an epidemic of the 21st century and its relation to fertility]. *Rev med clin Las Condes*. 2021;32(2):161–165.
2. Gómez-Ambrosi J, Catalán V. Prevalencia de diabesidad en España: depende de cómo se defina la obesidad [Prevalence of diabesity in Spain: it depends on how obesity is defined]. *An Sist Sanit Navar*. 2022;45(1):e0993. doi:10.23938/ASSN.0993
3. Caballero B. Humans against Obesity: ¿Who Will Win? *Adv Nutr*. 2019;10(suppl_1):S4–S9. doi:10.1093/advances/nmy055
4. Barquera S, Hernández-Barrera L, Trejo-Valdivia B, Shamah T, Campos-Nonato I, Rivera-Dommarco J. Obesidad en México, prevalencia y tendencias en adultos. Ensanut 2018-19 [Obesity in Mexico, prevalence and trends in adults. Ensanut 2018-19]. *Salud Publica Mex*. 2020. 62 (6):682–692. Spanish. PMID: 33620965. doi:10.21149/11630
5. Instituto Nacional de Estadística e Informática-INEI. *Perú: Enfermedades transmisibles y no transmisibles, 2019* [National Institute of Statistics and Informatics-INEI. *Peru: Non-Communicable and Communicable Diseases, 2019*]. Lima: INEI; 2020.
6. Hernández-Rodríguez J, Arnold-Domínguez Y, Moncada-Espinal O. Prevalencia y tendencia actual del sobrepeso y la obesidad en personas adultas [Prevalence and trend of overweight and obesity in adults worldwide. Rev Cuba Endocrinol]. *Rev Cuba Endocrinol*. 2020;30(3):1.
7. Pajuelo J, Torres L, Agüero R. Asociación entre obesidad abdominal y factores demográficos, según niveles de altitud en el Perú [Association between abdominal obesity and demographic factors according to altitude levels in Peru]. *An Fac Med*. 2020;81(2):167–173.
8. Hosoya T, Oba S, Komiya Y, et al. Apple-shaped obesity: a risky soil for cytokine-accelerated severity in COVID-19. *PNAS*. 2023;120:22. doi:10.1073/pnas.2300155120
9. Barreto V, Leite TH, Mediano MFF, et al.Association between obesity and COVID-19 mortality and length of stay in intensive care unit patients in Brazil: a retrospective cohort study. *Sci Rep*. 2022;12(1):13737. doi:10.1038/s41598-022-17197-w
10. Popkin BM, Du S, Green WD, et al. Individuals with obesity and COVID-19: a global perspective on the epidemiology and biological relationships. *Obesity Rev*. 2020;21(11). doi:10.1111/obr.13128
11. San Juan M. Promoción de la alimentación saludable en atención primaria y pediatría [Promotion of healthy eating in primary care and pediatrics]. *Rev Electrónica de PortalesMedicos*. 2020;15(6):1.
12. Harvard TH. Chan: el Plato para Comer Saludable [Chan: the Plate for Healthy Eating]. Spanish. Spanish: https://www.hsph.harvard.edu/nutritionsource/healthy-eating-plate/translations/spanish/. Accessed July 16, 2023.
13. American Diabetes Association. ¿What is the Diabetes Plate Method?; 2020. Available from: https://www.diabetesfoodhub.org/articles/what-is-the-diabetes-plate-method.html. Accessed November 14, 2024.
14. Cotonieto E, Rodríguez R. Salud comunitaria: una revisión de los pilares, enfoques, instrumentos de intervención y su integración con la atención primaria [Community health: A review of pillars, approaches, intervention tools and its integration with primary care]. *J Negat No Pos Res*. 2021;2021:393–410.
15. Lafaille-Roncoroni V, Zimmer A, Raynaud S, et al. Prescripción dietética en la obesidad [Dietary prescription in obesity]. *EMC Tratado de Med*. 2023;27(1):1–7. doi:10.1016/S1636-5410(22)47468-X
16. Pajuelo J, Torres L, Agüero R, Bernui LI. El sobrepeso, la obesidad y la obesidad abdominal en la población adulta del Perú [Overweight, obesity and abdominal obesity in the adult population of Peru]. *An Fac Med*. 2019;80(1):21–27. doi:10.15381/anales.v80i1.15863
17. Hidalgo VI, Coelho P, Batista M, et al. Obesidad abdominal en adultos del estado de Pernambuco, Brasil: un estudio epidemiológico de tipo transversal [Abdominal obesity among adults in the State of Pernambuco, Brazil: a cross-sectional epidemiological study]. *Rev Esp Nutr Hum Diet*. 2020;24(3):190–202. doi:10.14306/renhyd.24.3.849
18. Menecier N, Lomaglio DB. Hipertensión arterial, exceso de peso y obesidad abdominal, en mujeres adultas de la Puna de Catamarca. *Argentina Rev Argent Antropol*. 2021;23(2):1. doi:10.24215/18536387e040
19. Aranceta-Bartrina J, Pérez-Rodrigo C, Alberdi-Aresti G, Ramos-Carrera N, Lázaro-Masedo S. Prevalence of general obesity and abdominal obesity in the Spanish adult population (Aged 25-64 Years) 2014-2015: the ENPE Study. *Rev Esp Cardiol*. 2016. 69(6):579–587. English, Spanish. PMID: 27133458. doi:10.1016/j.rec.2016.02.009
20. Zapata ME, Bibiloni Esteva MD, Tur JA. Prevalence of overweight, obesity, abdominal-obesity and short stature of adult population of Rosario, Argentina. *Nutr Hosp*. 2016;33(5):1149–1158. doi:10.20960/nh.580
21. Teachman J. Body weight, marital status, and changes in marital status. *J Family Issues*. 2016;37(1):74–96. doi:10.1177/0192513X13508404
22. García H, Viera AG. Obesidad general y abdominal en mujeres de Hermosillo: prevalencia y factores de riesgo [Obesity and abdominal obesity among women in Hermosillo: prevalence and risk factors]. *Región y Sociedad*. 2021;33:463.
23. Araujo JM, Rivas E, Avila A, et al. Relación entre hipertensión arterial y obesidad central en madres de familia [Relationship between arterial hypertension and central obesity in mothers. ScienceUAT]. *CienciaUAT*. 2015;9(2):53–58. doi:10.29059/cienciauat.v9i2.534

24. Pérez C, Gianzo M, Hervás G, Aranceta J. Prevalencia de obesidad y obesidad abdominal en la población española de 65 y más años de edad: estudio ENPE [Prevalence of obesity and abdominal obesity in the Spanish population aged 65 and over: 250 ENPE study]. *Medicina clínica*. 2022;158(2):49–57. doi:10.1016/j.medcli.2020.10.025
25. Hernández-Gallardo D, Arencibia-Moreno R, Hidalgo-Barreto TJ, Mendoza-López LV, Maqueira-Caraballo de la GC, García-Pena M. Obesidad central en estudiantes universitarios masculinos de Manabí, Ecuador: obesidad central en estudiantes universitarios [Obesity central obesity in male university students from Manabí, Ecuador: central obesity in university students]. *Nutr Clín Diet Hosp*. 2023;43(3):1.
26. Noriega VH. *Efecto de la aplicación del método del* "Plato Saludable" *en la adherencia al Consejo Nutricional de los pacientes diabéticos tipo 2 del Hospital Nacional Cayetano Heredia [Effect of the application of the "Healthy Plate" method on adherence to the Nutritional Advice of type 2 diabetic patients 255 from the Cayetano Heredia National Hospital. Lima, 2018 [Master's Thesis]. Lima: National University of San Marcos]* [Tesis de Maestría]. Lima: Universidad Nacional Mayor de San Marcos; 2019. Available from: https://hdl.handle.net/20.500.12672/11502. Accessed April 24, 2024.
27. Hassan Y, Head V, Jacob D, Bachmann MO, Diu S, Ford J. Lifestyle interventions for weight loss in adults with severe obesity: a systematic review. *Clin Obes*. 2016;6(6):395–403. PMID: 27788558. doi:10.1111/cob.12161
28. Ortega R, Grandes G, Gómez-Cantarino S. Vulnerabilidad de la obesidad definida por el índice de masa corporal, perímetro abdominal y porcentaje de grasa corporal [Vulnerability of obesity defined by body mass index, abdominal perimeter and 260% body fat]. *Atención Primaria*. 2023;55 (2):102523. doi:10.1016/j.aprim.2022.102523
29. Subero E, Mata C, Hernández P. Diseño del plato saludable y apreciaciones de los trabajadores sobre una jornada de educación nutricional [Design of a healthy meal and worker feedback following one day of nutritional education]. *Salud Trab* 2017;25(2):138–146.