

OVERWEIGHT AND OBESITY CARE FROM THE PERSPECTIVE OF FOOD AND NUTRITION SURVEILLANCE IN PRIMARY CARE IN MATO GROSSO DO SUL, BRAZIL: A CROSS-SECTIONAL STUDY

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Highlights: (1) FNS improves overweight and obesity care in PHC. (2) Greater FNS use increases integrative practices. (3) FNS facilitates referral to specialized care. (4) Dietary assessment expands with FNS.

PRE-PROOF

(as accepted)

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ABSTRACT

Aim: To analyze how food and nutritional surveillance (FNS) is incorporated into the care of overweight and obese individuals within Primary Health Care (PHC) in Mato Grosso do Sul (MS), based on the perspective of health professionals. **Methods:** Cross-sectional, quantitative study with PHC professionals in MS using an online questionnaire about the role of health teams in caring for overweight and obesity. The professionals were categorized into: 1) reference to FNS practice, and; 2) Do not consult FNS practice. The chi-square test and linear regression were performed to analyze the difference between the two groups (5% significance). **Results:** Regarding the treatment of overweight and obesity, differences were observed for: Nutritional Care, Early Diagnosis, Promotion of Physical Activity and Medication Treatment. Note that when the team performed FNS, the chance of offering PICs increased (OR= 3.78; 95% CI 1.48 – 9.60), knowledge of referral flows for specialized care (OR=2.99 ;95%CI 1.21–7.38), carrying out an assessment of food consumption (OR=3.72; 95%CI 1.48–9.32) and the unit offering individual care for overweight patients. and obesity (OR=3.70; 95%CI 1.12–12.23). **Conclusion:** The FNS has a positive effect on the care of overweight and obesity in PHC in Mato Grosso do Sul.

Keywords: Primary Health Care; Food and Nutrition Surveillance; Obesity Management.

**CUIDADO DO SOBREPESO E DA OBESIDADE NA PERSPECTIVA DA
VIGILÂNCIA ALIMENTAR E NUTRICIONAL NA ATENÇÃO PRIMÁRIA EM
MATO GROSSO DO SUL: UM ESTUDO TRANSVERSAL**

RESUMO

Objetivo: Analisar como a Vigilância Alimentar e Nutricional (VAN) é incorporada ao cuidado dos indivíduos com sobrepeso e obesidade na Atenção Primária à Saúde (APS) em Mato Grosso do Sul (MS) sob a perspectiva dos profissionais de saúde. **Métodos:** Estudo transversal, quantitativo, com profissionais da APS no MS, utilizando um questionário online sobre o cuidado ao sobrepeso e obesidade. Os profissionais foram categorizados: 1) referem a prática de VAN, e; 2) não referem a prática de VAN. Utilizou-

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se teste do qui-quadrado e a regressão linear para analisar a diferença entre os dois grupos (significância de 5%). Resultados: Em relação ao tratamento do sobrepeso e obesidade, foram observadas diferenças para: Cuidado Nutricional, Diagnóstico Precoce, Promoção de Atividade Física e Tratamento Medicamentoso. Observa-se que, quando a equipe realizava a VAN, aumentou a chance para Práticas Integrativas e Complementares (PICs) (OR= 3,78; IC 95% 1,48–9,60), conhecimento dos fluxos de encaminhamento para atenção especializada (OR=2,99; IC 95% 1,21–7,38), realização de avaliação do consumo alimentar (OR=3,72; IC 95% 1,48–9,32) e a unidade oferecer atendimento individual para sobrepeso e obesidade (OR=3,70; IC 95% 1,12–12,23). Conclusão: A VAN tem um efeito positivo no cuidado ao sobrepeso e obesidade na APS no Mato Grosso do Sul.

Palavras-chave: Atenção Primária à Saúde; Vigilância Alimentar e Nutricional; Manejo da Obesidade.

INTRODUCTION

Overweight and obesity are pressing public health challenges in Brazil and worldwide, contributing significantly to morbidity, mortality, and increased healthcare costs^{1,2,3}. In Brazil, despite the growing prevalence of these conditions, obesity is often underdiagnosed and undertreated in Primary Health Care (PHC). According to the Ministry of Health, only 2.85% of the 105 million Brazilians served by PHC had obesity recorded in their health assessments, a number that does not reflect the real magnitude of the issue^{4,5,6}.

In Mato Grosso do Sul (MS), the situation is particularly concerning: 62.8% of adults are overweight and 27.0% are obese, both above the national averages⁶. The state also has one of the highest mortality rates attributable to excessive weight in Brazil⁷⁻⁹.

By emphasizing PHC actions due to its problem-solving capacity and organization of care within Health Care Networks (HCN), the implementation of Clinical Pathways (CP) for obesity represents an important tool to address the issue and, therefore, deserves attention, particularly in identifying barriers and difficulties, as well as opportunities for its achievement¹⁰. The need to strengthen integrated care, expanded clinical practice, care

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technologies, multidisciplinary teams, and intersectoral actions are pointed out as important strategies for improving the care of overweight and obesity¹¹.

In the context of obesity and overweight CP, integrating HCN with PHC as the coordinator of care, it is necessary to map the territory for planning and acting through health surveillance (HS) activities¹². HS aims for constant observation and analysis of the population's health situation, to promote a set of actions intended to control determinants, risks, and health damages, thereby ensuring integrated care¹². From the perspective of building integrated care for individuals with obesity, HS actions need to be incorporated into the service routine. The monitoring of malnutrition should occur through the execution of FNS, which is presented as a guideline of the National Food and Nutrition Policy (PNAN in Brazilian acronym) for nutritional care in the SUS^{12,13}.

Within the Brazilian Unified Health System (SUS), PHC plays a central role in organizing care and coordinating health promotion and disease prevention actions¹⁰. Among the tools available to PHC teams is Food and Nutrition Surveillance (FNS) — known in Portuguese as *Vigilância Alimentar e Nutricional* (VAN) — a strategic component of health surveillance. FNS consists of the regular collection, analysis, and use of data on food consumption markers and nutritional status to guide decision-making and health planning¹⁴.

In previous research conducted by Reis *et al.* (2021)¹⁵, it was observed that in the city of Rio de Janeiro, regarding obesity care in PHC in 2013, only 20.4% of teams integrated FNS into their work process, and 25.1% scheduled according to obesity risk classification. Another study on the work activities and processes of multidisciplinary teams in obesity care, based on the third cycle of the National Program for Improving Access and Quality of Primary Care, identified that multidisciplinary teams are involved in the care of individuals with obesity, with significant emphasis on team training actions, use of health education documents such as the Dietary Guidelines for the Brazilian population, and FNS implementation. The most promising results were observed in the northeast region, which has more multidisciplinary teams¹⁶.

The management of FNS indicators in PHC is essential for overweight and obesity care, as it supports mapping users who need to be part of the care and monitoring flow that effectively ensures integrated care^{17,18}. Therefore, this study aimed to analyze how

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FNS is incorporated into the care of overweight and obese individuals within Primary Health Care (PHC) in Mato Grosso do Sul (MS), based on the perspective of health professionals.

METHODS

Study design and ethical considerations

This is a descriptive-exploratory, cross-sectional study with a quantitative approach, conducted in the state of Mato Grosso do Sul (MS), Brazil. The study followed the recommendations of Resolution No. 510/2016 of the Brazilian National Health Council (CNS) for research involving human subjects and was approved by the Research Ethics Committee of the Federal University of Mato Grosso do Sul (CAAE: 20532419.0.0000.0021; approval no. 3.981.748). This research was funded by the CNPq/MS/SAS/DAB/CGAN Call No. 26/2018. All participants signed the Informed Consent Form (ICF) prior to data collection.

Sampling and participants

A probabilistic sampling strategy was adopted based on the number of Family Health Facilities registered in the National Registry of Health Facilities (CNES). The target population was composed of PHC professionals working in Family Health Strategy (FHS) teams and related multidisciplinary support teams. Eligibility criteria included: being a formal SUS worker in MS, holding a degree in a health-related field, and being 18 years of age or older.

Data collection procedures

Data were collected using a structured online questionnaire titled “*Diagnosis of Organization, Management, and Nutritional Care Offered to Overweight and Obese Individuals in Primary Health Care.*” This instrument was developed by Higher Education Institutions in partnership with the General Coordination of Food and Nutrition (CGAN) of the Ministry of Health. It comprised 99 questions divided into the following domains: Professional profile (e.g., sex, race/color, educational background, workplace);

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Structure and organization of PHC services; Activities related to the care of overweight and obese individuals; Use of Food and Nutrition Surveillance (FNS) in routine practice.

The questionnaire was administered remotely via the SurveyMonkey® platform. To reach participants, the State Health Department of MS, in collaboration with CGAN, sent official letters to selected health facilities requesting that a professional be designated to respond. Due to initial low response rates, complementary strategies such as outreach via WhatsApp groups and live information sessions were implemented.

Variable definition and data analysis

Respondents were categorized into two groups for comparison: 1. Professionals who reported carrying out Food and Nutrition Surveillance (FNS) in their team's routine; and, 2. Professionals who did not report conducting FNS.

Variables were classified as continuous or categorical. Sample profile variables included location of the health unit, sex, race/color, area of training, and type of facility. Descriptive statistics included relative and absolute frequencies, means, and standard deviations. The Shapiro–Wilk test was applied to assess the normality of distributions. Bivariate analyses between groups were conducted using the chi-square test, with a significance level set at 5%.

A multivariate logistic regression was performed to evaluate the association between routine FNS practice and key individual care strategies, including: Anthropometric and dietary assessments; Knowledge of referral flows for specialized care; Provision of family, nutritional, and psychological care; - Participation in mutual support groups; Offering of Integrative and Complementary Practices (ICP); Promotion of physical activity; and Medication treatment.

The Stepwise Selection method was applied bidirectionally to determine variable inclusion ($p < 0.05$) or exclusion ($p > 0.10$) in the final model. The Variance Inflation Factor (VIF) was used to assess multicollinearity. The logistic regression used robust error variance to account for heteroscedasticity. Model validity was evaluated through the area under the ROC curve (AUC). In order to improve the accuracy of the estimates and validate the robustness of the logistic regression results, the bootstrap resampling

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technique was applied with 1,000 replications. The statistical analysis was performed using Stata® 17.0 software.

To ensure transparency and quality, this article follows the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) recommendations. This study benefited from the use of artificial intelligence (AI) tools for non-substantive support during manuscript preparation. Specifically, AI was employed to improve Stata programming codes used in statistical analyses and to assist with grammar review and clarification of language-related issues in the English version of the manuscript. All scientific interpretations, critical decisions, and content validation were conducted by the authors.

RESULTS

A total of 112 valid responses were obtained from PHC professionals representing 45 (56.96%) of the 79 municipalities in Mato Grosso do Sul. These professionals worked in facilities serving an average of 4,245 individuals (range: 230 to 25,000) and 1,318 families (range: 79 to 5,300) (data not presented in tables).

Most respondents worked in central-type health facilities ($n = 51$; 45.54%), were female ($n = 103$; 91.96%), and self-declared white ($n = 74$; 66.07%). Regarding professional background, the majority were nurses ($n = 79$; 70.53%), followed by nutritionists ($n = 23$; 20.53%), who are mainly responsible for FNS actions. Most worked in Family Health Facilities (FHF). Additional demographic and professional details can be found in Table 01.

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Table 01. Characterization of Responding Professionals Regarding the Care of Overweight and Obese Individuals in Primary Health Care in Mato Grosso do Sul, 2021.

Variable	N	%
<i>Location of the APS Health Facility</i>		
Central Urban	51	45.54
Peripheral Urban	45	40.18
Rural	16	14.29
<i>Respondent's gender</i>		
Male	9	8.04
Female	103	91.96
<i>Race/Color</i>		
Yellow	3	2.68
White	74	66.07
Brown	31	27.68
Black	4	3.57
<i>Undergraduate field of the respondent professional</i>		
Nutrition	23	20.53
Medicine/ Physician	2	1.79
Nursing	79	70.53
Dentistry	2	1.79
Social assistance	2	1.79
Psychology	3	2.68
Fisioterapia	1	0.89
<i>Type of facility where you work</i>		
Basic unit	15	13.39
FHF	80	71.43
NASF - Type I, II ou III	8	7.14
Other*	9	8.04
<i>Did you participate in a training course within the scope of the project to combat and control obesity in the Unified Health System in 2019/2020?</i>		
Yes	15	13.39
No	97	86.61

Does the team you are part of perform FNS in your practice?

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Yes	45	40.18
No	67	59.82

n = 112 respondents.

*Medical Specialty Center/Multidisciplinary Team, Primary Care/PHC Coordination, Multidisciplinary Team, Hospital, Municipal Health Department - Food and Nutrition Public Programs and Policies, Prison Health Unit, and Polyclinic.

**Commissioned Position in the Municipal Health Department and Mais Médicos Program.

NASF – Family Health Support Center

FHF – Family Health Facility

FNS – Food and Nutrition Surveillance.

Concerning territorial FNS indicators, significant differences were observed between the two groups regarding whether the team internally discusses FNS indicators in the territory ($p < 0.001$), the team shares FNS data with municipal management ($p < 0.001$), with the food and nutrition coordination ($p < 0.001$), with the municipal PHC coordination ($p < 0.001$), with users in service groups, and with health professionals from other points of the HCN ($p = 0.046$). More details can be seen in Table 02.

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Table. 02. Use of data from the territory's Food and Nutrition Surveillance for care of Primary Health Care users, Mato Grosso do Sul, 2021.

Variable	Total		Practicing FNS (n=45)		Not practicing FNS (n=67)		p-value
	n	%	n	%	n	%	
In your workplace, within the scope of nutritional care, is data analysis/diagnosis of users and the territory carried out (nutritional status and/or food consumption of users, studies on the determinants of food and nutritional problems in the territory)?							
Yes	50	44.64	34	75.55	11	16.41	0.0001 ^A
No	62	55.36	11	24.45	51	83.59	
Does the team internally discuss the territory's FNS indicators?							
Yes	23	20.54	18	40.00	5	7.46	0.0001 ^A
No	89	79.46	27	60.00	62	92.54	
With which stakeholders do the team share the territory's FNS indicators?							
Municipal health management	20	17.86	15	33.33	5	7.42	0.0001 ^A
Coordination of the Food and Nutrition Technical Area	14	12.50	14	31.11	-	-	-
Coordination of Primary Health Care management	15	13.39	13	28.88	2	2.98	0.0001 ^A
Municipal Health Council	4	3.57	3	6.66	1	1.49	0.148
With users	6	5.36	5	11.11	1	1.49	0.027 ^A
With nutritionists from School Food	3	2.68	3	6.66	-	-	-
Health professionals from other care points	20	17.86	12	26.66	8	11.94	0.046 ^A
Does not share	6	5.36	4	8.88	2	2.98	0.174

n=112 respondents.

A - p-value<0.05.

FNS = Food and Nutrition Surveillance

Regarding FNS actions, it was observed that even those who did not report performing FNS as part of their team's routine indicated that some actions are adopted in the care of people with overweight and obesity.

Following the analysis of professional groups, it was asked which services HCN offers for the care of people with overweight and obesity. Significant differences were

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noted, such as professionals who reported FNS practice presented greater knowledge about the existence of “Health Academy Facilities” ($p=0.048$) and “Specialized Care (SC) and Polyclinics” ($p=0.039$). They were also asked about actions for preventing overweight and obesity in users assisted by their team. When comparing the groups, significant differences were observed for prevention activities based on the Promotion of Adequate and Healthy Eating in unit groups (data not presented in tables).

Regarding the organization of care for people with overweight and obesity, statistically significant differences were observed in the strategies used to organize and coordinate care in terms of “Risk stratification/classification of severity for Overweight and Obesity” ($p=0.009$) and the “Use of clinical protocols and therapeutic guidelines in PHC” ($p=0.023$). Additional results can be found in Table 03.

Table 03. Organization of care for overweight and obese users, Mato Grosso do Sul, 2021.

Variable	Total		Practicing FNS (n=45)		Not practicing FNS (n=67)		p-value
	n	%	n	%	n	%	
What strategies are used to coordinate care for overweight and obese users in the municipality?							
Risk stratification/severity classification for Overweight and Obesity							
Yes	63	56.25	32	71.11	31	46.27	0.009 ^A
No/ There is none in the municipality/ I don't know	49	43.75	13	28.89	36	53.73	
Reference and counter-reference flows defined with the HCN and state and municipal regulations							
Yes	52	46.43	23	51.11	29	43.28	0.415
No/ There is none in the municipality/ I don't know	60	53.57	22	48.89	38	56.72	
Waiting list management (for AE and/or bariatric surgery)							
Yes	51	45.54	22	48.89	29	43.28	0.559
No/ There is none in the municipality/ I don't know	61	54.46	23	51.11	38	56.72	

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Singular Therapeutic Project							
Yes	41	36.61	20	44.44	21	31.34	0.158
No	71	63.39	25	55.56	46	68.66	
Use of clinical protocols and therapeutic guidelines in PHC							
Yes	60	53.57	30	66.67	30	44.78	0.023 ^A
No/ There is none in the municipality/ I don't know	52	46.43	15	33.33	37	55.22	
Use of clinical protocols and therapeutic guidelines in AE							
Yes	34	30.36	18	40	16	23.88	0.069
No/ There is none in the municipality/ I don't know	78	69.64	27	60	51	76.12	
What FNS actions are adopted in the care of overweight and obese people?							
Measurement of weight and height and calculation of BMI (Food and Nutrition Surveillance System - SISVAN e-SUS)							
Yes	101	90.17	44	97.77	57	85.07	0.027*
No/I don't know	11	9.83	1	2.23	10	14.93	
Assessment of food consumption (SISVAN e-SUS)							
Yes	63	56.25	35	77.77	28	86.56	0.0001 ^A
No/I don't know	49	43.75	10	22.23	39	13.44	
Early diagnosis. based on nutritional monitoring, clinical and laboratory tests -							
Yes	74	66.07	37	82.22	37	55.22	0.003 ^A
No/I don't know	38	33.93	8	78.78	30	44.78	
In relation to users indicated for bariatric surgery, what actions are developed by the teams?							
The team recommends that the user seek specialized services							
Yes	80	71.43	33	73.33	47	70.15	0.715
No/I don't know	32	28.57	12	26.67	20	29.85	
The team makes the reference (with opinion, exam results) to the AE							
Yes	76	67.86	33	73.33	43	64.18	0.309
No/I don't know	36	32.14	12	26.67	24	35.82	

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The team receives counter-referrals from other points of care in the network							
Yes	25	22.32	12	26.67	13	19.40	0.365
No/I don't know	87	77.68	33	73.33	54	80.60	
The team monitors the user management until the surgery is made possible.							
Yes	51	45.54	23	51.11	28	41.79	0.332
No/I don't know	61	56.46	22	48.89	39	58.21	
The team provides follow-up after bariatric surgery							
Yes	60	53.57	28	62.22	32	47.76	0.132
No/I don't know	52	46.43	17	37.78	35	52.24	
The team carries out intra and intersectoral actions that promote the comprehensive development of actions in the overweight and obesity care line							
Yes	24	21.43	18	40.00	6	8.96	0.001 ^A
No/I don't know	88	78.57	27	60.00	61	91.04	
Is the team aware that the municipality offers regulation for access to AE?							
Yes	64	57.14	33	73.33	31	46.26	0.005 ^A
No	48	42.86	12	26.67	36	53.74	

n=112 respondents.

A - p-value<0.05.

FNS = Food and Nutrition Surveillance

APS = Primary Health Care

AE = Specialized Care

HCN = Health Care Networks

FHF = Family Health Facility

In terms of care coordination for people with overweight and obesity, it was observed that the group performing FNS referred more frequently to group actions related to care for people with overweight and obesity at health unit/FHF and/or Health Academy Facilities, or similar ($p=0.040$) and reported more referrals to other actions at intersectoral points of action ($p=0.034$) and performed more “Active search for absentees” ($p=0.011$) (data not presented in tables).

Significant differences were observed between groups for questions on care structure and processes, such as “Does the health unit where you work offer individual care related to overweight and obesity?” ($p=0.001$).

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When asked about how overweight and obese users are recruited for individual care, significant differences were also observed between the groups for recruitment through “Nutritional assessment of Bolsa Família Program (PBF) participants” ($p<0.001$), “Health Academy Facilities” ($p=0.034$), and PSE ($p<0.001$).

Regarding treatment strategies employed for the care of individuals, the group who reported FNS practice executed greater variety of strategies, such as “Nutritional Care” ($p=0.015$), “Early Diagnosis, through nutritional monitoring, clinical and laboratory tests” ($p=0.041$), “Provision of integrative and complementary health practices” ($p=0.001$), “Promotion of Physical Activity” ($p=0.001$), and “Medication Treatment” ($p=0.028$).

Concerning the diagnosis and treatment of users with overweight and obesity, the two groups showed significant differences in questions such as “Do overweight and obese users treated at the health unit/FHF have regular access to tests requested by the health team?” ($p=0.017$) and “Does the health unit/FHF have Support Systems for complementary exams (any type) for the diagnosis and treatment of obese individuals?” ($p=0.041$).

There were also significant differences when asked about actions for individuals with severe obesity (indication for bariatric surgery) concerning intra- and intersectoral actions that promote the integral development of overweight and obesity care actions ($p<0.001$), with these actions being much more frequent in the group of professionals who reported FNS practice in the team.

When asked directly about routine FNS activities for monitoring individuals with overweight and obesity, significant differences were observed for “Weight and height measurement for BMI calculation” ($p=0.027$), “Dietary consumption assessment” ($p<0.001$), and “Early diagnosis, through clinical and laboratory tests” ($p=0.003$). These and other results can be found in Table 04.

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Table 04. Treatment strategies for overweight and obese people, Mato Grosso do Sul, 2021.

Variable	Total		Practicing FNS		Not practicing FNS		p-value
			(n=45)		(n=67)		
	n	%	n	%	n	%	
What are the main strategies for treating overweight and obesity carried out in the municipality?							
Family approach							
Yes	78	69.64	36	80	42	62.69	0.051
No	34	30.36	9	20	25	37.31	
Nutritional care							
Yes	96	85.71	43	95.56	53	79.10	0.015 ^A
No	16	14.29	2	4.44	14	20.90	
Psychological care							
Yes	82	73.21	36	80	46	68.66	0.184
No	30	26.79	9	20	21	31.34	
Early diagnosis. based on FNS monitoring. clinical and laboratory tests							
Yes	72	64.29	34	75.56	38	56.72	0.041 ^A
No	40	35.71	11	24.44	29	43.28	
Mutual aid groups							
Yes	21	18.75	12	26.67	9	13.43	0.079
No	91	81.25	33	73.33	58	86.57	
Offering Integrative and Complementary Practices							
Yes	42	37.50	26	57.78	16	23.88	0.001 ^A
No	70	62.50	19	42.22	51	76.12	
Promoting physical activities							
Yes	69	61.61	36	80	33	49.25	0.001 ^A
No	43	38.39	9	20	34	50.75	
Medical treatment							
Yes	53	47.32	27	60	26	38.80	0.028 ^A
No	59	52.68	18	40	41	61.20	

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Does the health facility where you work offer individual care for overweight and obesity?

Yes	82	73.21	41	91.11	41	61.19	0.001 ^A
No /I don't know	30	26.79	4	8.89	26	38.81	

Considering the individual care of overweight and obese people. what are the main ways of attracting these users? (n=82)

Community Health Promotion Activities

Yes	36	43.90	21	51.22	15	36.58	0.182
No /I don't know	46	56.10	20	48.78	26	63.41	

Nutritional assessment of Bolsa Família Program participants

Yes	58	70.73	37	90.24	21	51.22	0.001 ^A
No /I don't know	24	29.27	4	9.76	20	48.78	

Active search

Yes	40	48.78	23	56.10	17	41.46	0.185
No /I don't know	42	51.22	18	43.90	24	58.54	

Referral of users by other public sectors (education, social assistance, etc.)

Yes	43	52.44	23	68.30	20	48.78	0.507
No /I don't know	39	47.56	18	31.70	21	51.22	

Operational or health promotion groups of the Health Unit

Yes	29	35.37	16	39.00	13	31.70	0.488
No /I don't know	53	64.63	25	61.00	28	68.30	

Health Academy Facilities

Yes	27	32.93	18	31.70	9	21.95	0.034 ^A
No /I don't know	55	67.07	23	68.30	32	78.05	

Saúde na Escola Program

Yes	54	65.85	35	85.36	19	46.34	0.001 ^A
No /I don't know	28	34.15	6	14.64	22	53.65	

Do overweight and obese users treated at the unit have regular access to the tests requested (any type) by the health team?

Yes	93	83.04	42	93.33	51	76.12	0.017 ^A
No /I don't know	19	16.96	3	6.67	16	23.88	

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Does the unit have support systems for
complementary exams (any type) for the diagnosis
and treatment of people with obesity?

Yes	59	52.68	29	64.44	30	44.78	0.041 ^A
No /I don't know	53	47.32	16	35.56	37	55.22	

n=112 respondents.

*p-value<0.05.

FNS = Food and Nutrition Surveillance

AE = Specialized Care

Table 05 presents the Odds Ratios for the final logistic regression model, with significant variables related to the likelihood of not carrying out some type of intervention for overweight and obesity care, according to whether the team practices FNS. After adjustment using the bootstrap technique, it was observed that when the team routinely practiced FNS, the likelihood of offering ICPs to individuals with overweight and obesity increased (OR= 3.78; 95% CI 1.48 – 9.60), the team's knowledge of referral flows to AE increased (OR = 2.99; 95% CI 1.21 – 7.38), the team conducted dietary consumption assessments of these individuals (OR=3.72; 95% CI 1.49 – 9.31), and the unit offered specific individual care to people with overweight and obesity (OR = 3.70; 95% CI 1.12 – 12.23). The AUC calculated for the model was 0.8153, and the average VIF of the variables listed in the model was 2.31.

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Table 05. Analysis of the Odds Ratio for professionals who carried out Food and Nutrition Surveillance for care strategies for overweight and obese people, Mato Grosso do Sul, 2021.

Variables	Practicing FNS (n=45)		Not practicing FNS (n=67)		Raw data		Adjusted	
	N	%	n	%	OR	IC 95%	OR	IC 95%
Assessment of food consumption (SISVAN e-SUS)								
No	10	22.2	39	58.2	1		1	
Yes	34	77.8	28	41.8	1.58	(0.72–2.44)	3.72	(1.49 – 9.31)
Regulation for access to Specialized Care?								
No	12	26.6	36	53.7	1		1	
Yes	33	73.4	31	46.3	1.33	(1.40–7.25)	2.99	(1.21 – 7.38)
Offering integrative and complementary health practices								
No	19	42.2	51	76.1	1		1	
Yes	26	57.8	16	23.9	4.36	(1.92 – 9.89)	3.78	(1.48 – 9.60)
Does the health facility where you work offer individual care related to overweight and obesity?								
No	4	8.9	26	38.9	1		1	
Yes	41	91.1	41	61.1	6.5	(2.07 – 20.3)	3.70	(1.12 – 12.2)

Adjusted pseudo R² = 24.55 – Wald test = 27.94 (p=0.0005).

n=112 respondents.

FNS – Food and Nutrition Surveillance

DISCUSSION

This study aimed to analyze the care of overweight and obese individuals in PHC from the perspective of FNS in Mato Grosso do Sul. Overall, the study observed differences among teams practicing FNS, particularly regarding territory diagnosis, management interfaces, social control, and other points of care in the HCN. It was also noted that FNS actions seem to better guide referrals to other PHC services and referrals to specialized care.

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Regarding the characterization of the studied professionals, it was noted that family health teams are predominantly composed of women, self-identified as white, civil servants, divided between central and peripheral health facilities, and located in health unit/FHF, similar to the reality the state and country¹⁹. Respondents were nurses or nutritionists, professions more commonly involved in FNS practices.

Considering the FNS process as an important part of health surveillance, it can beneficially assist in territory mapping, strengthening the bond between professionals and users, and enabling better and more efficient service planning regarding local demands²⁰.

Aligned with this finding, greater stratification/classification of overweight and obesity risk and the use of PHC clinical protocols and therapeutic guidelines were also observed. This is important for integrated overweight care, demonstrating a greater capacity for planning, diagnosis, and intervention. In general, it is observed that FNS has the potential to promote health, prevention, and recovery, related to overweight and obesity, especially within PHC responsibilities^{21,22}.

FNS practice also proved positive for teams regarding referrals to Health Academy Facilities and intra- and intersectoral care practices for overweight and obesity. These factors can be beneficial in the care of overweight individuals, as health professionals become more aware of promoting physical activity and ensuring continued, integrated care with other points of care, achieving better care integration^{4,23}.

Regarding the treatment of overweight and obesity, teams that performed FNS collected more food intake markers, engaged more in active search and qualified listening, offered more individual care for these cases, with higher rates of nutritional care, early diagnosis, complementary therapies such as ICP, physical activity promotion, medication treatment, and established better strategies for continuity of care for overweight and obese individuals.

These observed factors indicate that FNS in PHC territory must be encouraged as a form of primary care for overweight and obese individuals, as differences among teams show that the therapeutic path is better chosen when FNS is part of the team's routine^{17,24}. In addition, it is important to highlight the distinction among teams regarding referrals to actions at other intersectoral points. This demonstrates FNS's potential to promote health

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in other spaces, such as social assistance (Unified Social Assistance System), education (School Health Program), and physical activity promotion (health academy facilities and similar services), demonstrating FNS's intersectoral potential and its interprofessional importance^{15,16,25}.

Thus, teams performing FNS activities appear to know the territory better and can outline the clinical path of obese individuals for the treatment and care of each case. It is essential to emphasize that FNS should be carried out at all points of care in the network, from PHC to hospital care, thus providing information that can support the qualification of comprehensive care for individuals following the Overweight and Obesity Clinical Pathway^{15,17}.

When asked about analyzing territory diagnosis on the determinants of nutritional problems, it was observed that most interviewed professionals do not perform FNS. This may be a limitation in services, as the absence of FNS practices may result in a lack of information about the territory and the obese individual, and the lack of a framework of FNS data references for decision-making. Health teams performing FNS, however, showed significant results in data analysis/diagnosis of users and the territory within nutritional care, all due to understanding the real needs of the population served and the knowledge of the territory to implement nutritional intervention measures²⁶.

Professionals who adopt FNS actions in their practice know where to capture these users in other sectors, such as social assistance and education, showing the intersectoral nature that can be fostered through FNS. This movement to capture overweight and obese users can impact early diagnosis through nutritional monitoring, clinical and laboratory exams, in addition to facilitating the provision of integrative and complementary health practices, physical activity promotion, and medication treatment^{15-17,25}.

Teams practicing FNS also make more referrals for operational group actions related to care for overweight and obese individuals in health unit/FHF and/or health academy facilities or similar. This is important for the care of overweight and obese individuals, as it explores therapeutic possibilities with scientifically proven impacts on managing this condition. Thus, FNS can serve as a robust tool within PHC, based on PNAN principles, for nutritional care in SUS^{13,27}.

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Regarding care coordination and continuity of care for overweight and obese individuals, no differences were observed between the two analyzed groups for individuals with severe obesity (referral for bariatric surgery assessment). This may be due to the fact that, so far, there is no regional or state flow for obese individuals in the HCN of Mato Grosso do Sul. This represents a weakness, as the organization of care requires the clear establishment of agreed-upon care pathways²⁸.

Teams adopting FNS in their professional practice reported that at health unit/FHF, overweight and obese individuals have regular access to tests requested (routine and complementary) by the health team, which may indicate greater team empowerment in decision-making and greater awareness of the equipment and processes available in SUS for overweight therapy. Thus, FNS can play an essential supportive role in PHC, which should be resolute and articulate with other levels of health care, medium and high complexity²⁶.

The study's limitations include the data collection period during the COVID-19 pandemic, in which responding professionals faced a heavy workload and, in some cases, role reassignment, which may have hindered information completion. Another factor is the sample calculated for the state of Mato Grosso do Sul, which included 631 health facilities, but the study obtained responses from only 112. This compromise results in extrapolation, and the study's conclusions may be limited to the responding municipalities (45 municipalities). However, the state does not have another diagnosis of overweight and obesity care from the FNS perspective, which makes the information contained here of significant relevance to HCN organization.

CONCLUSION

In conclusion, FNS presents itself as an important PHC tool in the comprehensive care of overweight and obese individuals, being essential for mapping processes, reception, therapeutic direction, and monitoring results.

Thinking about strengthening and expanding the HCN through a well-targeted and resolute overweight and obesity CP, FNS is one of the main indicators produced in PHC to monitor the obesity situation in the SUS context. The positive outcomes associated

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with FNS implementation in PHC highlight its potential to optimize clinical pathways for obesity management.

These results may guide public health managers in allocating resources, improving care delivery, and prioritizing surveillance-based approaches in the development of comprehensive health strategies. Therefore, it is necessary that policy measures, programs, and actions that value FNS be integrated, especially in PHC, to qualify care, planning, and monitoring of the situation in the country.

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