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RESEARCH ARTICLE (ORIGINAL)

Prevalence of Childhood Obesity and Lifestyle Habits in Preschool Children: A Cross-Sectional Study in Community Nursing

Prevalência de Obesidade Infantil e Hábitos de Vida em Idade Pré-Escolar: Estudo Transversal em Enfermagem Comunitária

Prevalencia de la Obesidad Infantil y Hábitos de Vida en la Edad Preescolar: Estudio Transversal en Enfermería Comunitaria

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Abstract
Background: Childhood obesity among preschool-aged children is a public health problem associated with behavioral and family-related factors. Identifying lifestyle habits can guide nursing interventions.
Objective: To characterize the lifestyle habits and weight status of preschool-aged children and analyze their association with parental sociodemographic characteristics.
Methods: A cross-sectional, observational study was conducted in a municipality in northern Portugal, involving preschool-aged children and their parents. A questionnaire on dietary habits, sleep, physical activity, and parental sociodemographic variables was administrated, along with an assessment of nutritional status using body mass index. Descriptive analyses and association tests were performed at a 5% significance level.
Results: Overweight was identified in 13.5% and obesity in 8.9% of the children. with Weight status was associated with maternal educational attainment. Although adequate lifestyle habits predominated, risk behaviors were identified.
Conclusion: The findings reinforce the importance of systematically assessing lifestyle habits and nutritional status, as well as the role of nurses in the early identification of risk factors and the promotion of healthy lifestyles.

Keywords: childhood obesity; health literacy; nursing care; lifestyle; community health nursing

Resumo
Enquadramento: A obesidade infantil em idade pré-escolar é um problema de saúde pública associado a fatores comportamentais e familiares. A identificação de hábitos de vida orienta intervenções em enfermagem.
Objetivo: Caracterizar os hábitos de vida e o perfil ponderal de crianças em idade pré-escolar e analisar a associação com características sociodemográficas parentais.
Metodologia: Estudo observacional transversal realizado num concelho do norte de Portugal, com crianças em idade pré-escolar e pais. Aplicou-se um questionário sobre hábitos alimentares, sono, atividade física e variáveis sociodemográficas parentais, complementado pela avaliação do estado nutricional através do índice de massa corporal. Realizaram-se análises descritivas e testes de associação, com significância de 5%.
Resultados: Verificou-se excesso de peso em 13,5% e obesidade em 8,9% das crianças. O perfil ponderal associou-se à escolaridade materna. Apesar de predominarem hábitos adequados, identificaram-se comportamentos de risco.
Conclusão: Reforça-se a importância da avaliação sistemática dos hábitos de vida e do estado nutricional, bem como do papel dos enfermeiros na identificação precoce de riscos e promoção de estilos de vida saudáveis.

Palavras-chave: obesidade infantil; literacia para a saúde; cuidados de enfermagem; estilo de vida; enfermagem em saúde comunitária

Resumen
Marco contextual: La obesidad infantil en edad preescolar constituye un problema de salud pública, asociado a factores conductuales y familiares. Identificar los hábitos de vida orienta las intervenciones de enfermería.
Objetivo: Caracterizar los hábitos de vida y el perfil ponderal de niños preescolares y analizar su asociación con las características sociodemográficas parentales.
Metodología: Estudio observacional y transversal realizado en un municipio del norte de Portugal, con niños preescolares y sus padres. Se aplicó un cuestionario sobre alimentición, sueño, actividad física y variables sociodemográficas parentales, junto con la evaluación del estado nutricional mediante el índice de masa corporal. Se realizaron análisis estadísticos descriptivos y pruebas de asociación, con un nivel de significación del 5%.
Resultados: Se observó una prevalencia significativa de sobrepeso y obesidad, y se vinculó el perfil de peso infantil con hábitos de vida y características parentales, especialmente con el nivel de estudios de la madre. Aunque predominan hábitos adecuados, también se observaron comportamientos de riesgo.
Conclusión: Se refuerza la importancia de evaluar los hábitos de vida y el estado nutricional y el papel de los enfermeros en la detección precoz de riesgos y en la promoción de estilos de vida saludables.

Palabras clave: obesidad infantil; alfabetización en salud; cuidados de enfermería; estilo de vida; enfermería en salud comunitaria

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Introduction

Childhood obesity is an increasing public health concern, with a direct impact on health, development, and well-being throughout the life course (World Health Organization [WHO], 2021). It is a chronic, multifactorial condition that, when established early, is strongly associated with the persistence of overweight into adulthood and an increased risk of developing cardiovascular, metabolic, and psychological disorders (WHO, 2021).

During the early years of life, parents and caregivers play a central role in shaping children's dietary habits, sleep patterns, and physical activity. In this context, parental health literacy emerges as a key factor in the adoption of health-promoting behaviors. Health literacy, understood as the ability to access, understand, appraise, and apply relevant information to everyday decision-making, has been widely recognized as a predictor of better health outcomes, particularly in family settings (Nutbeam, 2008; Sanders et al., 2009).

The aim of this study was to characterize the lifestyle habits and weight status of preschool-aged children and to analyze their association with parents' sociodemographic factors, highlighting implications for community nursing.

Background

Childhood obesity is a chronic, multifactorial condition affecting millions of children worldwide, and its prevalence continues to rise. According to the WHO (2021), approximately 39 million children under age five were overweight or living with obesity in 2020. This condition is linked to a higher risk of overweight persisting into adulthood and to the early onset of chronic diseases, including type 2 diabetes, hypertension, dyslipidemia, and certain cancers. Beyond metabolic and cardiovascular implications, childhood obesity is often associated with respiratory difficulties, orthopedic complications, low self-esteem, and poorer school performance (WHO, 2021; Direção-Geral da Saúde [DGS], 2023).

In Portugal, data from the Childhood Obesity Surveillance Initiative (COSI) indicate that approximately 29.6% of children are overweight and 12% have obesity, placing the country among the most affected in Europe (Rito et al., 2021). At the local level, clinical records from the Local Health Unit of Matosinhos (ULSM) indicate a prevalence of childhood obesity of 5.1%, although limitations related to underreporting and the lack of systematic screening strategies are acknowledged (ULSM, 2023).

The early years of life are a crucial window for promoting healthy lifestyles (DGS, 2023). Behaviors such as adequate dietary intake, regular physical activity, quality sleep, and limited screen time are protective against childhood overweight. However, these behaviors are closely tied to the family context, particularly parents' ability to interpret, apply, and value health-related information (Marmot et al., 2020; Sanders et al., 2009).

Parents' health literacy has been recognized as a critical determinant of children's health. Low health literacy may limit the adoption of health-promoting behaviors and hinder the appropriate use of available services. Studies have shown that children whose parents have low health literacy are more likely to develop obesity, particularly in contexts of socioeconomic vulnerability (Chari et al., 2014; Sanders et al., 2009)

In this context, nurses—especially those in primary health care and schools—are crucial for the early detection of risk factors and empowering parents. Their close interaction with families allows them to develop continuous educational interventions suited to the sociocultural background, emphasizing healthy lifestyle promotion from childhood (Ordem dos Enfermeiros [OE], 2018; Whitehead et al., 2021). Hence, understanding the factors linked to childhood overweight and parents' health literacy is vital for guiding evidence-based clinical practices and addressing health disparities.

Given the theoretical framework presented, this study sought to address the following research hypotheses:

H1**:** Preschool-aged children with less healthy lifestyle habits have a higher prevalence of overweight and obesity.

H2**:** There are associations between parents' sociodemographic characteristics and children's nutritional status.

Methodology

This study used an observational, cross-sectional, and descriptive design to characterize the lifestyle habits and weight status of preschool-aged children in a municipality in northern Portugal and to analyze their association with parental sociodemographic characteristics. This design allows phenomena to be described at specific points in time and is frequently used in public health and community nursing to identify patterns and intervention needs (Polit & Beck, 2021).

The sample included 517 parents and guardians of children aged 3 to 6 years attending public, private, and social solidarity schools in Matosinhos. Convenience sampling was used, with inclusion criteria being the child's enrollment in a local educational institution and the parents' consent to complete an online survey. The minimum sample size was estimated at 385 participants, based on an unknown population proportion, a 5% margin of error, and a 95% confidence level.

Data were collected between April and May 2024 via a Microsoft Forms questionnaire, made available via a QR code and disseminated through educational institutions, healthcare services, and ULSM institutional channels. The survey was self-administered, ensuring participant anonymity and compliance with ethical and data protection standards in accordance with the General Data Protection Regulation (GDPR), with approval from the ULSM Ethics Committee.

The questionnaire comprised four main dimensions: sociodemographic and anthropometric data on the child and caregivers; dietary habits, assessed using the 16 items of the Mediterranean Diet Quality Index for Children and Adolescents (KIDMED), supplemented by one

question on the daily consumption of sugar-sweetened beverages (Serra-Majem et al., 2004); physical activity and sedentary behavior, assessed using two dichotomous questions regarding the performance of 60 minutes of physical activity per day and exposure to less than one hour of screen time per day; and sleep, assessed using three dichotomous questions regarding total daily sleep duration, nighttime awakenings, and bedtime.

The KIDMED assesses adherence to the Mediterranean diet through 16 positively or negatively scored items and classifies the results into three categories: low adherence (≤3), moderate adherence (4–7), and high adherence (≥ 8; Serra-Majem et al., 2004). The additional question on the consumption of sugar-sweetened beverages was not included in the calculation of the KIDMED score. The cut-off values used for the physical activity, screen time, and sleep duration indicators were based on the World Health Organization recommendations for children under 5 years of age (WHO, 2019). Questions regarding nighttime awakenings and bedtime were analyzed individually. To minimize potential sources of error, the questionnaire was pretested for clarity and comprehensibility, and data collection was conducted in a standardized, anonymous, and confidential manner. Uniform criteria were established for classifying the children's nutritional status. The KIDMED was scored according to the procedure described by its authors; questions on physical activity, screen time, and sleep were analyzed as dichotomous indicators, and no scores attributable to the Pre-PAQ or CSHQ-PT were calculated.

Data were analyzed using IBM SPSS Statistics, version 28. Categorical variables were summarized with absolute and relative frequencies, and continuous variables were summarized with means and standard deviations. To assess the association between sociodemographic variables and children's weight status (normal weight, overweight, and obesity), Pearson's Chi-square Test and Fisher's Exact Test were used, with statistical significance set at $p < 0.05$.

Results

A total of 517 parents and guardians of preschool-aged children participated in this study. The majority of the children were female (51.7%), and most of the children attended public schools (58.0%), as presented in Table 1. Approximately 80% of the children were registered with ULSM Primary Health Care services.

Table 1

Sociodemographic characteristics of the sample

Variable	*n* (%)
Sex (Female)	268 (51.8%)
Sex (Male)	249 (48.2%)
Public school	300 (58.0%)
Social solidarity school	121 (23.4%)
Private school	96 (18.6%)

Note. *n* = Number; % = Percentage.

Regarding the children's weight status, 77.4% had a normal BMI, 13.5% were overweight, and 8.9% had obesity. The mean BMI was 16.1 kg/m² (*SD* = 3.4). The prevalence of obesity was slightly higher among children aged 4 and 5 years (9.7% and 9.3%, respectively), as shown in Table 2. Figure 1 illustrates the overall distribution of nutritional status.

Table 2

Nutritional status by age

Age	Mean BMI (SD)	Obesity (%)	Overweight (%)	Adequate BMI (%)
3 years	16.2 (2.9)	7.8%	10.8%	81.4%
4 years	16.0 (2.6)	9.7%	11.8%	78.5%
5 years	16.4 (4.4)	9.3%	16.4%	74.3%
6 years	15.8 (2.5)	8.0%	13.6%	78.4%

Note. *BMI* = Body mass index; *SD* = Standard deviation; *%* = Percentage.

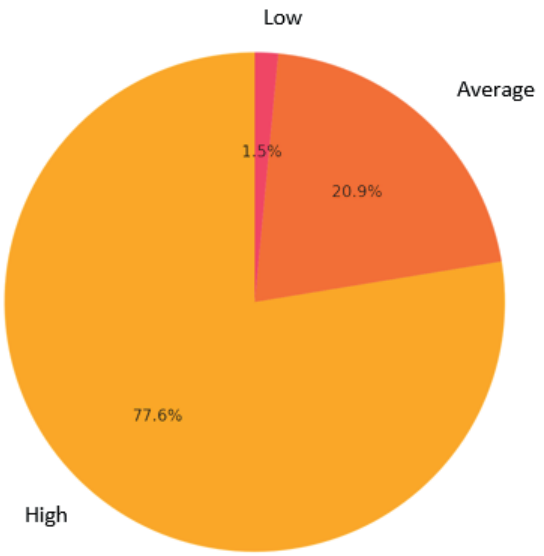
Among caregivers, 43.8% of mothers and 25.5% of fathers were overweight, while 12.7% of mothers and 14.4% of fathers had obesity. The majority of mothers (52.6%) and fathers (48.5%) were between 30 and 40 years of age. In terms of educational attainment, more than 50% of mothers had a higher education degree (bachelor's or postgraduate degree), compared with approximately 36.5% of fathers.

Figure 1 presents the distribution of adherence to the Mediterranean diet, with 77.6% of the children showing high adherence.

Although overall adherence to the Mediterranean diet was good, less healthy dietary practices, such as skipping breakfast or low cereal consumption, were more frequent among children with overweight or obesity. However, no statistically significant association was observed between the KIDMED score and weight status ($p > 0.05$).

Figure 1

Adherence to the Mediterranean diet



A statistically significant association was observed between maternal educational attainment and children's weight status ($\chi^2 = 20.035$; $p = 0.003$), whereas the association with maternal monthly income was not statistically significant ($p = 0.097$), as shown in Table 3.

Table 3

Association between maternal sociodemographic variables and children's weight status

Variable	Chi-square score	*df*	*p*
Mother's educational attainment	20.035	6	0.003
Mother's monthly income	7.868	4	0.097

Note. *df* = Degrees of freedom; *p* = Significance value.

Regarding health behaviors, 77.6% of the children showed high adherence to the Mediterranean diet, 50.7% engaged in 60 minutes of physical activity per day, 59.1% had less than one hour of screen exposure per day, 71.0% slept more than 10 hours per day, and 28.7% went to bed before 9:00 p.m., as shown in Table 4.

Table 4

Children's health behaviors

Indicator	*n* (%)
High adherence to the Mediterranean diet	260 (77.6%)
60 minutes of physical activity per day	170 (50.7%)
Less than 1 hour of screen time per day	198 (59.1%)
More than 10 hours of sleep per day	238 (71.0%)
Bedtime before 9:00 p.m.	96 (28.7%)

Note. *N* = 335 valid responses; *n* = Number; % = Percentage.

While children generally adhered well to the Mediterranean diet, those with overweight or obesity more often engaged in less healthy dietary habits, like skipping breakfast or eating fewer cereals. Nonetheless, no significant link was found between the KIDMED score and weight status (p>.05).

Discussion

The results of this study reveal a notable prevalence of overweight (13.5%) and obesity (8.9%) among preschool-aged children in a municipality in northern Portugal, figures consistent with national averages and with data from the COSI Portugal study (Rito et al., 2021). These findings underscore the need for prompt early interventions to curb childhood obesity, especially during a critical period when dietary, sleep, and physical activity habits are still forming.

Most children adhered well to the Mediterranean diet; however, certain risky practices were noted, such as skipping breakfast and not consuming enough whole grains. Research links these behaviors to increased risks of obesity, insulin resistance, and appetite control issues (Kral et al., 2011; Ricotti et al., 2021; Steffen et al., 2003). These patterns may stem from family habits as well as socioeconomic and cultural obstacles.

The significant association between children's weight status and the mother's educational attainment, along with the observed trend in monthly household income, underscores the influence of social determinants of health. Current evidence shows that lower education and income levels are strongly associated with poorer child health outcomes, including obesity, oral health, sleep, and psychosocial development (Marmot et al., 2020; Vazquez & Cubbin, 2020). These factors should be considered when planning culturally sensitive, equity-oriented nursing interventions. In this context, the essential role of nurses in promoting parents' health literacy is particularly noteworthy, not only as health educators but also as professionals equipped to implement autonomous and sustained interventions. Parents' health literacy is especially relevant to the adoption of health-promoting behaviors in children (Sanders et al., 2009). Improving parents' health literacy may promote behavioral change, encourage the adoption of healthy habits, and, in the medium term, reduce the risk of chronic noncommunicable diseases.

Besides nutrition education, nurses are equipped to address sleep, physical activity, and screen use—areas that are often not systematically examined during child health surveillance visits, depending on the child's age and existing national programs. Nonetheless, these areas are vital in tackling childhood obesity. Nurses' autonomous practice, especially within primary health care and school health settings, allows for the planning and execution of structured, ongoing interventions that extend beyond simply providing information, fostering family empowerment and creating environments conducive to health (OE, 2018; Whitehead et al., 2021).

Recent studies recommend multicomponent interventions in community settings that integrate educational actions with behavioral counseling, home visits, and intersectoral collaboration (Brown et al., 2019; Whitehead et al., 2021). Given their proximity to families and continuity of care, nurses are uniquely positioned to implement these approaches and assume a leadership role in the local response to childhood obesity.

In summary, the findings of this study highlight the need to strengthen childhood obesity prevention strategies in community settings, with a focus on socioeconomic factors and lifestyle habits. Nursing interventions should promote not only weight monitoring but also parental empowerment to support informed, healthy choices. Valuing nurses' autonomous practice, combined with family-centered intervention models, offers a strategic opportunity to improve health outcomes from childhood onward.

This study has several limitations that should be considered when interpreting the results. First, the cross-sectional design precludes establishing causal relationships among the variables analyzed. Although the sample was relatively large, it was obtained through convenience sampling, which may limit the generalizability of the findings to other populations. The information collected was based on parents' self-report, which may introduce social desirability bias or reporting errors, particularly regarding children's weight, height, and behaviors. In addition, genetic, hormonal, or clinical factors that may influence children's weight status were not assessed.

Conclusion

This study characterized the lifestyle habits and weight status of preschool-aged children, revealing a notable prevalence of overweight and obesity, as well as associations with parents' sociodemographic characteristics, particularly the mother's educational attainment.
Although lifestyle habits were generally considered adequate, modifiable risk behaviors persist, reinforcing the importance of surveillance and early intervention. The findings identify priority areas for nursing practice, particularly in promoting healthy lifestyles and strengthening parents' empowerment.
Although health literacy was not directly assessed, the findings underscore the importance of nursing interventions that promote parents' understanding and informed adoption of health-promoting behaviors, thereby contributing to the prevention of childhood obesity and the reduction of health inequalities from the earliest years of life.

Author contributions

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Visualization: Costa, A. C., Silva, L.
Writing – original draft: Costa, A. C., Silva, L.
Writing – review & editing: Costa, A. C., Correia, J., Silva, L.

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