Family violence and body mass index among adolescents enrolled in the Bolsa Família Program and treated at a primary care clinic

Violência familiar e índice de massa corporal em adolescentes atendidos no Programa Bolsa Família numa unidade básica de saúde

La violencia familiar y el índice de masa corporal en adolescentes atendidos en el Programa Bolsa Familia en una unidad básica de salud

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Abstract

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This article aimed to investigate the relationship between family violence and body mass index (BMI) in adolescents whose families were enrolled in the Bolsa Família Program. The cross-sectional study included 201 adolescents of both sexes, 10 to 19 years of age, in Rio de Janeiro, Brazil, 2008-2009. BMI and physical, psychological, and verbal abuse of adolescents by their parents were evaluated. The association between family violence and BMI was measured via linear regression models. In girls, verbal abuse was directly associated with BMI, showing a significant mean increase of 2.064, 2.438, and 2.403 in BMI when perpetrated by the mother, father, and both parents, respectively. Among boys, family violence was associated with lower BMI (but without reaching statistical significance). The findings point to the need for innovative practices and approaches in the nutritional care of adolescents enrolled in the Bolsa Família Program, considering family violence as a contributing factor to inadequate nutritional status.

Domestic Violence; Body Mass Index; Nutritional Status; Adolescent

Resumo

Este artigo objetivou investigar a relação entre violência familiar e índice de massa corporal (IMC) de adolescentes do Programa Bolsa Família. Foi um estudo transversal com 201 adolescentes de 10-19 anos, de ambos os sexos, no Município do Rio de Janeiro, Brasil, em 2008-2009. O IMC e as violências física, psicológica e agressão verbal entre pais e o adolescente foram avaliados. A associação entre a violência e IMC foi medida via modelos de regressão linear. Nas mulheres, a agressão verbal foi associada de forma direta ao IMC, com um aumento em média significativo de 2,064, 2,438 e 2,403 de IMC quando perpetrada pela mãe, pelo pai e por ambos os pais, respectivamente. Já entre os homens, verificou-se que a presença de agressão se associou com IMC mais baixos (resultados não significativos). Esses achados apontam para a necessidade de inovações na abordagem prática quanto ao atendimento nutricional dos adolescentes beneficiados pelo Programa Bolsa Família, levando em consideração a violência familiar, como mais um fator relacionado ao estado nutricional inadequado.

Violência Doméstica; Índice de Massa Corporal; Estado Nutricional; Adolescente

Introduction

Population nutritional status has been targeted for public health attention [1,2]. Measures initially focused on preventing and fighting undernutrition [3]. However, changes in economic, social, demographic, and eating patterns in recent decades have led to changes in health and nutrition policies, expanded to incorporate interventions against overweight and obesity [4].

In Brazil, the results of the *Family Budgets Survey* [5] showed an increase in excess weight and a decrease in underweight in all the country's geographic regions and income strata. From 2008 to 2009, 20.5% of adolescents showed excess weight and 4.9% were obese, while only 3 to 4% were underweight.

According to the Brazilian Ministry of Health [6], the increasing rates of overweight and obesity in the country's population can be explained by the consumption of high calorie-density and nutritionally poor foods, associated with lower energy expenditure due to the reduction in physical activity. As discussed by Enes & Slater [7], changes in eating patterns and obesity in adolescents have been associated with the early emergence of comorbidities and emotional disorders. Excess weight has been associated with both adolescents' behavior and other factors [8] that influence food intake and physical activity, such as the physical, social, and economic environment [9]. Evidence suggests that biological, behavioral, and environmental factors interrelate and reinforce each other to produce inadequate nutritional status [7].

Environmental factors include family violence, which has received increasing attention in recent years due to its consequences for physical and mental health and overall morbidity and mortality [10].

The literature is recent on the relationship between family violence and inadequate nutritional status in adolescents. Studies have generally shown that young people exposed to violence among family members are more prone to excess weight [11,12,13,14,15]. Various factors point in this direction. According to some authors, exposure to violence in childhood can lead to greater food intake and facilitate the development of obesity, which can persist into adulthood [12,15].

In addition, the fact that health professionals ignore cases of violence, aggravated by their lack of experience in approaching the subject of nutritional status, hinders their understanding of the association between physical and/or psychological abuse against adolescents, eating disorders, and inadequate nutritional status [16]. Thus the current study investigated the association between body mass index (BMI) and family violence suffered by adolescents enrolled in the conditional cash transfer program known as Bolsa Família.

Methods

The survey was conducted in the Hélio Pellegrino Polyclinic in Rio de Janeiro, one of the units providing care to beneficiaries of the Bolsa Família Program [17]. The unit is responsible for providing care to beneficiaries residing in Program Area 2.2 (AP 2.2), which includes the Praça de Bandeira and Morro do Turano neighborhoods. The current study used data from evaluation reports from August 2008 to August 2009 on 434 families enrolled in Bolsa Família.

In 2008 and 2009, a convenience sample of 386 adolescents was monitored by the nutrition department. Of these, 201 adolescents (52%) from 10 to 19 years of age who were in physical condition for taking anthropometric measurements were selected for the survey and assessed by the study project's principal investigator. A total of 185 adolescents (48% of the original sample) were excluded for the following reasons: pregnancy or first trimester postpartum, adolescents with diseases affecting their nutritional status (genetic deficiencies), difficulties in understanding the questionnaire (hearing impairment), and those assessed by health professionals other than the project's investigator.

Data were obtained with a pretested, validated questionnaire that included questions on the outcome variable (continuous BMI), central exposure (family violence), and covariates (adolescent's socio-demographic characteristics, sexual maturation, and body image).

Evaluation of nutritional status was based on weight and height measurements taken with a Filizola scale, model 31 (Filizola S.A., São Paulo, Brazil) including a stadiometer with a capacity of 150kg, accurate to 100g, and a scale in millimeters, according to the standards recommended by the Food and Nutritional Surveillance System (SISVAN) [18]. These measurements are used to calculate BMI [weight(kg)/height(m^2)], classified by percentile criteria according to sex and age bracket as proposed by the World Health Organization (WHO) [19], which defines underweight as BMI < 3, normal weight as BMI $\geq$ 3 and $\leq$ 85, overweight as > 85 and $\leq$ 97, and obesity > 97, and numerically (continuous BMI).

Height measurement was classified according to height-for-age index, with low height defined as below the 3rd percentile and adequate height as greater than or equal to the 3rd percentile [19].

Family violence was assessed with two validated instruments that measured physical, verbal, and psychological abuse against the adolescents.

Verbal aggression and physical abuse were assessed using the Portuguese-language version of the *Conflict Tactics Scales* (CTS-1) [20]. The study focused on relations between the parents (father and mother) and the adolescents. The scales for verbal aggression (items d, e, f, h, i, j), minor physical assault (items k, l, m), and serious physical assault (items n, o, p, q, r, s) were categorized as follows: had not occurred in the relationship versus had occurred at least once in the relationship [21]. The questions were addressed to cover the 12 months prior to the interview.

Psychological abuse was assessed using a Portuguese-language adaptation [22] of the *Psychological/Verbal Abuse Scale* [23]. The adapted scale consists of 18 closed items, with five possible answers: never, rarely, sometimes, almost always, and always, scored as 1, 2, 3, 4, and 5, respectively. The scoring was done by adding the scores for each item and dividing by the total points that each adolescent could score on the questionnaire, and multiplying by 100 to express percentage points. Presence or absence of psychological abuse was defined by the median in relation to the 18 items in the scale [24]. A score greater than or equal to the median was defined as presence of psychological abuse.

Covariates included the adolescents' following individual characteristics: age, sex, race/color (black vs. non-black), schooling, sexual maturation, and body image.

Sexual maturation was self-rated by viewing the Tanner table with photos corresponding to the five stages of pubertal development [25].

Body image was obtained by self-assessment with five levels of satisfaction: very satisfied, satisfied, reasonably satisfied, dissatisfied, and very dissatisfied, using a scale covering specific body areas [26]. Body image classified for "all parts of the body" was dichotomized as satisfactory (combining very satisfied and satisfied) vs. unsatisfactory (combining reasonably satisfied, dissatisfied, and very dissatisfied).

Data storage and analysis used Epi Info 2000 (Centers for Disease Control and Prevention, Atlanta, USA). The means for the dependent variable (BMI) were compared to the covariates by sex using the Student t-test. Spearman's correlation test was used to estimate the association between age and BMI.

Simple linear regression was used to analyze crude associations between the exposure and outcome variables. In the multivariate analysis, linear regression models were adjusted by the covariates that presented associations with $p < 0.10$ in the crude analyses. All the analyses were conducted separately for boys and girls, since the factors that affect BMI differ between the sexes in adolescents. Statistical significance was set at $p < 0.05$ in the multiple linear regression model.

The models were tested with Cook's distance and showed good fit after excluding data points with a large influence on the results.

The study was approved by the Ethical Research Committee of the Rio de Janeiro Municipal Health Department (*Ruling n. 122A/2007*). The study only included adolescents that agreed to participate and who signed (together with their parents or guardians) the free and informed consent form authorizing their participation.

Results

The sample study consisted of 201 adolescents, including 110 girls (54.7%) and 91 boys (45.3%). As shown in Table 1, mean age was 12.9 years [standard deviation (SD) = 2.24]. The majority (71.6%) classified themselves as black, nearly all (92.4%) were enrolled in primary school, and more than 70% reported a satisfactory body image.

As for growth and development, most of the adolescents were in the final stage of sexual maturation, and the majority presented adequate height-for-age (96.5%). As for nutritional disorders, 18.4% showed excess weight (overweight and obesity), while only 4.5% were underweight. Obesity was three times more prevalent in girls, while underweight was four times more frequent in boys.

Table 2 shows the prevalence of family violence against the adolescents. Verbal abuse was the most frequently reported form of violence (n = 167, 83.1%) and was more common in girls (91.8%). Psychological abuse was also more frequent in girls (53.6%). As for physical violence, in general the rates decreased as the severity of the violent act increased. However, girls reported higher rates of minor physical abuse (51.8%), while boys reported more serious physical abuse (33%).

According to Table 3, the crude analyses between the variables and BMI showed statistically significant differences between mean BMI and race/color and age for both boys and girls. BMI increased with age in both girls (r = 0.678; $p < 0.001$) and boys (r = 0.475; $p < 0.001$). Adolescents that classified themselves as black showed higher mean BMI than non-blacks. In girls, the difference in mean BMI was also statistically significant according to sexual maturation

Table 1

Characteristics of adolescents enrolled in the Bolsa Família Program and treated at a primary care clinic, according to sex. Rio de Janeiro, Brazil, 2008-2009.

Variables	Total sample		Females		Males	
	N	%	n	%	n	%
Categorical variables						
Sex	201		110	54.7	91	45.3
Race/color						
Non-black	57	28.4	32	29.1	25	27.5
Black	144	71.6	78	70.9	66	72.5
Body image						
Satisfactory	147	73.1	83	75.5	64	70.3
Unsatisfactory	54	26.9	27	24.5	27	29.7
Schooling						
Primary	182	92.4	94	88.7	88	96.7
Secondary	15	7.6	12	11.3	3	3.3
Sexual maturation						
Menarche	-	-	76	69.1	-	-
Pre-puberty	39	19.4	8	7.3	31	34.1
Puberty	162	80.6	102	92.7	60	65.9
Height-for-age						
Low height-for-age	7	3.5	2	1.8	5	5.5
Adequate height-for-age	194	96.5	108	98.2	86	94.5
Nutritional status						
Underweight	9	4.5	2	1.8	7	7.7
Normal weight	155	77.1	86	78.2	69	75.8
Overweight	27	13.4	15	13.6	12	13.2
Obesity	10	5,0	7	6.4	3	3.3
Numerical variables	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Age	12.9	2.24	13.21	2.34	12.61	2.10
Weight	46.7	12.8	48.98	11.94	43.92	13.30
Height	1.53	0.11	1.54	0.09	1.52	0.13
BMI	19.63	3.63	20.51	3.79	18.57	3.15

SD: standard deviation; BMI: body mass index.

Table 2

Prevalence of family violence among adolescents enrolled in the Bolsa Família Program and treated at a primary care clinic, according to sex. Rio de Janeiro, Brazil, 2008-2009.

Family violence	Total sample		Females		Males	
	N	%	n	%	n	%
Psychological abuse	101	50.2	59	53.6	42	46.2
Minor physical abuse	97	48.3	57	51.8	40	44.0
Serious physical abuse	65	32.8	35	31.8	30	33.0
Verbal abuse	167	83.1	101	91.8	66	72.5

Table 3

Comparison of mean body mass index (BMI) among adolescents enrolled in the Bolsa Família Program and treated at a primary care clinic, according to sex and target variables. Rio de Janeiro. Brazil, 2008-2009.

Variables	Males		Females	
	Mean (SD)	p-value	Mean (SD)	p-value
Race/color				
Non-black	17.50 (1.75)	0.052	19.03 (3.32)	0.010
Black	18.75 (2.98)		20.89 (3.36)	
Sexual maturation				
Pre-puberty	17.98 (2.72)	0.297	16.17 (2.74)	0.000
Puberty	18.62 (2.75)		20.69 (3.28)	
Adolescent's schooling				
Primary	18.43 (2.77)	0.495	20.01 (3.39)	0.019
Secondary	17.33 (1.93)		22.47 (3.09)	
Body image				
Satisfactory	18.51 (2.47)	0.547	19.53 (2.84)	0.000
Unsatisfactory	18.13 (3.36)		22.99 (3.89)	
Psychological abuse				
No	18.74 (3.02)	0.211	20.23 (3.82)	0.721
Yes	18.01 (2.36)		20.47 (3.09)	
Serious physical abuse, maternal				
No	18.38 (2.75)	0.647	20.33 (3.61)	0.954
Yes	18.04 (2.49)		20.38 (2.76)	
Minor physical abuse, maternal				
No	18.48 (2.69)	0.344	20.16 (3.61)	0.493
Yes	17.84 (2.72)		20.64 (3.22)	
Verbal abuse, maternal				
No	18.29 (3.05)	0.930	18.12 (3.10)	0.000
Yes	18.34 (2.31)		20.99 (3.30)	
Serious physical abuse, paternal				
No	18.41 (2.96)	0.323	19.55 (3.20)	0.030
Yes	17.58 (2.04)		21.58 (4.22)	
Minor physical abuse, paternal				
No	18.22 (2.88)	0.959	19.74 (3.39)	0.228
Yes	18.26 (2.70)		20.82 (3.92)	
Verbal abuse, paternal				
No	18.91 (2.83)	0.196	18.15 (2.98)	0.012
Yes	17.93 (2.76)		20.57 (3.55)	
Serious physical abuse, both parents				
No	18.51 (2.85)	0.227	20.12 (3.40)	0.197
Yes	17.73 (2.13)		21.09 (3.54)	
Minor physical abuse, both parents				
No	18.49 (2.59)	0.414	20.17 (3.56)	0.487
Yes	18.01(2.83)		20.64 (3.31)	
Verbal abuse, both parents				
No	18.53 (2.55)	0.606	17.91 (3.08)	0.004
Yes	18.20 (2.75)		20.75 (3.36)	

SD: standard deviation.

(p < 0.001), body image (p < 0.001), and schooling (p = 0.019).

Table 4 shows the crude and adjusted results of the multivariate linear regression analysis for boys. Regardless of age and race/color, there was no significant association between the different types of abuse and BMI, but there was a reduction in BMI in adolescents who had suffered any type of violence (physical, psychological, or verbal abuse), although not statistically significant.

Meanwhile, for girls (Table 5), verbal abuse was significantly associated with BMI in both the crude and adjusted analyses, independently of age, race/color, schooling, body image, and sexual maturation. Girls showed an average increase of 2.064, 2.438, and 2.403 in BMI in the presence of maternal verbal abuse (p = 0.001), paternal verbal abuse (p = 0.003), and verbal abuse by both parents (p = 0.003), respectively.

Discussion

Anthropometry uses indicators such as BMI that associate weight and height, and has been widely applied in epidemiological studies for nutritional evaluation [27]. BMI has been recommended as an anthropometric indicator for nutritional disorders in adolescence, despite the wide variation in this life phase due to age, sexual maturation, and growth [28].

Unfavorable alterations in BMI can express excess weight (high BMI) or underweight (low BMI). Such nutritional states can indicate health problems [29] in childhood, adolescence, and adulthood [30].

According to the current study's findings, verbal abuse of adolescents by parents was directly associated with BMI. Girls showed a mean increase of 2.064, 2.438, and 2.403 in BMI in the presence of maternal verbal abuse (p = 0.001), paternal verbal abuse (p = 0.003), and verbal abuse by both parents (p = 0.003), respectively, independently of age, race/color, schooling, body image, and sexual maturation. For boys, verbal abuse, physical abuse, and psychological abuse were associated with lower BMI (without statistical significance).

Little is known about the relationship between violence and its effect on nutritional status. The literature has suggested that victims of violence can present excess weight. The relationship is not clear, and authors have attempted to elucidate it by mechanisms that associate childhood trauma [31] and stress [13] with obesity.

Individuals with a history of childhood abuse may adopt unhealthy eating behaviors as an attempt to cope with or compensate for the abusive acts [31]. In fact, trauma or stress can lead to withdrawal as a form of defense, leading in turn to a decrease in physical activity. Stressful experiences can also alter neuroendocrine responses related to increased activity in the hypothalamic-pituitary-adrenal axis, associated with constant cortisol hyper-secretion by the adrenal gland. All these mechanisms can trigger an energy imbalance and potentially favor obesity [13].

Boynton-Jarret et al. [11] call attention to the limited understanding of the mechanisms by which violence leads to unfavorable health changes in the individual. Epidemiology defines determinants for the occurrence of a disease in social and biological terms that affect individuals over the course of life. Exposures to adverse situations in childhood and critical periods may have both latent and cumulative effects that negatively influence current and lifetime health outcomes.

There are no Brazilian studies to date that specifically relate family violence to nutritional status in adolescents, but some studies have attempted to explain the role of psychosocial factors in adolescents' nutritional status. For example, stress has been proposed as a possible lifetime cause of nutritional disorders [13,14]. The few studies on the specific issue of family violence and adolescents' nutritional status have been published in other countries [12,13,14,32], and the results suggest that stressful experiences can lead to excess weight in both sexes. These results differ from the current study's findings, since family violence was only associated with increased BMI in girls, suggesting a differential response to such trauma between male and female adolescents. Wisniewski & Chernausek [33] mention that gender differences can occur in childhood and adolescence. Especially for adolescents, such differences can occur both before and during puberty. Various weight gain and body make-up patterns are observed, in addition to susceptibility to social and environmental factors that influence boys and girls differently.

According to some authors, among social factors, violence is related differently to health outcomes in males and females. As reported by Sundaram et al. [34], there are probably gender differences in the way violence is experienced, in addition to different perceptions of health between men and women. While men tend to experience more lethal forms of violence, women show more significant associations between violence and negative health outcomes. Ditlevsen & Elklit [35] suggest that gender differences may also be due to social expectations towards male and female gender roles. Society expects women

Table 4

Crude and adjusted multiple linear regression coefficients between body mass index (BMI) and family violence variables among male adolescents enrolled in the Bolsa Família Program and treated at a primary care clinic. Rio de Janeiro, Brazil, 2008-2009.

Variables	BMI			
	Crude		Adjusted *	
	Coefficient	p-value	Coefficient	p-value
Psychological abuse	-0.727	0.211	-0.275	0.617
Serious physical abuse, maternal	-0.344	0.647	-0.566	0.421
Serious physical abuse, paternal	-0.841	0.323	-0.508	0.531
Serious physical abuse, both parents	-0.781	0.227	-0.610	0.312
Minor physical abuse, maternal	-0.633	0.344	-0.655	0.295
Minor physical abuse, paternal	0.038	0.959	-0.285	0.703
Minor physical abuse, both parents	-0.481	0.414	-0.417	0.453
Verbal abuse, maternal	0.051	0.930	-0.233	0.675
Verbal abuse, paternal	-0.977	0.196	-0.712	0.318
Verbal abuse, both parents	-0.326	0.606	-0.118	0.842

* Model adjusted for age and race/color.

Table 5

Crude and adjusted multiple linear regression coefficients between body mass index (BMI) and family violence variables among female adolescents enrolled in the Bolsa Família Program and treated at a primary care clinic. Rio de Janeiro, Brazil, 2008-2009.

Variables	BMI			
	Crude		Adjusted *	
	Coefficient	p-value	Coefficient	p-value
Psychological abuse	0.238	0.721	-0.425	0.423
Serious physical abuse, maternal	0.050	0.954	0.173	0.799
Serious physical abuse, paternal	2.030	0.030	1.076	0.160
Serious physical abuse, both parents	0.967	0.198	0.526	0.377
Minor physical abuse, maternal	0.479	0.493	-0.081	0.886
Minor physical abuse, paternal	1.085	0.228	0.381	0.602
Minor physical abuse, both parents	0.467	0.487	0.003	0.995
Verbal abuse, maternal	2.874	0.000	2.064	0.001
Verbal abuse, paternal	2.418	0.012	2.438	0.003
Verbal abuse, both parents	2.836	0.004	2.403	0.003

* Model adjusted for age, race/color, adolescent's schooling, body image, and sexual maturation.

to be more vulnerable and men to be tougher and more resistant to trauma. Stress may also be caused by different expectations in the various human life cycles, producing changes in neurobiological development due to different forms of exposure to trauma. Olofsson et al. [36] observed a difference between the sexes when studying exposure to violence and its long-term conse-quences in late adolescence and young adulthood. The authors found that young women with a history of violence showed a long-term association with negative health outcomes, while the same was not true for men.

Among the complex processes comprising stress pathways in childhood, family violence can lead to obesity, according to Greenfield &

Marks [12]. The latter authors report that individuals that suffer physical and psychological abuse from one or both parents show higher food consumption in response to stress and greater risk of obesity in adulthood. Their findings point to the need to consider the biological differences between individuals, since for some, exposure to violence can lead to greater food consumption and thus excess weight in childhood, adolescence, and adulthood.

Recently, some authors have reported findings that do not always suggest changes in nutritional status with the development of obesity. The results are conflicting as to the type of disorder – excess weight [15,37] and underweight [38,39] – and in relation to gender [15,38], type of abuse [39], and severity of trauma [37].

Jun et al. [15] observed that a violent environment is associated with the development and maintenance of obesity in adolescents. The authors point to gender differences in the evolution of BMI. Strategies to deal with conflicts should thus take gender into account.

Boyonton-Jarret et al. [37] showed a gradual association between the severity of abuse in childhood and adolescence and obesity in adulthood. The authors studied a prospective cohort of black women 21 to 69 years of age who had witnessed or experienced abuse in childhood and adolescence and found that higher frequency of abuse was associated with greater risk of developing excess weight in adulthood. The findings point to the impact of the severity of abuse on nutritional status, favoring obesity.

According to Veldwijk et al. [39], as BMI increased, adolescents showed higher rates of violence; 31% had suffered domestic violence. The authors also noted differences according to type of abuse, gender, and schooling. Their results point to a change in nutritional status both for underweight and excess weight among adolescents when gender was considered. These differences may result from defense mechanisms against the trauma such as distortions in eating behavior or weight gain or physiological changes that can develop differently between males and females.

Schneiderman et al. [38] investigated whether violence is predictive of obesity in adolescents and observed that individuals in early adolescence with a history of abuse showed higher odds of obesity when compared to their non-abused peers. Considering gender in this association, they noted that only adolescent girls that were victims of sexual and physical abuse showed significantly lower odds of obesity as compared to non-abused girls. These findings show that the possible explanations for the relationship between violence and nutritional status do not necessarily lead to obesity.

Importantly, studies on this theme show methodological differences in their design (cross-sectional versus longitudinal) and techniques for taking anthropometric measurements and measuring family violence. Thus, it is not always possible to compare the results among the few existing studies.

In addition, the current study used a convenience sample consisting of individuals enrolled in the Bolsa Família Program, with similar socioeconomic characteristics. The program's main prerequisites are low family income, regular school attendance, and proof of regular follow-up of the individual's health by a health service. This type of sample, with homogeneous characteristics, differs from the other studies cited here, which can also limit comparison of the findings. It is thus important for future studies to focus on the association between family violence and nutritional status from a more comprehensive perspective, incorporating more representative samples of the population or adopting longitudinal study designs.

A single observation of nutritional status at a given time point (in adolescence) can mask possible manifestations of nutritional disorders that may affect these individuals over the course of their growth and development and persist into adulthood. The current study is thus not capable of inferring the temporal nature of the associations. In other words, does parental violence against the adolescent precede inadequate nutritional status, or does nutritional status interfere in interpersonal relations, making them more violent?

Meanwhile, the relationship between increased food intake and presence of stressful factors (emotional eating) is not a simple issue. Regardless of whether the individual's nutritional status is adequate, compensatory strategies can be used or improved (eat less the following day, do more physical exercise), and there may be some individual protective characteristic that favors maintenance of adequate weight [14]. As described by Assis et al. [40], in addition to family support, adolescents can draw on protective mechanisms such as individual capacity (autonomy, self-esteem, and affective and flexible temperament) and a favorable social environment (relationship with friends, partners, and school) that allow the young person to cope with an adverse situation (in other words, resilience). Such mechanisms may help some adolescents cope with family violence and possibly avoid obesity. More studies are needed to elucidate such compensatory mechanisms, with resilience as a potential target.

Importantly, the identification of violence as a stressor may help foster educational measures and healthy orientation for individuals treated at health services and elsewhere, including peer exchange and activities and a focus on adequate nutritional status in adolescents.

The debate on adverse health effects for adolescents should be promoted by health workers and teachers. Interdisciplinary actions with a broad scope should be implemented to help young people recognize and expose situations of violence and defend themselves.

Final remarks

According to the current study's findings, adolescent girls showed higher BMI in the presence of verbal abuse from their parents. As for boys, no statistically significant difference was found in the relationship between BMI and family violence.

The study showed a high prevalence of verbal abuse in the family setting (83.1%). This observation may be useful when developing strategies to orient families on the harmful effects for adolescents' health, including their nutritional status.

We believe that prospective approaches analyzing the adolescents' nutritional status at different stages in life would lead to a better assessment of the consequences of family violence for their health.

Resumen

Este artículo se centra en la relación entre la violencia familiar y el índice de masa corporal (IMC) de los adolescentes del Programa Bolsa Familia. Fue un estudio transversal con 201 adolescentes, de 10 a 19 años, de ambos sexos, en el municipio de Río de Janeiro, Brasil, 2008-2009. Se evaluaron el IMC y la violencia física, psicológica y la agresión verbal entre los padres y los adolescentes. La asociación entre la violencia y el IMC se midió a través de modelos de regresión lineal. En las mujeres, la agresión se asoció directamente con el IMC, con un aumento en la media promedio de 2,064, 2,438 y 2,403 cuando se realizó el IMC de la madre, el padre y los dos padres, respectivamente. Entre los hombres, se encontró que la presencia de ataque se asoció con un menor IMC (no significativo). Estos resultados apuntan a la necesidad de innovaciones en la práctica y el enfoque de la atención nutricional de los adolescentes que se beneficiaron del Programa Bolsa Familia, considerando la violencia familiar como un factor relacionado con una inadecuada nutrición.

Violencia Doméstica; Índice de Masa Corporal; Estado Nutricional; Adolescente

Contributors

A. M. V. L. Silva was responsible for elaborating the study design and data collection instrument, data analysis, and writing of the article. S. R. Taquette assisted in the study design and data collection instrument and conducted a critical revision of the article. M. H. Hasselmann contributed to the study design and data collection instrument, data analysis, and critical revision of the article.

Acknowledgments

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