Well-being in adolescents: the 11-year follow-up of the 1993 Pelotas (Brazil) birth cohort study

Bem-estar entre adolescentes: a visita de 11 anos da coorte de nascimentos de Pelotas, Rio Grande do Sul, Brasil, 1993

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Abstract

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Studies on well-being and its possible determinants are rare in the international literature, and almost non-existent in Brazil, particularly among youth. The present study focused on the epidemiology of well-being among adolescents belonging to a birth cohort. Well-being was measured using face-to-face interviews, with a question whose answer was based on a graphic scale of faces. 4,452 adolescents were interviewed. Approximately half (49.4%) classified themselves as very happy (face 1); this proportion was higher among girls than boys. Poorer adolescents were more likely than their wealthier peers to identify with the happiest face (number 1), but were also more likely to report moderate to low levels of well-being (faces 3-7). Body mass index was inversely associated with well-being. Among girls, physical activity was directly associated with well-being.

Adolescent; Body Mass Index; Socioeconomic Factors; Cohort Studies

Introduction

Although there is a consensus in the literature that public health should evaluate not only disease but health as well, studies in the field still approach mainly negative health outcomes. However, recently there has been an increasing trend towards studies that analyze positive health outcomes. Among such outcomes, studies on well-being and happiness have drawn increasing attention in the scientific literature [1,2,3]. Even with this growing interest, there are some difficulties in studying well-being. The operationalization of this variable is extremely complex, given the lack of consensus on both the underlying concepts and available research instruments [4]. There exists a series of scales and instruments to quantitatively or qualitatively measure an individual's state of well-being. In addition, there is a major debate as to whether this characteristic is a trait (inborn) or state (transitory) [5].

Despite these difficulties, the interest in such research has grown, especially due to the evidence of positive associations with health [6] and longevity [7]. The concept of health proposed by the World Health Organization (WHO) [8] itself encompasses the concept of well-being (physical, mental, and social). According to several studies, the degree of happiness increases according to both individual and community socioeconomic status [9]. Other variables like gender, age, schooling, marital status, religion, physical activ-

ity, smoking, alcohol consumption, and stressful events have also been studied for associations with well-being [10].

Epidemiological studies with information on levels of well-being and their possible determinants are relatively scarce in the international literature and almost non-existent in Brazil (especially for children and adolescents). The current study thus focused on the epidemiology of well-being in adolescents from a birth cohort in Pelotas, Southern, Brazil.

Methods

The subjects in this study are part of a prospective cohort in which all hospital births in the city of Pelotas in 1993 were monitored. At the time, the mothers answered a questionnaire and the newborns were weighed and measured. Sub-samples of these individuals were visited at 1, 3, and 6 months and 1, 4, 6, and 9 years of age. In 2004-2005, all the cohort members were searched for a new follow-up, the methodological details of which are described elsewhere [11]. The findings presented in this article refer to this last visit, when the mean age of the adolescents was 11 years.

The principal variable – well-being – was collected through household interviews using a single question, the answer to which was based on a graphic scale of faces shown in Table 1 [12]. First the interviewer said to the adolescent: "*Now I'm going to show you some faces that vary from a person who is very happy* [show face 1] *to a person who is very sad* [show face 7]". Then the interviewer asked: "*Which of these faces shows the way you felt during most of the last year?*". To investigate factors potentially associated with level of well-being, the following characteristics were examined: gender (male or female); self-reported skin color (white or black/brown); assets index (based on a score of household assets, evaluated through principal components analysis and divided into quintiles); nutritional status (underweight, normal, overweight, or obese according to WHO criteria [13]); and level of physical activity (based on a score that included physical activities during leisure time or on the way to and from school, later divided into quartiles). These variables were collected with a standardized and previously tested questionnaire, applied jointly with the data collection on outcome (well-being).

For the data analysis, well-being was first classified into three groups: very high (face 1), high (face 2), and moderate/low (faces 3 to 7). The proportion of adolescents in each of these groups according to the independent variables was compared using the chi-square test. Next, to analyze the factors associated with well-being, this variable was dichotomized in two groups: very happy (face 1) and other (faces 2 through 7). The crude and adjusted analyses were both performed with Poisson regression, adjusting for robust variance [14]. To identify possible gender differences, separate analyses were performed for boys and girls.

To adjust for possible confounders, a hierarchical model was constructed [15], containing two levels. The first level included demographic and socioeconomic factors (gender, skin color, and assets index), and the second level included variables related to nutritional status and level of physical activity. Each variable was controlled for those at the same level or higher, and all were submitted to adjusted analysis, keeping in the model only those with p less than 0.20. Significance level was set at 5%, and all the analyses used Stata version 9.2 (Stata Corp., College Station, USA).

The research was approved by the Institutional Review Board of the School of Medicine at the Federal University in Pelotas. Parents or guardians signed a free and informed consent form authorizing the children to participate in the study.

Results

Of the 4,452 adolescents interviewed, complete information on the outcome (well-being) was obtained for 4,426 (99.4%). Approximately half (49.4%) of the adolescents identified with face 1 (very happy), as shown in Table 1. Table 2 shows that there proportionally more very happy girls (face 1) as compared to boys. The same was true for blacks/browns as compared to whites. Poorer adolescents showed a higher proportion of very high well-being than their wealthier peers, but they also showed a higher proportion of moderate/low well-being (faces 3 through 7). As for nutritional status, the higher the body mass index category (BMI), the lower the proportion of youth with greater well-being (face 1). Meanwhile, the level of physical activity was not associated with categories of well-being, except for a borderline association (p = 0.048) with face 1 (Table 2).

Table 3 shows the results of the crude and adjusted analysis of well-being (considering adolescents that identified with face 1 versus the rest). Higher well-being (face 1) was 10% greater for girls and black or brown youth as compared to their peers. In addition, prevalence of well-being (face 1) showed an inverse association with assets index and nutritional status and a direct associa-

Table 1

Percentage distribution of adolescents according to score on faces scale. 1993 Pelotas (Brazil) birth cohort study, 2004-2005 follow-up.

	Face 1	Face 2	Face 3	Face 4	Face 5	Face 6	Face 7
	A	B	C	D	E	F	G
Total	49.4	36.6	8.9	2.4	1.0	0.8	0.9
Boys	47.2	36.9	10.2	2.6	1.0	1.0	1.1
Girls	51.5	36.2	7.6	2.2	1.1	0.7	0.7

Table 2

Level of well-being according to study characteristics. 1993 Pelotas (Brazil) birth cohort study, 2004-2005 follow-up.

Variable	Level of well-being			p-value *
	Very high (face 1)	High (face 2)	Moderate/Low (faces 3 to 7)	
Gender	0.004	0.590	0.001	0.001
Male	47.2	37.0	15.8	
Female	51.5	36.2	12.3	
Skin color	0.002	0.003	0.742	0.006
White	48.2	38.2	13.7	
Black/Brown	53.3	33.4	13.3	
Household assets index (quintiles)	< 0.001	< 0.001	0.012	< 0.001
1st (lowest)	55.1	30.3	14.6	
2nd	51.1	32.7	16.2	
3rd	47.7	37.4	14.9	
4th	49.0	39.4	11.6	
5th (highest)	43.4	45.1	11.5	
Nutritional status	0.004	0.004	0.879	0.016
Underweight	55.2	31.0	13.9	
Normal	50.3	35.7	14.0	
Overweight	44.8	40.1	15.1	
Obese	45.1	41.4	13.4	
Level of physical activity (quartiles)	0.048	0.153	0.790	0.221
1st (lowest)	49.0	36.5	14.5	
2nd	47.1	38.7	14.3	
3rd	49.2	36.9	14.0	
4th (highest)	53.0	33.9	13.1	
Total	49.4	36.6	14.0	-

* Chi-square test for heterogeneity.

Table 3

Adolescents classified as very happy (scale 1) according to independent variables: crude and adjusted analysis. 1993 Pelotas (Brazil) birth cohort study, 2004-2005 follow-up.

Variable	Crude analysis		Adjusted analysis	
	PR (95%CI)	p-value	PR (95%CI)	p-value
Gender		0.004		0.001
Male	1.00		1.00	
Female	1.09 (1.03; 1.16)		1.11 (1.04; 1.18)	
Skin color		0.002		0.031
White	1.00		1.00	
Black/Brown	1.11 (1.04; 1.18)		1.08 (1.01; 1.15)	
Household assets index (quintiles)		< 0.001 *		< 0.001 *
1st (lowest)	1.00		1.00	
2nd	0.93 (0.85; 1.01)		0.93 (0.85; 1.01)	
3rd	0.87 (0.79; 0.95)		0.87 (0.79; 0.95)	
4th	0.89 (0.81; 0.98)		0.90 (0.82; 0.99)	
5th (highest)	0.79 (0.72; 0.87)		0.81 (0.73; 0.89)	
Nutritional status		0.001 *		0.047 *
Underweight	1.10 (0.99; 1.22)		1.09 (0.98; 1.22)	
Normal	1.00		1.00	
Overweight	0.89 (0.80; 0.90)		0.92 (0.83; 1.02)	
Obese	0.90 (0.81; 0.99)		0.95 (0.86; 1.06)	
Level of physical activity (quartiles)		0.039 *		0.019 *
1st (lowest)	1.00		1.00	
2nd	0.96 (0.88; 1.05)		0.96 (0.88; 1.06)	
3rd	1.00 (0.92; 1.09)		1.02 (0.94; 1.12)	
4th (highest)	1.08 (1.00; 1.18)		1.10 (1.01; 1.20)	

PR: prevalence ratio; 95%CI: 95% confidence level.

* Linear trend p-value.

tion with physical activity. The results remained similar for the crude and adjusted analyses.

When boys (Table 4) and girls (Table 5) were analyzed separately, some peculiarities stood out. For boys, after adjusted analysis, only the assets index remained associated (inversely) with greater well-being. Among girls, the only variable significantly associated with well-being (face 1) in both the crude and adjusted analysis was the level of physical activity (more active girls were happier than less active girls).

Discussion

Well-being, the object of this study, can be considered a subjective portion of quality of life [16], encompassing constructs like happiness, life satisfaction, state of spirit, and positive affect [4]. Face scales provide a more direct representation of feelings than a verbal translation of the answer to a question on happiness [12]. The current study indicated that half of the adolescents considered themselves very happy (face 1). If we take the first two faces, 86% of the adolescents considered themselves happy or very happy. These results are consistent with the Brazilian and international literature.

As mentioned previously, measuring well-being is complex, given the different concepts involved and the various possibilities for operationalizing the variable. The method used in the present study is operationally simple, but cannot capture the entire construct called "well-being". In addition, our data were collected in 11-year-olds, and it is thus risky to generalize the findings to the entire adolescent age bracket, due to the intense and rapid changes taking place during this period of life.

In Pelotas, Silva et al. [2] used the faces scale to measure what they called psychological well-being. Their study was performed in a represen-

Table 4

Boys classified as very happy (scale 1) according to independent variables: crude and adjusted analysis. 1993 Pelotas (Brazil) birth cohort study, 2004-2005 follow-up.

Variable	Crude analysis		Adjusted analysis	
	PR (95%CI)	p-value	PR (95%CI)	p-value
Skin color		0.004		0.126
White	1.00		1.00	
Black/Brown	1.15 (1.05; 1.27)		1.08 (0.98; 1.20)	
Household assets index (quintiles)		< 0.001 *		< 0.001 *
1st (lowest)	1.00		1.00	
2nd	0.92 (0.81; 1.05)		0.92 (0.81; 1.05)	
3rd	0.89 (0.78; 1.02)		0.89 (0.78; 1.02)	
4th	0.80 (0.69; 0.92)		0.81 (0.70; 0.94)	
5th (highest)	0.70 (0.61; 0.82)		0.72 (0.62; 0.84)	
Nutritional status		0.003 *		0.096 *
Underweight	1.17 (1.00; 1.37)		1.17 (1.01; 1.38)	
Normal	1.00		1.00	
Overweight	0.84 (0.71; 1.00)		0.92 (0.77; 1.09)	
Obese	0.88 (0.77; 1.01)		0.95 (0.83; 1.09)	
Level of physical activity (quartiles)		0.056 *		0.215 *
1st (lowest)	1.00		1.00	
2nd	1.04 (0.89; 1.20)		1.04 (0.89; 1.21)	
3rd	1.07 (0.93; 1.24)		1.06 (0.92; 1.23)	
4th (highest)	1.13 (0.99; 1.29)		1.09 (0.95; 1.26)	

PR: prevalence ratio; 95%CI: 95% confidence level.

* Linear trend p-value.

tative sample of the city's youth. Despite using a different terminology, the question they used was very similar to that in the current study. Approximately 90% of the adolescents pointed to the facial expressions that represent the two highest levels of well-being. In a large population survey in Australia, Dear et al. [17] estimated a 70% happiness index for the country's population, also using the faces scale.

Studies suggest that determinants of happiness are associated with hereditary factors. Lykken & Tellegen [18] compared dizygotic and monozygotic twins, raised together or separately, showing that approximately half of the variance found in self-rated happiness is associated with heredity. Thus, the other half could be explained by environmental factors. However, socioeconomic status, schooling, family income, marital status, and religion explained only 6% of the variance. Thus, other variables should be investigated in order to better understand the factors associated with well-being. In the current study, girls and adolescents with black or brown skin pointed to face 1 (very happy) 10% more often than boys and white adolescents.

In the analysis of socioeconomic status, some results from this study apparently disagree with data from the literature. The groups with fewer household assets showed higher proportions of face 1 (very happy). However, when faces 1 and 2 were combined (very high and high well-being), the results were the opposite, thus agreeing with most of the literature. In 2007, Silva et al. [2], in a study of adolescents 15-18 years of age, found associations between greater psychological well-being and higher socioeconomic status. In a study by Subramanian et al. [9] on individuals from 36 communities in the United States, after controlling for demographic variables, higher income and schooling were associated with greater happiness. Such associations were even stronger when compared at the community rather than individual level. Importantly, in the current study the highest percentages of faces 3 to 7 were also found in the poorest groups, indicating moderate or low well-being. This result is similar to the findings by Sparrenberger et al. [5], who evaluated psychological distress using the same faces scale in adults in Pelotas. The review by Myers [19] calls attention to the difference in

Table 5

Girls classified as very happy (scale 1) according to independent variables: crude and adjusted analysis. 1993 Pelotas (Brazil) birth cohort or study, 2004-2005 follow-up.

Variable	Crude analysis		Adjusted analysis	
	PR (95%CI)	p-value	PR (95%CI)	p-value
Skin color		0.152		0.152
White	1.00		1.00	
Black/Brown	1.07 (0.98; 1.16)		1.07 (0.98; 1.16)	
Household assets index (quintiles)		0.130 *		0.258 *
1st (lowest)	1.00		1.00	
2nd	0.93 (0.82; 1.05)		0.93 (0.82; 1.06)	
3rd	0.84 (0.74; 0.96)		0.85 (0.75; 0.97)	
4th	0.97 (0.86; 1.09)		0.98 (0.87; 1.11)	
5th (highest)	0.87 (0.77; 0.99)		0.89 (0.78; 1.02)	
Nutritional status		0.191 *		0.135 *
Underweight	1.04 (0.90; 1.20)		1.06 (0.91; 1.23)	
Normal	1.00		1.00	
Overweight	0.92 (0.81; 1.04)		0.92 (0.81; 1.05)	
Obese	0.95 (0.82; 1.11)		0.95 (0.83; 1.04)	
Level of physical activity (quartiles)		0.044 *		0.053 *
1st (lowest)	1.00		1.00	
2nd	0.93 (0.83; 1.04)		0.93 (0.83; 1.04)	
3rd	0.99 (0.88; 1.11)		0.99 (0.88; 1.11)	
4th (highest)	1.14 (1.02; 1.28)		1.13 (1.01; 1.27)	

PR: prevalence ratio; 95%CI: 95% confidence level.

* Linear trend p-value.

levels of happiness between rich and poor countries, while commenting that among individuals, the differences appear more frequently in poorer countries, where the fact that one has (or lacks) an income is more important than in developed countries.

As for level of physical activity, more active adolescents were 10% more likely to be classified as very happy (face 1) as compared to their less active peers, after adjusted analysis. Also in the city of Pelotas, Silva et al. [2], studying adolescents 15 to 18 years of age, observed that physical activity tended to correlate with greater psychological well-being. In the Netherlands, Stubbe et al. [3] found an association between physical activity and being happier and more satisfied with life.

Epidemiological studies that present information on self-perceived happiness at the population level and possible determinants are relatively scarce in the world literature and nearly non-existent in Brazil. In the last decade, appreciation of this theme spawned studies showing a possible causal association between indicators of well-being and positive health outcomes [20]. Happiness or correlated constructs appear to induce increased immunity, serving as protective factors in disease outcomes or even acting as predictive factors for greater longevity [7,21].

Knowing which adolescents are happy and which characteristics are associated with this group is essential for formulating hypotheses on the causes of "well-being", besides serving as the basis for public policies aimed at population well-being in this age bracket.

Resumo

Estudos sobre os níveis de bem-estar e seus possíveis determinantes são escassos na literatura mundial e quase inexistentes no Brasil, principalmente entre jovens. O objetivo do presente estudo foi conhecer a epidemiologia do bem-estar em adolescentes pertencentes a uma coorte de nascimentos. O nível de bem-estar foi coletado mediante entrevistas domiciliares, utilizando uma pergunta, cuja resposta era baseada em uma escala gráfica de faces. Foram entrevistados 4.452 adolescentes. Aproximadamente a metade (49,4%) identificou-se com a face 1 (muito felizes), sendo esta proporção maior nas meninas do que nos meninos. Os adolescentes mais pobres apresentaram maior prevalência de nível muito elevado de bem-estar (face 1) do que os mais ricos, mas também foram os que apresentaram maior prevalência de bem-estar moderado ou baixo (faces 3 a 7). Quanto maior a categoria de índice de massa corporal menor a proporção de jovens com elevado bem-estar (face 1). As meninas fisicamente ativas apresentaram maior percentual de elevado bem-estar em comparação às sedentárias.

Adolescente; Índice de Massa Corporal; Fatores Sócioeconômicos; Estudos de Coortes

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