

## Stages of change for physical activity and socioeconomic correlates in schoolchildren from Fortaleza, Ceará, Brazil: a cross-sectional study

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ORIGINAL ARTICLE

### ABSTRACT

This study aimed to identify the prevalence and factors associated with Stages of Change for Physical Activity (SCPA) in adolescents. A cross-sectional study was conducted with 386 students from public schools in Fortaleza, Ceará. The following question was used: "In relation to your physical activity habits, would you say that:" classifying the answers in five SCPA (pre-contemplation, contemplation, preparation, action and maintenance). Sex, age, number of people who live, work situation, family income and parental education were independent variables. The Chi-square test was used ( $p < 0,05$ ). The prevalence of students in SCPA was 17,7%, 19,2%, 21,6%, 14,8%, and 27,0% for pre-contemplation, contemplation, preparation, action and maintenance, respectively. Boys had elevated proportion in the action and maintenance stages ( $p = 0,01$ ). Adolescents whose family had income greater than R\$ 1000,00 had higher proportion in the maintenance stage when compared to those with lower income ( $p = 0,01$ ). The other variables were not associated with SCPA ( $p \geq 0,05$ ). In conclusion, elevated prevalence of adolescents in inactive SCPA was identified. It is important to direct strategies that generate interest for physical activity, especially girls and adolescents with lower income.

*Keywords:* adolescent behaviour, motor activity, social class

### INTRODUCTION

The benefits provided by the practice of physical activity (PA) in adolescence are fundamental for the physical and bone development of the young population, besides it is a preponderant factor in influencing the adoption of this habit in adult life (Seabra, Mendonça, Thomis, Anjos, & Maia 2008; World Health Organization [WHO], 2010). International recommendations for children and adolescents are directed toward the accumulation of at least 60 minutes of moderate to vigorous daily PA (WHO, 2010). However, it is observed that the lifestyle of children and adolescents has been characterized by the least amount of body movements in recent years (Murphy, Mcneilly, & Murtagh, 2010).

Some behavioural theories have been used to understand adherence to PA. One of them is the Transtheoretical Model (TM), which is based on five stages of behaviour change (SBC):

precontemplation, contemplation, preparation, action and maintenance, following an order from the "least favourable to behaviour" to the "most favourable to behaviour" (Matta, 2012; Silva, Smith-Menezes, Almeida-Gomes, & Sousa, 2010). This model can aid in the understanding of aspects of social cognitive theory and learning theory (Boscatto, Duarte, & Gomes, 2011), as well as facilitate the planning of strategies to promote PA according to the SBC in which the individual is at a given moment.

The stages of behaviour change for physical activity (SBCPA) are characterized by assuming in their conception cognitive, social and environmental factors, where its application consists in identifying the current and/or intentional habits of change in the future for the practice of PA (Boscatto et al., 2011). The literature presents the evaluation of SBCPA in adolescents as a decisive factor in the identification of inappropriate habits, as well as

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an important strategy to promote PA with this population (Hintze, Cattai, Silva, & Junior 2012; Silva, Pelegrini, Grigollo, Silva, & Petroski, 2011; Viana & Andrade, 2010).

In a systematic review on the prevalence and factors associated with PA in Brazilian adolescents, it was pointed out that only two of the 48 studies included had evaluated the SBCPA (Barbosa Filho, Campos, & Lopes, 2014). Moreover, the discussion about socioeconomic factors (for instance, age, income, parental schooling, occupation) that may be associated with SBCPA represented a poor area of studies. A study in this perspective may contribute by indicating the population subgroups with the highest propensity to the inactive stages of SBCPA, which may help in the definition and direction of strategies and public policies to promote PA in the young population.

Thus, the present study aims to analyse the prevalence and factors associated with SBCPA in a sample of public school students from the city of Fortaleza, Ceará.

### METHOD

This was a descriptive, analytical, correlational, cross-sectional survey study using a quantitative methodology (Thomas & Nelson, 2007).

#### Participants

The study sample consisted of 386 adolescents of both sexes, aged between 11 and 18 years old, enrolled in the 7th, 8th and 9th grades of elementary school, in the morning and afternoon shifts of four public schools of the city of Fortaleza, Ceará. These schools were selected intentionally because of the availability and acceptance of school direction to participate in the study.

#### Instruments and Procedures

For the identification and classification of SBCPA, it was considered as physically active a young person who accumulates at least 60 minutes of physical activity every day of the week, as recommended by the World Health Organization (Who, 2010). To this end, each adolescent answered the following question: *"In*

*regard to your habits of practicing physical activities, you would say that:"*, with five response items indicating each SBCPA, namely: (1) maintenance, *"I have been physically active for more than 6 months"*; (2) action, *"I have been physically active for less than 6 months"*; (3) preparation, *"I am not, but I intend to become physically active in the next 30 days"*; (4) contemplation, *"I am not, but I intend to become physically active in the next 6 months"*; and (5) precontemplation, *"I am not and do not intend to become physically active in the next 6 months"*. This question has been used to identify SBCPA in studies with Brazilian adolescents (Barbosa Filho et al., 2014).

The information on the demographic characteristics (sex, age), socioeconomic characteristics (number of people with whom they live, work situation, family income and parental schooling) were reported by the adolescents in a structured questionnaire and with closed response options. The questions used were based on an instrument previously applied with Brazilian adolescents (Silva et al., 2013).

The application of this questionnaire was carried out in the classroom with the group of students present on the day of data collection. After the distribution of the questionnaires and possession of a copy, the researcher read each question, and then the students marked their answer individually, moving on to the next question. Data collection was performed in September and October 2013.

#### Statistical analysis

The descriptive data analysis for categorical variables was performed using distributions of absolute and relative frequency. The SBCPA comparisons between the categories of demographic and socioeconomic variables were performed using the Chi-square test. The level of significance was set at 5% ( $p < 0.05$ ). The data were entered and analysed in SPSS version 20.

#### Ethical Concepts

The authorization of the managerial nucleus (the direction/coordination) of the school was obtained by means of official signature and

voluntary adherence of the respondents to participate in the study. The parents and/or guardians authorized the participation of the students in the research by signing the informed consent form. The confidentiality of the identity of the respondents was guaranteed and the information obtained was only used for scientific purposes.

### RESULTS

A total of 386 adolescents were investigated, the majority being female (52.1%) and aged between 11 and 14 (68.8%). According to Table 1, most respondents do not work (80.1%), live with 4 to 6 people (59.8%) and have family income up to 1000,00 reais (69.5%). The most cited fathers and mothers schooling was to have reached up to middle school 50.5% and 51.5%, respectively (Table 1). Regarding to the SBCPA, 27.0% of adolescents reported being in the maintenance phase. The proportions of adolescents in the preparation, contemplation, precontemplation and action in the SBCPA were 21.6%, 19.2%, 17.4%, and 14.8%, respectively (Table 1).

When comparing the sexes, there was a significant difference between boys and girls, where male adolescents presented a higher prevalence in the maintenance stage when compared to the girls ( $p = 0.01$ ). While the girls were more frequent in the precontemplation

stage compared to the boys ( $p = 0.01$ ). There was no significant difference between the age groups ( $p = 0.82$ ) (Table 2).

Table 1  
*Demographic and socioeconomic characteristics and EMCAF of adolescents from Fortaleza, Ceará*

Variable	N	%
<b>Sex</b>		
Female	201	52.1
Male	185	47.9
<b>Age*</b>		
11 to 14 years	265	68.8
15 years and over	120	31.2
<b>Number of people you live with *</b>		
1 to 3 people	100	26.3
4 to 6 people	228	59.8
More than 7 people	53	13.9
<b>Occupation*</b>		
works	76	19.9
Does not work	306	80.1
<b>Family income*</b>		
Up to R \$ 500,00	60	23.2
Between R \$ 501,00 and R \$ 1000,00	120	46.3
More than R \$ 1000,00	79	30.5
<b>Parenting schooling *</b>		
Elementary School	137	50.5
High school	84	31
Higher education	50	18.5
<b>Mother's education *</b>		
Elementary School	154	51.5
High school	101	33.8
Higher education	44	14.7
<b>EMCAF</b>		
Pre-contemplation	67	17.4
Contemplation	74	19.2
Preparation	83	21.6
Action	57	14.8
Maintenance	104	27.0

EMCAF= Behaviour change stage for physical activity; \* Some variables had missing data and the total of the categories does not represent a sum of 386 adolescents.

Table 2

*Comparison of EMCAF according to the demographic characteristics of adolescents from Fortaleza, Ceará*

Variable	EMCAF N(%)					p	
	Pre	Contemplation	Preparation	Action	Maintenance		
Sex	Female	42 (21.0)	49 (24.5)	55 (27.5)	33 (16.5)	21 (10.5)	0.01*
	Male	25 (13.5)	25 (13.5)	28 (15.1)	24 (13.0)	83 (44.9)	
	Total	67 (17.4)	74 (19.2)	83 (21.6)	57 (14.8)	104 (27.0)	
Age	11 to 14 years	49 (18.6)	48 (18.2)	57 (21.6)	41 (15.5)	69 (26.1)	0.82
	15 years and over	18 (15.0)	26 (21.7)	26 (21.7)	16 (13.3)	34 (28.3)	
	Total	67 (17.4)	74 (19.3)	83 (21.6)	57 (14.8)	103 (26.8)	

EMCAF = Behaviour change stage for physical activity, \* Significant difference with  $p < 0.05$ .

Table 3 refers to the comparison of socioeconomic characteristics (number of people with whom they live, occupation, family income and schooling of the father and mother) with the SBCPA. Concerning to income, it was observed that 47.4% of those surveyed who have family income up to R\$ 500.00 are in the maintenance and action stages; 28.3% of the adolescents who

have income between R\$ 501.00 and R\$ 1000.00 are in the preparation stage. And 48.1% of adolescents who have income greater than R\$ 1000.00 are in the maintenance stage. There were statistically significant differences for the variable in question ( $p = 0.01$ ). The other variables were not associated with the SBCPA ( $p \geq 0.05$ ).

Table 3

*Comparison of EMCAF according to the socioeconomic characteristics of adolescents from Fortaleza, Ceará*

Variable	EMCAF N(%)					p-value
	Pre	Contemplation	Preparation	Action	Maintenance	
People you live with *						
1 to 3 people	17 (17.0)	20 (20.0)	19 (19.0)	18 (18.0)	26 (26.0)	0.97
4 to 6 people	40 (17.6)	42 (18.5)	53 (23.3)	30 (13.2)	62 (27.3)	
More than 7 people	10 (18.9)	11 (20.8)	10 (18.9)	8 (15.1)	14 (26.4)	
Total	67 (17.6)	73 (19.2)	82 (21.6)	56 (14.7)	102 (26.8)	
Occupation*						
works	13 (17.3)	14 (18.7)	14 (18.7)	9 (12.0)	25 (33.3)	0.68
Does not work	52 (17.0)	60 (19.6)	68 (22.2)	48 (15.7)	78 (25.5)	
Family income*						
Up to R \$ 500.00	65 (17.1)	74 (19.4)	82 (21.5)	57 (15.0)	103 (27.0)	0.01*
Between R \$ 501.00 and R \$ 1000.00	8 (13.6)	11 (18.6)	12 (20.3)	14 (23.7)	14 (23.7)	
More than R \$ 1000.00	23 (19.2)	21 (17.5)	34 (28.3)	13 (10.8)	29 (24.2)	
Parents schooling *						
Elementary School	10 (12.7)	11 (13.9)	11 (13.9)	9 (11.4)	38 (48.1)	0.96
High school	41 (15.9)	43 (16.7)	57 (22.1)	36 (14.0)	81 (31.4)	
Higher education	20 (14.6)	29 (21.2)	25 (18.2)	22 (16.1)	41 (29.9)	
Mother's education *						
Elementary School	14 (16.7)	19 (22.6)	18 (21.4)	11 (13.1)	22 (26.2)	0.76
High school	9 (18.0)	9 (18.0)	7 (14.0)	9 (18.0)	16 (32.0)	
Higher education	43 (15.9)	57 (21.0)	50 (18.5)	42 (15.5)	79 (29.2)	

EMCAF= Behavior change stage for physical activity, \* Significant difference with  $p < 0.05$ .

## DISCUSSION

Among the SBCPA of those surveyed in the study, the ones with the highest number of adolescents were the maintenance and preparation stages. However, in general, it can be seen that there was a balance in the distribution of the subjects in relation to the SBCPA. Despite this, it is important to note that more than half of the sample is identified in the stages of precontemplation, contemplation and preparation, in which they characterize individuals who are not active, regardless of time.

These results are in agreement with the study by Maciel and Veiga (2012) that investigated the SBCPA in 416 adolescents between the ages of 14 and 19 belonging to the secondary schools in the cities of Belo Horizonte and Contagem/MG. In which they found the majority of the participants in the stages of precontemplation, contemplation, preparation and relapse, thus classified as physically inactive in leisure. In a study carried out with 281 high school students from a city of Sergipe, it was identified that 65.8% of the adolescents were classified in the stages referring to a physically inactive behaviour: precontemplation, contemplation, preparation (Silva, Smith-Menezes, Almeida-Gomes, & Sousa, 2010).

On the other hand, Viana and Andrade (2010) show that there are divergences in the practice of physical activity in the adolescent population, the results of the study analysed by these authors vary in very high or modest proportions, where there is a prevalence of 67.6% of the adolescents who practice some type of physical exercise with regularity (stages of action and maintenance). Corroborating with these data, the study by Silva, Pelegrini, Grigollo, Silva, and Petroski (2011) investigated the SBCPA of 601 high school students from the Midwest of Santa Catarina with an average of 15.7 years old and had the following results: 41.9% and 14%, respectively, in the maintenance and action stages. That is, 55.9% of the participants considered active. These investigations demonstrate different forms and criteria to identify the SBCPA, such as collection and characteristics of the samples and the recommendation of the daily and weekly amount of physical activity practice.

The importance of using the behavioural stages model is emphasized because this theory is considered a tool to promote the practice of physical activity in the population. Mainly, when there is scope for differentiating individuals as to their intention to begin practicing physical activity (for those physically inactive) and the

time they practice (for those physically active) (Dumith, Domingues, & Gigante, 2008).

The values related to the association between the SBCPA and sex indicate a prevalence of male students in the maintenance stage, that is, boys have higher PA practice habits than girls. These results are in accordance with the study of Oliveira et al. (2012) in which the SBCPA of 4.207 adolescents between 14 and 19 years old was investigated. The authors showed that the frequency of adolescents in the maintenance and action stages (physically active) was also significantly higher among boys. Other studies that analysed the adolescents' SBCPA presented higher percentages for inactive behaviours, also with an emphasis on the physical inactivity of women (Silva, Smith-Menezes, Almeida-Gomes, & Sousa 2010; Souza & Duarte, 2005).

The decline in the practice of physical activity in adolescence, especially among girls, occurs due to cultural factors, stimulation of games that emphasize home care, dolls and the permanence of girls at home (Malta et al., 2010). This information is confirmed in the literature, where there is clarification regarding men being more active than women (Hallal Knuth, Cruz, Mendes, & Malta, 2010; Tenório et al., 2010).

Overall, in the present study, there was a balance in the association of subjects' ages with the SBCPA. However, in a study carried out to evaluate the stage of readiness to change of behaviour (SRCB) of the feeding and the PA of 145 adolescents, aged between 10 and 18 years old, interested in joining the Multiprofessional Obesity Treatment Program (MOTP) Hintze et al. (2012), verified that older adolescents (13 to 17 years old) were in more advanced SRCB compared to younger adolescents (11 and 12 years old). Significant differences were also found between the SBCPA and age at a study in Korea, with adolescents aged between 13 to 18 years old. Where, it was found that those with lower age (13-15 years old) had more advanced stages of readiness compared to the usual practice of physical activity, in relation to adolescents between 16 and 18 years old (Kim, 2004).

The different results found among the studies mentioned above are possibly due to the

differences between the samples studied, because the regions in which the research was carried out had different social and behavioural contexts.

Among the results obtained from the comparison of the SBCPA related to socioeconomic characteristics, it is important to highlight that parents' schooling has become an important indicator of economic level. In the present study, although there is no significant difference of this variable when related to the SBCPA, a balanced distribution can be highlighted in the results. Where, regardless of parents' educational level, most adolescents are in the maintenance stages. On the other hand, the level of physical activity may be related to the level of education, with the highest probability of practicing physical activity in people who have completed higher education and less in those with lower education levels (Florindo & Ribeiro, 2009).

Another relevant aspect that can be observed regarding the socioeconomic characteristics of the individuals was observed in the income that had a significant influence on the analysis of the results. It is observed that the highest percentage of school children who are in the maintenance stage (actives) are those with high family income (over R\$ 1000.00). Confirming what was found in a study by Bungum and Vincent (1997), which shows that the socioeconomic level can influence the number of opportunities offered to young people, since the richest may be involved in both structured activities as those of gyms and clubs and free activities in parks, in the neighbourhood or in playgrounds, while the poorest theoretically would only have the second option.

The present study analysed the prevalence of the SBCPA of adolescents from a region not yet investigated and sought to verify the association of these stages with demographic and socioeconomic factors. This initial step was important to highlight the framework of intention in which the young are in the regions investigated. The answers of this study are directed to facilitate the development of strategies of interventions directed to the physical activity. Where, there is a need to

emphasize and motivate the female audience to engage in physical activity. Regarding to the limitations of this study, it is possible to mention the deficiency in the association of the SBCPA with other variables related to behavioural factors for physical activity such as active time in physical education classes and adolescents' preferred leisure activities.

### CONCLUSION

Although the SBCPA of the majority of adolescents investigated have been presented in a balanced manner, the prevalence in the stages of behaviour associated with physical inactivity (precontemplation, contemplation and preparation) is still permanent compared to the stages of action and maintenance. The boys stood out with more significant possibilities for adopting the practice of PA in relation to girls. Similarly, low-income adolescents were more likely not to engage in physical activity. Thus, it is important to emphasize and prioritize actions to promote physical activity that can reach and motivate female adolescents and low family income.

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Nothing to declare.

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