Stages of behavior change for physical activity in adolescents from the Amazon

Estágios de mudança de comportamento para a atividade física em adolescentes da Região Amazônica

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Abstract – The aim of this study was to estimate the prevalence of stages of behavior change (SBC) for physical activity and to verify the associated demographic and economic factors, in adolescents from the Amazon. A total of 2.517 adolescents (aged 14-19 years) from public high schools participated of the study. SBC for physical activity, demographic (sex, age, school year, school shift and residence area) and economic factors (occupational status, family income and maternal schooling) were investigated. The associations between SBC and independent variables were tested by multinomial logistic regression. Most adolescents were in the maintenance stage (40.8%) and the minority was in pre-contemplation stage (9.0%). Female adolescents were more likely of being in the action (OR=1.44; CI95%=1.14-1.81), preparation (OR=2.71; CI95%=2.14-3.44), contemplation (OR=2.89; CI95%=2.25-3.69) and pre-contemplation (OR=2.91;CI 95%=2.16-4.00) stages compared to male adolescents. Adolescents aged 16-17 years were less likely of being in the action stage (OR=0.71; CI95%=0.53-0.94) and those aged 18-19 years were more likely of being in the preparation stage (OR=1.50; CI95%=1.04-2.16) compared to those aged 14-15 years. Family income of six minimum wages or more was associated to higher chances of being in the action (OR=2.09; CI95%=1.38-3.17), preparation (OR=2.02; CI95%=1.31-3.12) and contemplation (OR=1.87; IC95%=1.18-2.95) stages. Adolescents who worked were less likely of being in the pre-contemplation stage (OR=0.45; CI95%=0.27-0.74), compared to those who do not work. Most of adolescents were in the maintenance stage for physical activity. The factors associated to SBC were female sex, age groups of 16-17 years and 18-19 years, income of six minimum wages or more and work.

Key words: Adolescent behavior; Health; Life style; Motor activity.

Resumo – *Esse estudo objetivou estimar as prevalências e verificar os fatores demográficos e econômicos associados aos estágios de mudança de comportamento (EMC) para a prática de atividade física (AF) em adolescentes amazonenses. Participaram desse estudo transversal 2.517 adolescentes (16,6±1,2 anos) de escolas públicas do Amazonas. Foram investigados os EMC relacionados à AF e fatores demográficos (sexo, idade, ano e turno escolar e área de residência) e econômicos (situação ocupacional, renda familiar e escolaridade da mãe). A maioria dos adolescentes estava no estágio manutenção (40,8%) e a minoria deles no estágio pré-contemplação (9,0%). As moças apresentaram maior chance de estarem nos estágios ação (RO=1,44;IC95%=1,14–1,81), preparação (RO=2,71;IC95%=2,14–3,44), contemplação (RO=2,89;IC95%=2,25–3,69) e pré-contemplação (RO=2,91;IC95%=2,16–4,00) comparadas aos rapazes. Adolescentes com idades de 16–17 anos tiveram menor chance de estarem no estágio ação (RO=0,71;IC95%=0,53–0,94) comparados aos de 14–15 anos. Aqueles de 18–19 anos apresentaram maior chance de estarem no estágio preparação (RO=1,50;IC95%=1,04-2,16) em relação aos adolescentes de 14–15 anos. A renda familiar de seis salários mínimos ou mais esteve associada a uma maior chance de estar nos estágios ação (RO=2,09;IC95%=1,38–3,17), preparação (RO=2,02;IC95%=1,31–3,12) e contemplação (RO=1,87;IC95%=1,18–2,95) em relação à renda de até dois salários mínimos. Adolescentes que trabalhavam tiveram menor chance de estarem no estágio pré-contemplação (RO=0,45;IC95%=0,24–0,74) comparados aos que não trabalhavam. A maioria dos adolescentes amazonenses estava no estágio manutenção em relação à AF. Os fatores associados aos EMC foram sexo feminino, faixas etárias de 16–17 e 18–19 anos, renda de seis salários ou mais e trabalhar.*

Palavras-chave: *Atividade motora; Comportamento do adolescente; Estilo de vida; Saúde.*

INTRODUCTION

The behavior of adolescents in relation to physical activity (PA) has been the target of several studies in recent years, which have emphasized the direction of strategies so that the regular practice of PA is incorporated into the daily life of young individuals[1-4]. World guidelines recommend that adolescents accumulate 60 minutes of moderate/vigorous daily PA[5]. However, a large part of this population (around 80.0%) does not reach these recommendations, which makes insufficient PA a global public health problem[6].

In this context, identifying the behavior change intention in adolescence and those who do not intend to practice PA can be useful for the elaboration of strategies directed to groups that need more urgent interventions[7-8]. In this premise, the Stages of Behavior Change - SBC (pre-contemplation, contemplation, preparation, action and maintenance) have been considered one of the theoretical models that best characterize people's behavior on health-related habits, including PA[8], allowing to identify the current conditions and the intention to change behaviors in a certain space of time[9].

Several studies have used SBC to know the behavior of young subjects in relation to the practice of PA[4,10-15]. However, there are few surveys conducted with Brazilian adolescents, especially those from the northern region[7]. Moreover, SBC has often been used to classify the level of PA from the grouping of pre-contemplation, contemplation and preparation stages to classify individuals as insufficiently active, and action and maintenance stages to classify individuals as physically active, differing from the initial proposal of the theoretical model[7].

Evidences have pointed out that girls[14-16] and older adolescents[1,15,17] are groups less likely of adopting an active behavior. Other factors such as school grade, economic level, maternal schooling, domicile area, study shift and occupational situation still need to be investigated, since the low number of reports in literature with the adolescent population does not yet allow inferring the direction of associations between these variables and SBC[7].

In view of the above, it is believed that the investigation of these factors will be useful to identify groups of adolescents with greater intention of remaining in a little active behavior. In addition, group evaluation by SBC can help in the conduction of initiatives aimed at the inclusion and maintenance of adolescents in stages of more active behaviors. Thus, this study aimed to estimate the prevalence and to verify the demographic and economic factors associated with SBC for the practice of PA in Amazonian adolescents.

METHODOLOGICAL PROCEDURES

This cross-sectional study is linked to the macro-project "Lifestyle and Health Indicators for Schoolchildren of the Amazon", Federal University of Amazonas (UFAM), conducted in 2011. The project was approved by the Human Research Ethics Committee of UFAM (CAAE No. 0302.0115.00011).

The study was limited to investigating adolescents (age 14-19 years) enrolled in public high schools in five Amazonian cities. According to information presented by the Secretary of Education of the State of Amazonas (SEDUC), 88,562 students attended high school (Manaus = 78,498, Itacoatiara = 4,164, Parintins = 4,863, São Gabriel da Cachoeira = 768, and Presidente Figueiredo = 249) in the year the research was conducted.

For the sample calculation, in each of the cities, previous probabilistic sampling procedures[18] were used, adopting prevalence estimated at 50% (unknown outcome), 95% confidence interval, sampling error of five percentage points, and design effect of 1.5. In order to minimize the occurrence of possible losses, 10% increment was added to the final sample calculated for each city (Manaus = 631, Itacoatiara = 580, Parintins = 587, São Gabriel da Cachoeira = 423). Nevertheless, in the city of Presidente Figueiredo, census was carried out in the only two state schools of the city, collecting data of all enrolled students (n = 249). Considering these parameters, the estimated sample was 2,485 students.

In Manaus, the sample was selected in three stages: 1) proportional by educational districts, 2) stratified by public high schools and 3) group conglomerates, school grade and study shift. For this survey, all schools were considered eligible, and the number of schools was considered proportionately among the six education districts in the municipality. In the second stage, schools were stratified according to the total number of students (size: small size up to 200 students, medium size from 200 to 499 students and large size 500 students or more) and, sequentially, lottery was carried out considering the size in each one of the six geographical areas. In the third stage, the study shift, school grade and classes were considered, and all students present on the day of data collection were invited to participate in the study. In the other cities (Itacoatiara, Parintins and São Gabriel da Cachoeira), due to the low number of educational institutions, all schools were selected, using the second and third stages.

In all, data from 3,267 students were collected (Manaus = 1,413, Itacoatiara = 580, Parintins = 575, São Gabriel da Cachoeira = 450 and Presidente Figueiredo = 249). However, 382 questionnaires were considered losses due to lack of information from the participants and 368 were excluded from the analyses of the present study because they were outside the age group of interest (14-19 years), which resulted in a final sample of 2,517 adolescents with mean age of 16.6 (± 1.2) years.

Procedures and instruments

Data collection took place during Physical Education classes, in the classroom, on days and times scheduled in advance with those in charge of schools. Students were informed of the importance of the research and its objectives, and were subsequently invited to participate. All participants signed the Assent Form and presented the Free and Informed Consent Form signed by parents/guardians (for those aged <18 years) or by themselves (aged ≥ 18 years).

The demographic variables evaluated were sex (male, female), age group (14-15, 16-17, 18-19 years), school grade (first, second, third), study shift (day, night) and area of residence (urban, rural). The economic variables were occupational status (working, not working), monthly family income considering the minimum wage in force in 2011 (up to two wages, three to five wages and six wages or more) and maternal schooling (up to eight years, eight years or more). All the information was reported by adolescents, and the answers were obtained through the application of a questionnaire.

SBC for the practice of PA were identified through a single question with five response options, each characterizing one of the stages of behavior change. The question presented to adolescents and the possible response options were: "In relation to your habits of practicing physical activity, you would say that: a) I have been physically active for more than six months (maintenance stage); b) I have been physically active for less than six months (action stage); c) I am not, but I intend to become physically active in the next 30 days (preparation stage); d) I am not, but I intend to become physically active in the next six months (contemplation stage); e) I am not and do not intend to become physically active in the next six months (pre-contemplation stage)"[19]. Adolescents were instructed to consider themselves physically active if they accumulated at least 60 minutes of moderate to vigorous daily PA in five days or more in the week.

Statistical analysis

To characterize the sample, descriptive statistics (absolute and relative frequencies) and confidence intervals were used for the respective prevalence in each SBC. The chi-square test was used to verify possible associations among variables. Multinomial logistic regression was used to verify factors associated with SBC, with crude and adjusted analyses being performed by variables with $p < 0.20$ in the crude analysis, considering the maintenance stage as a reference category in all analyses. Analyses were performed using the Statistical Package for the Social Sciences (SPSS) software version 20.0, adopting significance level of 5%.

RESULTS

Data referring to the characteristics of study participants are presented in Table 1.

The majority of adolescents were at the maintenance stage (40.8%; 95% CI = 38.9-42.4) (Figure 1). There were differences in the proportions of boys and girls in the maintenance (girls 95% CI = 42.5-46.1; boys 95% CI = 53.7-57.3), action (girls 95% CI =50.1-53.7; boys 95% CI = 45.8-79.4), preparation (girls 95% CI = 65.6-69.0; boys 95% CI = 30.7-34.0), contemplation (girls 95% CI = 67.4-70.7; boys 95% CI = 29.0-32.3) and pre-contemplation stages (girls 95% CI = 68.7-72.0; boys 95% CI = 27.7-31.0).

Table 1. Demographic and economic characteristics of high school adolescents enrolled in public schools of the Amazon (n = 2,517), 2011.

Variables	n (%)	95% CI
Sex		
Male	1.106 (43.9)	42.0-45.6
Female	1.411 (56.1)	54.2-57.8
Age group, years		
14-15	519 (20.6)	19.0-21.9
16-17	1.413 (56.1)	54.2-57.7
18-19	585 (23.2)	21.5-24.6
School grade		
1st	1.103 (43.8)	41.8-45.5
2nd	895 (35.6)	33.7-37.2
3rd	519 (20.6)	19.0-22.1
School shift		
Day	2.040 (81.0)	79.5-82.3
Night	477 (19.0)	17.5-20.3
Residence area		
Urban	2.326 (92.4)	91.3-93.3
Rural	191 (7.6)	6.60-8.50
Occupational situation		
Does not work	2.061 (81.9)	80.4-83.2
Works	456 (18.1)	16.7-19.4
Family income		
Up to 2 MW	1.612 (64.0)	62.2-65.6
3 to 5 MW	710 (28.2)	26.4-29.7
6 or more MW	195 (7.7)	6.70-8.60
Maternal schooling		
Less than 8 years	1.468 (65.4)	63.6-66.9
8 years or more	775 (34.6%)	32.7-36.2

n: absolute frequency; (%): Relative frequency.
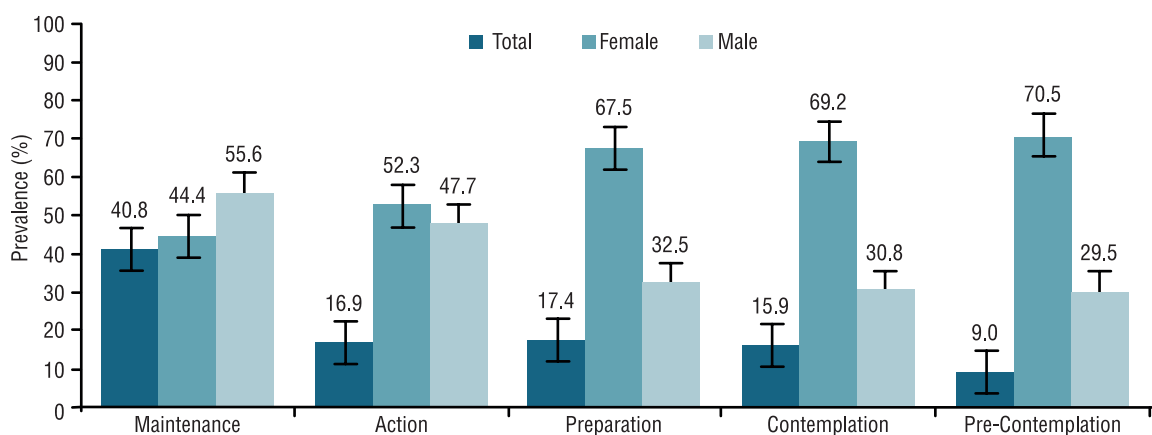* Minimum wages; ** study years.

Figure 1. Prevalence of SBC in the total sample and stratified by sex in adolescents from the Amazon (n = 2,517), 2011.

Table 2 shows the proportions of adolescents in each SBC for PA when considering demographic and economic factors. Associations were observed among SBC with age group (p = 0.025) and occupational status (p <0.001).

Table 3 shows the results of the association analysis between SBC and independent variables. In the crude analysis, gender, age group, school shift, occupational situation and family income were associated with at least one of the SBC categories. In the adjusted analysis, female sex presented higher chance of being in the action (OR = 1.44, 95% CI = 1.14-1.81), preparation (OR = 2.71, 95% CI = 2.14-3.44), contemplation (OR = 2.89, 95% CI = 2.25-3.69) and pre-contemplation stages (OR = 2.91, 95% CI = 2.16-4.00). In addition, adolescents aged 16-17 years had lower chance of being in the action stage (OR = 0.71, 95% CI = 0.53-0.94), and those aged 18-19 years had higher chance of being in the preparation stage (OR = 1.50, 95% CI = 1.04-2.16). Adolescents with family income of six minimum wages or more were more likely of being in the action (OR = 2.09, 95% CI = 1.38-3.17), preparation (OR = 2.02, 95% CI = 1.31-3.12) and contemplation stages (OR = 1.87, 95% CI = 1.18-2.95). Adolescents who worked were less likely of being in the pre-contemplation stage (OR = 0.45, 95% CI = 0.27-0.74).

Table 2. Prevalence of SBC according to demographic and economic factors in adolescents from the Amazon (n = 2,517), 2011.

Variáveis	Total n (%)	Maintenance n (%)	Action n (%)	Preparation n (%)	Contemplation n (%)	Pre-contemplation n (%)	p-value
Age group, years							0,025*
14-15	519 (20.6)	210 (40.5)	113 (21.8)	73 (14.1)	82 (15.8)	41 (7.9)	
16-17	1.413 (56.1)	573 (40.6)	217 (15.4)	251 (17.8)	233 (16.5)	139 (9.8)	
18-19	585 (23.2)	244 (41.7)	96 (16.4)	113 (19.3)	85 (14.5)	47 (8.0)	
School grade							0.436
1st	1.103 (43.8)	449 (40.7)	200 (18.1)	178 (16.1)	180 (16.3)	96 (8.7)	
2nd	895 (35.6)	380 (42.5)	147 (16.4)	156 (17.4)	133 (14.9)	79 (8.8)	
3rd	519 (20.6)	198 (32.8)	79 (15.2)	103 (19.8)	87 (16.8)	52 (10.0)	
School shift							0.122
Day	2.040 (81.0)	814 (39.9)	340 (16.7)	357 (17.5)	336 (16.5)	193 (9.5)	
Night	477 (19.0)	213 (44.7)	86 (18.0)	80 (16.8)	64 (13.4)	34 (7.1)	
Residence area							0.599
Urban	2.326 (92.4)	940 (40.4)	396 (17.0)	408 (17.5)	374 (16.1)	208 (8.9)	
Rural	191 (7.6)	87 (45.5)	30 (15.7)	29 (15.2)	26 (13.6)	19 (9.9)	
Occupational situation							0.001*
Does not work	2.061 (81.9)	827 (40.1)	336 (16.3)	356 (17.3)	335 (16.3)	207 (10.0)	
Works	456 (18.1)	200 (43.9)	90 (19.7)	81 (17.8)	65 (14.3)	20 (4.4)	
Family income [a]							0.091
Up to 2 MW	1.612 (64.0)	681 (42.2)	258 (16.0)	275 (17.1)	252 (15.6)	146 (9.1)	
3 to 5 MW	710 (28.2)	286 (40.3)	122 (17.2)	122 (17.2)	114 (16.1)	66 (9.3)	
6 or more MW	195 (7.7)	60 (30.8)	46 (23.6)	40 (20.5)	34 (17.4)	15 (7.7)	
Maternal schooling [b]							0.229
Less than 8 years	1.468 (65.4)	616 (42.0)	246 (16.8)	246 (16.8)	220 (15.0)	140 (9.5)	
8 years or more	775 (34.6%)	309 (39.9)	140 (18.1)	142 (18.3)	128 (16.5)	56 (7.2)	

n: absolute frequency; %: Relative frequency of each category of independent variables.
a Minimum salaries; b Study years. Chi-square test. * Significant at p <0.05 level.

Table 3. Demographic and economic factors associated with SBC in adolescents from the Amazon (n = 2,517), 2011.

Variables	ACTION		PREPARATION		CONTEMPLATION		PRE-CONTEMPLATION	
	OR Crude (95% CI)	OR Adjusted[a] (95% CI)	OR Crude (95% CI)	OR Adjusted[a] (95% CI)	OR Crude (95% CI)	OR Adjusted[a] (95% CI)	OR Crude (95% CI)	OR Adjusted[a] (95% CI)
Sex								
Male	1	1	1	1	1	1	1	1
Female	1.38 (1.10-1.73)[b]	1.44 (1.14-1.81)[b]	2.60 (2.06-3.29)[b]	2.71 (2.14-3.44)[b]	2.82 (2.21-3.61)[b]	2.89 (2.25-3.69)[b]	2.99 (2.19-4.08)[b]	2.91 (2.16-4.00)[b]
Age group, years								
14-15	14-15	1	1	1	1	1	1	1
16-17	16-17	0.71 (0.53-0.94)[b]	1.26 (0.93-1.71)	1.32 (0.97-1.80)	1.04 (0.77-1.40)	1.11 (0.82-1.50)	1.24 (0.85-1.82)	1.38 (0.95-2.07)
18-19	18-19	0.74 (0.53-1.04)	1.33 (0.94-1.89)	1.50 (1.04-2.16)[b]	0.89 (0.63-1.27)	1.04 (0.72-1.51)	0.99 (0.62-1.56)	1.28 (0.81-2.09)
School grade								
1st	1		1		1		1	
2nd	0.87 (0.67-1.12)	Excluded	1.04 (0.80-1.34)	Excluded	0.87 (0.67-1.14)	Excluded	0.97 (0.70-1.35)	Excluded
3rd	0.90 (0.66-1.22)		1.31 (0.98-1.76)		1.10 (0.81-1.49)		1.23 (0.84-1.79)	
School shift								
Day	1	1	1	1	1	1	1	1
Night	0.97 (0.73-1.28)	1.00 (0.74-1.34)	0.86 (0.64-1.14)	1.19 (0.88-1.60)	0.73 (0.54-0.99)[b]	1.30 (0.94-1.79)	0.67 (0.45-1.00)	1.30 (0.87-1.96)
Residence area								
Urban	1		1		1		1	
Rural	1.22 (0.79-1.88)	Excluded	1.30 (0.84-2.01)	Excluded	1.33 (0.85-2.10)	Excluded	1.01 (0.60-1.70)	Excluded
Occupational situation								
Does not work	1	1	1	1	1	1	1	1
Works	1.08 (0.84-1.46)	0.15 (0.86-1.54)	0.94 (0.71-1.25)	0.99 (0.74-1.35)	0.80 (0.59-1.09)	0.92 (0.66-1.27)	0.40 (0.24-0.65)[b]	0.45 (0.27-0.74)[b]
Family income *								
Up to 2 MW	1	1	1	1	1	1	1	1
3 to 5 MW	1.13 (0.87-1.45)	1.13 (0.87-1.47)	1.06 (0.82-1.36)	1.13 (0.87-1.47)	1.08 (0.83-1.40)	1.16 (0.88-1.51)	1.08(0.78-1.49)	1.21 (0.87-1.68)
6 or more MW	2.02 (1.34-3.05)[b]	2.09 (1.38-3.17)[b]	1.65 (1.08-2.52)[b]	2.02 (1.31-3.12)[b]	1.53 (0.98-2.39)	1.87 (1.18-2.95)[b]	1.17 (0.64-2.11)	1.52 (0.83-2.79)
Maternal schooling **								
Less than 8 years	1		1		1		1	
8 years or more	0,88 (0,69-1,13)	Excluded	0,87 (0,68-1,11)	Excluded	0,86 (0,67-1,12)	Excluded	1,25 (0,89-1,76)	Excluded

OR: Odds Ratio; 95% CI: 95% Confidence Interval. * Minimum wages; ** study years. a Adjustment for all variables with p <0.20 in the crude analysis. b Significant at p <0.05.

DISCUSSION

The majority of adolescents were in the maintenance stage and the minority was in the pre-contemplation stage. These findings corroborate the results of research conducted with adolescents from Pernambuco[11] and Santa Catarina[4,10,12-14], but there were differences between studies in the

prevalence verified at each stage. Partially divergent results were found in a survey with Belgian[15] and US adolescents[17], since most of them were in the maintenance stage; however, the action stage was the least frequent.

These discrepancies may be related to regional differences between studies, which due to their particularities, may have an influence on SBC[7]. In Brazil, specifically in the northern region, the predominantly hot climate, precarious public security and lower economic development are factors that diverge in relation to the southern region and other countries, and may interfere with the behavior of adolescents. However, the possibility of interference of these factors in young people's behavior needs to be investigated, as this was not the purpose of this study. It is noteworthy that the findings of the present study corroborate the results of a recent systematic review on the subject with adolescents, which included researches from different countries, including Brazil[7]. The importance of adolescents progressing to the action stage is emphasized, since diseases such as diabetes, hypertension and dyslipidemias may have physical inactivity as risk factors[20].

Sex was associated with all stages. Girls were more likely of being in the action, preparation, contemplation and pre-contemplation stages compared to boys, corroborating other national surveys[4,10]. According to Silva et al.[4], the chance of boys practicing regular PA is higher compared to girls. However, the findings of the present study also suggest that girls showed greater intention to move to more active behavior.

Possibly, the behavior of young women in relation to PA is linked to socio-cultural aspects, since young men are stimulated from early age to PA and sports practices [21], while girls, due to an apparent fragility, engage more frequently in activities of mild intensity such as domestic activities[22]. It is also believed that girls, for perceiving a greater variety of barriers (lack of time, adequate climate, companionship and commitment to studies) for the practice of PA than boys[23-24], have less intention of changing the behavior. Thus, it is likely that such perceptions will be presented as something that needs to be solved as a priority, so that those who do not intend to include the daily practice of PA in their daily living consider such a possibility.

Regarding the age group, adolescents aged 16-17 years were less likely of being in the action stage, and those aged 18-19 years were more likely of being in the preparation stage, compared to those aged 14-15 years. Other studies also observed a lower possibility of adoption and maintenance of PA by older adolescents[14,15]. In addition, evidence indicates that even for those who are already regularly involved in PA, there is a decline in PA levels at the end of adolescence[6,25]. Perhaps this is linked to other priorities of adolescents in advanced ages such as the insertion in the labor market and the preparation for the entrance exam that requires an intense and exhaustive study routine, especially for those who are in the last year of high school. Thus, even if they intend to start in the near future, or keep practicing on a regular basis, this desire may be left behind.

Adolescents who worked were less likely of being in the pre-contemplation stage. A similar result was observed in a study with adolescents

from Santa Catarina[4], while a divergent result was observed in a study with adolescents from Pernambuco[11]. The difficulty of deepening the discussion about SBC and the occupational situation in adolescents needs to be recognized, since, although it is a population that usually seeks a job opportunity, the low proportion of workers in this age group limits the understanding between the practice of PA and the occupational issue in studies of this nature. Nevertheless, it is assumed that adolescents who work feel financially autonomous and, even if they value occupational and academic activities, they imagine themselves engaged in some planned PA in the future, with a view to improving health and consequently physical appearance.

Adolescents with higher family incomes were more likely of changing to a more active behavior. These results diverge, in part, from a study conducted with adolescents from Santa Catarina, where it was verified that higher income was a protection factor for the preparation stages, while for the contemplation stage, it was a risk factor[4]. In adolescents from Sergipe; however, it was observed that the lower purchasing power was a risk factor for the pre-contemplation and contemplation stages[3]. Such divergences may be a reflection of the complexity of the individual's intention to practice PA or not, especially when considering individual needs[26]. In addition, a more favorable economic position can positively contribute in aspects directed to the level of knowledge of those who compose the family[27]. Thus, it is assumed that for having more opportunities access to information, adolescents from families with better economic conditions understand the need to change habits and, in the near future, wish to adopt measures that contribute to health, among them regular PA practice, including paid activities such as those conducted at gyms or clubs.

Investigating SBC in isolation allows for a more in-depth understanding of how adolescents behave within a given time frame and their intent about possible changes in relation to PA, especially by identifying groups that need more effective interventions. Thus, the present study has relevance on some aspects, highlighting the distinct analysis according to each stage; the study with Amazonian adolescents, since the northern region of the country still lacks a greater number of studies on PA; the sample size and its representativeness can be considered as strengths, and the results found may be used for comparisons with future investigations.

Despite the relevance of the study, some limitations need to be considered in the interpretation of results, such as the cross-sectional design that did not include adolescents from private schools, making it impossible to generalize the results to the population of adolescents out of the school. Another limitation refers to the failure to investigate barriers perceived by adolescents for the practice of PA that could be associated with SBC.

CONCLUSION

Over one-third of adolescents from public high schools in the Amazon were in the maintenance stage for regular practice of PA. Factors associated

with at least one SBC were sex (female), age (16-17 years and 18-19 years), family income (six minimum wages or more) and occupational status (work). These factors should be considered in the planning and implementation of strategies for behavioral changes related to PA.

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