



Behavior change stages related to physical activity in adolescents

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ABSTRACT

Studies related to behavior in relation to the practice of physical exercises have attracted the attention of many researchers. However, there is still a lack of investigations on this topic especially among adolescents. The objective of this descriptive-analytical type research was to classify the practice of physical exercise according to the Behavior Change Stages (BCS) theory, according to gender, grade and socioeconomic level. The subjects were high-school adolescents from the city of Recife-PE with average age of 16.2 ± 1.1 (14 to 19 years of age) selected by conglomerate sampling totalizing 2,271 students (1,022 boys and 1,249 girls) from 29 private schools. Social-demographic and BCS characteristics were surveyed by means of the application of a self-report questionnaire. The analysis of data were conducted using the descriptive statistics, the chi-squared test, the Spearman correlation and the Mann-Whitney *U* test ($p < 0.05$). The students presented the following characteristics: 66.3% belonged to economical classes A1 and A2, what evidenced the high purchasing power of the sample. In the group studied, 61.6% of the adolescents were classified as inactive or irregularly active and 26.2% were classified as inactive (pre-contemplative and contemplative), and in the analysis by gender, boys were physically more active than girls according to grouped BCS. A decline on the practice of physical activities with the grade advance was also verified. The creation of interventions in schools of the region with the objective of encouraging the practice of physical activities is suggested, especially among girls, that contemplate the option selected by the students, and structural reformulations to suit schedule/activity as effective ways to change the behavior in relation to physical activities.

INTRODUCTION

In the last years, studies on the physical activity area related to health have indicated life-style as one of the most important health indicatives of the population. Nahas⁽¹⁾ defines life-style as "the set of habitual actions that reflect attitudes, values and opportunities in the lives of individuals", emphasizing the wideness of the term.

Specifically among young individuals, this definition receives a particular feature, considering the complexity and variability of behaviors observed in adolescents worldwide, considering, for example, cultural, social and political differences.

A study performed in France showed that, among 15-25 year old young individuals, accidents and suicide respond for 71% of deaths causes, and in many cases, followed by psychological disturbances⁽²⁾. In Spain, one observes reduction on the number of infections and nutritional diseases and increase on the number of

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adolescents exposed to drugs, violence, accidents, sexually transmissible diseases, undesired pregnancy, alimentary disorders among others factors potentially preventable⁽³⁾.

In the United States, available data indicate situation similar to Spain's, with the use of drugs and alcohol and improper sexual behavior leading the causes of morbidity, mortality and social problems among young individuals⁽⁴⁾.

A healthy life-style including the regular practice of physical activities is vital, both in the prevention and in the control of some non-transmissible chronic diseases, such as the cardiovascular diseases, obesity and dyslipidemia, and in the reduction of morbidity and mortality caused by many other diseases⁽⁵⁻⁹⁾.

In this context, physical activity is presented as one of the main components of a healthy life-style but, unfortunately, has undergone reduction on its regular practice. The numbers relative to inactiveness obtained in a national survey in the USA in the years of 1997 and 1998 showed that approximately four out of ten American adults (38.3%) do not participate in any type of physical activity in leisure⁽⁶⁾. These data currently indicate physical inactiveness as one of the most important public health problems in that country⁽¹⁰⁾.

In countries from the European Union, a large variability on the prevalence of physical activities practiced in leisure was found, where countries such as Finland and Sweden showed prevalence slightly above 90%; on the other hand, Portugal presented the worst situation, with 40.7% of prevalence⁽¹¹⁾.

In Brazil, studies are indicating values of 60% and 67% of sedentary behavior in the Northeastern, Southern and Southeastern regions and specific populations⁽¹²⁻¹⁶⁾. In study involving adolescents from the Southern region of Brazil, Silva and Malina⁽¹⁷⁾ found results even more disappointing, once 94% of girls and 85% of boys, according to the criteria adopted, were classified as inactive.

There are evidences in literature demonstrating that habits and behaviors related to health adopted in childhood and adolescence tend to stabilize in the adult life⁽¹⁸⁾; in the adult phase, the interventions undergo more resistance and behaviors are less passible of alteration. An intense decrease on the practice of physical exercises during adolescence especially among 15-year old girls on has been observed⁽¹⁹⁾.

The increase on the number of studies on the effects of physical activity regularly practiced is not only justified by benefits scientifically verified of a healthy lifestyle, but also by inferring definitely on the quality of life of these individuals.

Despite researches involving physical activity are countless in the world literature, there is a lack of studies that identify the practice of physical activity, especially in Brazilian adolescents within the age range with several possibilities of behavior change and by representing, at least theoretically, the school age.

In the theory elaborated by Prochaska and Marcus⁽²⁰⁾, the expected behavior change follows a sequence of stages in which the individual reaches the next stage, in case the characteristics of the stage he is found are already incorporated. Chart 1 shows the behavior change stages and their respective characteristics.

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CHART 1
Behavior change stages and their characteristics

Stages	Characteristics
Precontemplation	Individual does not intend to change behavior in the next six months
Contemplation	Individual is strongly inclined to change behavior in the next six months
Preparation	Individual intends to act in a near future (generally next month)
Action	Behavior has already been incorporated for at least six months
Maintenance	Action already happens for over than six months and the chances to return to old behavior are few

Source: Adapted from Prochaska and Marcus (1994).

The change stages model, also known as transtheoretical model, although primarily psychological, recognizes that change process specific factors, such as the perception of benefits (pro) and the barriers (against), include social and environmental factors.

Maybe considering the cognitive and behavioral processes, besides the internal and environmental factors involved in the adoption of a new behavior related to health, is the reason attributed for this model to be emphasized in the area related to health and particularly in the area involving physical activity.

Other advantage of this model lies in the fact that when an individual is classified, there are evidences of what could be the most suitable intervention for each type of behavior identified⁽²⁰⁾.

In this context, the present study searched to perform the physical activity classification according to the Behavior Change Stages theory (BCS) proposed by Prochaska and Marcus⁽²⁰⁾ in a sample of high-school adolescents from private schools of Recife, PE.

METHODS

According to Thomas and Nelson⁽²¹⁾, this is an descriptive, analytical type study. The orientations of the Ethics Committee of Researches involving Human Beings of the Santa Catarina Federal University were followed. Thus, the Consent Form was sent to all schools selected for this study and received properly signed by the data collection.

According to the last School Census, the city of Recife currently has 192 high-schools (three federal public schools, two municipal public schools, 87 state public schools and 100 private schools) (State of Pernambuco, 2002). To develop studies involving schools not always is an easy task, and one still observes that the large majority of studies involve adolescents from public schools, due to the most different and not less important reasons. These characteristics justify the selection of the private school segment, besides the fact that it represents 52.1 % of the total number of schools.

A total of 93,577 registrations were performed in high-schools of the city of Recife. From this total, 28,688 registrations (approximately 33%) were performed in the 100 private schools selected. As the schools are not uniformly distributed in the two Teaching Executive Management (DEE) actuation regions (North and South), 29 schools were randomly and proportionally selected as follows: 12 schools (41%) – DEE North and 17 schools (59%) – DEE South using a nominal relation provided by the Department of Information and Statistics (DIE) of the Education State Ministry in order to perform the allotment⁽²²⁾. In order to estimate the size of the sample, the Barbeta⁽²³⁾ proposition was used, adopting a sampling error of 2%. Thus, 2,299 students were randomly selected and, after applying the exclusion criteria (refusal to participate and filling errors), 2,271 young individuals were totalized (1,022 boys and 1,249 girls) with age average of 16.2 ± 1.1 years.

For selection purposes, the sampling was randomly performed by conglomerate with groups as sampling units. Thus, with the

objective of obtaining a sample representative of the DEE actuation region and the school grade, a sequence in two stages was determined:

1st stage: the representativeness of the number of students of each DEE actuation region in relation to the total population was determined;

2nd stage: the representativeness of the number of students considering the region and the high-school grade was determined.

A questionnaire composed of the identification items (age, gender and school grade), the socioeconomic level classification proposed by the National Association of Research Companies – ANEP⁽²⁴⁾, and the questions with regard to the BCS, was used in the data collection. According to the literature, the BCS were grouped into three categories, where the *precontemplation* and *contemplation* stages called as **inactive**, the *preparation* stage called as **irregularly active** and the *action* and *maintenance* stages called as **active**. This instrument was constructed based on a pilot study and applied in a self-administrated way. Its quality was verified through face validity and classification concordance procedures, according to the Kappa index classification table, obtaining score of $k = 0.88$.

The data collecting occurred in August 2002 and the questionnaire was applied in classroom. Initially, the research objectives were presented and later the students read the instrument. A period of 45 minutes was given to students to respond the questionnaire and the researcher was always present for any explanation.

For the analysis of data, the Mann-Whitney *U* tests and the Spearman rank order correlation were used in the inductive and descriptive non-parametric statistical analyses, respectively. The two-way contingency tables of BCS in relation to gender and age range were also used. The statistical package SPSS version 10.0 for Windows was used for all procedures and the significance level adopted was of 5%.

RESULTS

According to the ANEP socioeconomic classification, 66.3% of adolescents were classified in categories A1 and A2. Bungum and Vincent⁽²⁵⁾ assured that the NSE may influence the number of opportunities offered to adolescents, once the wealthiest may be involved both in structured activities such as academies and clubs and in free activities in parks, neighborhood or playgrounds, while the poorest would theoretically only have the second choice.

In the BCS analysis, one observes that 38.3% of the adolescents practice regular physical activity (action and maintenance), while 35.4% practice physical activities irregularly (preparation). In this context, these findings show a value of 26.2% for inactiveness (precontemplation and contemplation). The relative numbers of *inactive* and *irregularly active* altogether reached 61.6%, too high considering the favorable climatic conditions and environment the city of Recife offers during the entire year.

Analyzing by gender, it was verified that, according to literature, boys are more active than girls, once values found in *action* and *maintenance* stages were higher (figure 1). Based on the Mann-Whitney *U* test, statistically significant result between the BCS classification of boys and girls was found, and the boys were in more active stages than girls ($p = 0.000$).

Analyzing BCS by school grade (figure 2) it was verified that in the 5th grade, the prevalent stage was *maintenance* (32.8%), while in 6th and 7th grades, the *preparation* stage was the most prevalent, with 35.2% and 39.7%, respectively.

In this context, it is verified that, while in the 5th grade, 54.3% of the adolescents are concentrated in *preparation*, *precontemplation* and *contemplation* stages, this percentile is of 55.8% in the 6th grade and 76.1% in the 7th grade, emphasizing the decline observed in the practice of physical exercises with the school grade advance, possibly due to factors such the ingress in the labor market or the study for the college entrance examinations.

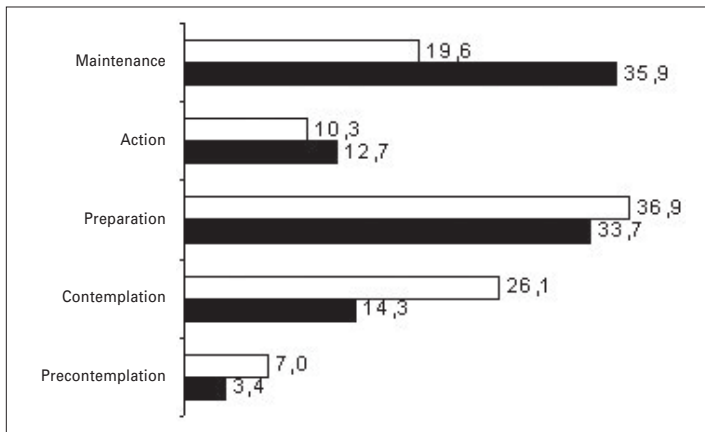


Fig. 1 – Relative frequency (%) of behavior change stages in adolescents from private schools of the city of Recife, according to gender

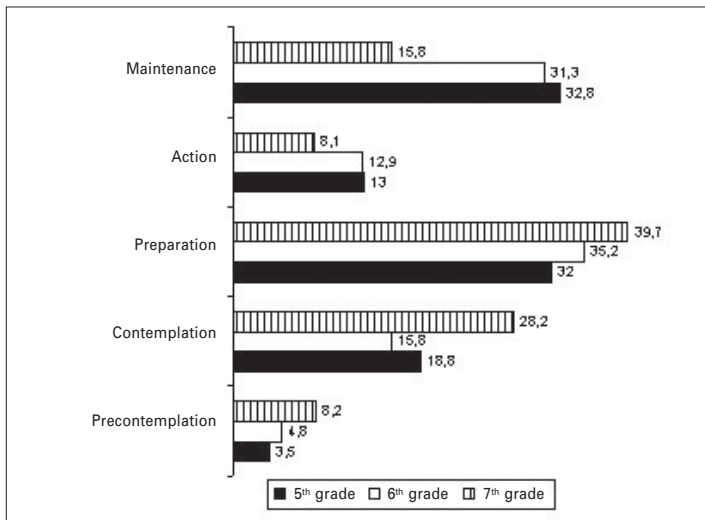


Fig. 2 – Relative frequency (%) of behavior change stages in adolescents from private schools of the city of Recife, according to school grade

Figure 3 shows the BCS prevalence grouped by chronological age. It is observed that at ages from 17 to 19 years, the highest frequency of *inactive* and *irregularly active* was found, equal to or greater than the *actives*.

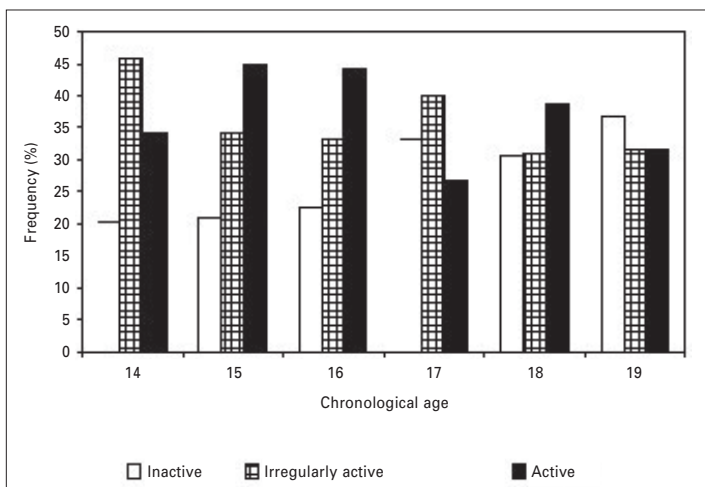


Fig. 3 – Behavior change stages (three categories) in adolescents from private schools of the city of Recife, according to chronological age

Two distinct pictures were observed when information relative to BCS grouped by gender were analyzed, once the number of *active* (48.6%) exceeded the number of *irregularly active* (33.7%) and *inactive* (17.7%) among boys, while, among girls, the number of *active* (29.9%) was overcome both by the number of *irregularly*

active (36.9%) and *inactive* (33.1%). These information are corroborated by literature, where boys are more active than girls, and that there is a general decline, regardless the gender, in the physical activity levels with the advance in age^(26,27).

From information collected, one could verify that BCS are negative and significantly correlated with chronological age ($r_s = -0.129$; $p = 0.000$), with school grade ($r_s = -0.187$; $p = 0.000$) and positively with NSE ($r_s = 0.053$; $p = 0.012$).

It is worth mentioning that the division of groups into *active*, *irregularly active* and *inactive* was not the same for all works found in literature, and some studies divided samples only into *active* and *inactive*, where the preparation stage is included in the first group. It must be warned that this is a discussible analysis option, once subjects found in the preparation stage, according to Prochaska and Marcus⁽²⁰⁾, still intend to change behavior in the near future or present irregular behavior and, hence, it would be more acceptable to include them in the inactive group and not otherwise.

Anyway, after the general analysis of the sample, one concludes that some information deserve emphasis, for example, the behavior of boys being differentiated from that reported by girls.

These results are in agreement with results found in literature, which indicate positive association between NSE and the increase on the physical activity level, besides the reduction on the physical activity levels with age advance⁽²⁸⁻³¹⁾. However, the values found in the present study are too low, thus hindering any inference.

Sallis *et al.*⁽³²⁾ analyzed differences in the physical activity practice levels by NSE, emphasizing that the regularity of Physical Education classes in wealthier schools is higher than in schools with less financial resources, where absences of both students and teachers are frequent.

For the performance of the Mann-Whitney *U* test, two age range groups were formed: one group with adolescents from 14 to 16 years old and another group with adolescents from 17 to 19 years old, this way attending to the test conditions.

There is certain scientific consistence, showing that boys are more active than girls, once the difference in the physical activity practice levels between genders is the most studied socio-demographic factor⁽³²⁾.

Based on the Mann-Whitney *U* test, a statistically significant result between the BCS classification of boys and girls was found in the present study, and boys were found in more active stages than girls ($p = 0.000$) (table 1).

TABLE 1
Comparison in the adolescents classification by gender, according to BCS

Indicative BCS	Control variable	
	Gender	
	Boys	Girls
Average rank	1,289.83	1,010.13
Significance level (p)	(0.000)	

Table 2 shows the decline on the physical activity levels between age groups. Similar result was found in 1999 by the Risky Behavior Supervising System in Youths - US Department of Health Prevention and Control⁽⁸⁾.

TABLE 2
Comparison in the adolescents classification by age (grouped), according to BCS

Indicative BCS	Control variable	
	Age	
	14-16 years	17-19 years
Average rank	1,214.15	1,019.33
Significance level (p)	(0.000)	

Studies have pointed to a decline on the physical activity levels at the end of the adolescence⁽³³⁾. This fact may be observed, once the younger group is more active than the older one.

DISCUSSION

Despite governmental, medical and scientific community recommendations that, in order to maintain oneself healthy, the adolescents need to practice physical activities regularly, there is still a lack of epidemiological studies that investigate the middle and long-term effects of physical activity on health⁽³²⁾.

The decline observed on the number of *active* with ages between 15 and 16 years and the maintenance of the increasing curve of *inactive* and *irregularly active* perhaps may be explained by the great percentile of youths getting prepared for the college entrance examinations, and therefore they dedicate more hours to study in this age range. Furthermore, the Brazilian adolescent is more and more searching for work and, according to the DIEESE, Brazil figures among the countries with more working adolescents⁽³⁴⁾.

The numbers relative to BCS are corroborated with indexes found in other countries, such as the United States, that currently strongly invest in campaigns that encourage the practice of physical activities in all ages, fact not observed in our country with the same intensity.

Despite the decline on the physical activity levels along the years is a well accepted and studied phenomenon, Sallis⁽²⁶⁾ reports that this phenomenon is not yet fully understood; in other words, it is not known yet whether this decline is due to a biological or environmental phenomenon.

In longitudinal research performed in American adolescents, an intense decline on the physical activity practice levels was found, especially at the end of the adolescence, what led authors to see schools as the perfect target for the implantation of public policies in adolescents health⁽³⁵⁾.

To promote researches on the prevalence of physical inactivity among Brazilian adolescents is a latent need for the development of physical activities increment interventions. This recommendation is corroborated with authors from other parts of the world, emphasizing that this is not a lack only among Brazilian adolescents^(2,3,36).

To perform researches without, however, pointing the evidences found for further interventions in order to make them more susceptible to success seems less and less acceptable.

It is known that almost all studies are limited. From the countless aspects presented by the human behavior in relation to physical activities, we would like to emphasize the fact that the application of the results of this study in other regions of Brazil may be defective, once there are reports in literature about seasonal influences in the physical activity levels and selection⁽²⁵⁾.

This alert suggests that intervention strategies should be carefully selected in order to assure affinity between the cultural/demographic characteristics and the peoples' wishfulness.

To observe the role each health professional plays and to encourage his leader position based on specialized improvement and actualization programs seem a reasonable way to narrow relations between researchers and health professionals in the labor market, who, many times, keep a quite unfavorable distance to dialogue.

According to Possebon and Cauduro⁽³⁷⁾, the veracity of medical certificates the students exhibit in order to be exempted of attending physical activity classes is discussible and yet, some of the reasons reported do not belong to the list of dispensations authorized by law. In addition, the authors report that these dispensations make the subject Physical Education discredited in school.

This complex situation must be discussed in a multidisciplinary way, once there are two problems: on one hand, the quality of the Physical Education class offered in school that leads to the students' refusal, and on the other, medical professionals who "cov-

er" the situation with the issue of false certificates. The effect? A vicious circle that maintains the refusal and the low participation of youths in physical activities in the school environment.

The knowledge of the students' wishfulness in relation to physical activities may lead to a radical change in curriculums offered in schools, once students are tired of activities (repetitive) and the way they are offered (not much stimulating), and the physical activities remain unchanged.

To create spaces in schools, public parks and squares for the practice of physical activities with skates and roller skates with bicycle parking does not seem to be relevant reforms in such structure in order to offer environmental facilitators for the practice of physical activities in schools and to stimulate the use of more active transportation.

Santos⁽³⁸⁾ emphasizes that the lack of spaces and security, besides extinguishing street children's play, especially in large cities, has more and more led young individuals to select television and computer, resulting in youth with higher levels of relative body fat.

On the other hand, governmental institutions may contribute with structural changes in cities, such as streets specially built for bicycle traffic and to remove obstructions from sidewalks, without, however, leaving public security as the users guarantee behind.

CONCLUSION

One may conclude that 62.1% of adolescents are inactive or insufficiently active according to BCS and that boys are more physically active than girls. Youth tend to reduce the practice of physical activities with the advance in the school grade and this decline is also evidenced when the data are analyzed by chronological age.

Carrying out further studies on the physical activity level in young individuals from other Brazilian regions is suggested for explanations with regard to behavioral differences in function of the geographic positioning, urbanization, climate, among others.

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