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Study of the physical activity level (PAL) of adolescents in school: Relationship to physical and psychological health.

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Abstract:

As a playful means of education, physical activity offers the possibility of maintaining one's body, improving physical fitness, participating in physical well-being while contributing to psychological well-being by improving self-confidence, self-esteem and other psychological variables. The objective of this study is to study the level of physical activity (PAL) of adolescents in school and its relationship with physical and psychological health. For this purpose we used descriptive and analytical methods on a random sample of 120 pupils aged between 15 and 18 years old. For the data collection we used a questionnaire to assess physical and psychological health, a 24-hour recall PAL assessment grid. Statistical analysis allows us to conclude that: the PAL of adolescents is moderate (1.89); the PAL is positively correlated with physical and psychological health (R=0.78). Therefore we recommend a physically active lifestyle, a large-scale strategy aimed at increasing the physical activity of adolescents while respecting their profile and motivation.

Key word: physical activity, physical health, psychological health, PAL

* المؤلف المرسل.

1- Introduction

Physical activity covers a wider field than just sports practice, it includes professional activities, travel almost in everyday life and during leisure time. For children and adolescents, physical activity includes play, sports, walking, cycling and compulsory physical and sports education (PES) sessions in the school curriculum. The nature, frequency, duration and intensity of physical activity are important parameters to be considered for good physical and mental health. On the basis of these parameters, certain recommendations are issued in order to specify the amount of physical activity necessary for it to be beneficial for the health of individuals. Indeed, since 2008, the WHO has been recommending a minimum of 30 minutes of moderate-intensity daily physical activity for adults, including senior citizens, and a minimum of 60 minutes for children and adolescents (Strong, 2005).

Physical or sporting activity is considered to be a factor a priori favourable to health (INSERM, 2008). Indeed, it is an essential component of a balanced lifestyle and its many benefits for physical and psychological health mean that this lifestyle habit should be encouraged and valued in society. However, many people, although aware of the benefits of PA, do not practice it, or at least not sufficiently, and this can be detrimental to health and well-being, particularly adolescents, where this age group represents an important transition stage, during which young people develop their identity and values and make choices about the lifestyle habits they adopt. These choices can have an impact on their current health status, but can also affect their long-term health status.

WHO (2005) defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. » Although it emphasizes the multidimensional aspect of health, this definition is incomplete as the focus is on the presence or absence of disease or infirmity. This definition has also been criticized because it does not refer to the fact that a person may be active and free of disease, but may not feel a state of complete well-being.

Health is generally understood to mean "a good physiological state of a living being, the harmonious and regular functioning of the organism". The state of health refers to the qualifier "healthy" (sanusen Latin) which means having organs in good condition, not being a carrier of physical or mental illnesses. A healthy pupil is, according to the expression, "healthy in body and mind" (Gilbert ORCI, 2006). From childhood, attempts should be made to create habits, acquire skills and develop a taste for sport. This is all the more important because, on the medical, psychological and social level, there are also benefits that are more specific to children and adolescents.

Some studies indicate that the level of physical activity present in adolescence tends to continue into adulthood. The relationship between the level of physical activity (PAL) and the physical and psychological health of adolescents is at the heart of our research work. It implies a good knowledge of the concepts explored, and studies of association between these concepts are discussed. This is important, especially in adolescents where physical activity is present in the school environment (PES). Knowing that an active lifestyle can be a barrier to health problems, it is essential to study the relationship between the NAP and the physical and psychological health of young people. This has led us to ask the following questions:

1) Is the level of physical activity of adolescents in school satisfactory according to WHO recommendations?
2) What is the nature of the relationship between the physical activity level (PAL) of students and physical health?
3) What is the nature of the relationship between the physical activity level (PAL) of students and psychological health?
4) What is the nature of the relationship between the physical activity level (PAL) of students and physical and psychological health?

2- Method and Materials

2-1- Sample:

Our study was based on a sample of 120 students in two secondary schools located in Bejaia. The members of our sample are aged between 15 and 18 years old. We chose this age group because it represents an important transition stage, during which young people develop their identity and values and make choices in terms of the lifestyle habits they adopt.

2-2- Materials

2-2-1- The questionnaire

Since our research work focuses on the relationship between two essential aspects; the level of physical activity of young people and their physical and psychological health, we considered it necessary to use the questionnaire as a data collection tool. It is composed of a series of questions that follow on from each other in a structured way, allowing for the methodical collection of information in the context of a survey. It aims at testing theoretical hypotheses. It provides quantitative and qualitative information that is accurate and can be used to establish correlations and numerical comparisons, often presented in tabular and/or graphical form.

2-2-1-1- Structure of the questionnaire

Our questionnaire contains twenty statements on PSAs and the two essential aspects of health, (physical and psychological health) and five suggested possible answers on the Likert scale. The statements from one to ten are focused on the physical aspect and the statements from eleven to twenty on the psychological aspect. The maximum possible score per axis is 50 points, while the minimum possible score is 10, giving us a median of 30.

2-2-2- Physical Activity Level (PAL) grid:

This is the estimated number of hours spent per day on each type of activity, averaged over the duration of these activities over a day. The more accurate the estimate, the closer the calculated PAL will be to reality (Bougandoura and Zaabar. 2018) . First note the duration of all the activities carried out during the day:

- Classify the activities at the level of their intensity (PAL), to simplify the evaluation the activities are divided into six main categories (to which corresponds a PAL) according to the table below.

- Calculate the average NAP in this way:

PAL= coefficient of PAL x duration (hours)/21

Each category corresponds to a specific level of activity that will have to be multiplied by the number of hours.

Table 1: Ranking of activities of children and adolescents aged 10 to 18 in 7

Catégorie	NAP	Activité
A	1	Sleep and siesta, lying down rest
B	1.75	Sitting position. (TV, computer, homework, meals, transport)
C	2.1	Standing position (toilet, shopping, kitchen, short trips)
D	2.6	Light, low-intensity activities (games can be active)
E	3.5	Moderate activities (brisk walking, manual work.)
F	5.2	Sporting activities (club training, PES...)
G	10	Sports competition

2-2-2-1- Categories by Physical Activity Level (PAL) (Martin 2000).

- Low physical activity 1.50 to 1.80

- Moderate physical activity 1.80 to 2.20

- High physical activity above 2.20

3- Procedure

For the purpose of the PES sessions, the questionnaire related to physical and mental health and the Physical Activity Level (PAL) grid were distributed. The objective of these two tests and the interest of our study were then clearly explained. Students were given all the time they needed to answer objectively. It was also emphasized that the results will be anonymous. The scales were retrieved immediately after all students had finished answering.

4- The statistical analysis:

Our statistical approach is partly descriptive, as far as the questionnaire concerning physical and psychological health is concerned; we calculated the overall average as well as the average of each dimension. The physical activity level of our sample members was calculated using the 24-hour activity recall method. In the second part, we processed the various data obtained from the analytical statistics, namely the Pearson test (r), which allows us to calculate the correlation between the level of physical activity (PAL) and physical and psychological health.

5 - Presentation of the results:

5-1- Presentation of results related to the Physical Activity Level (PAL).

Table 2: Average PAL of the sample members.

Sample members.	120
Physical Activity Level (PAL)	1,89

The results recorded in Table 2 show that the physical activity level (PAL) of the members of our sample is 1.9. This score is moderate in accordance with the recommendations of international health authorities (WHO).

5 -1-1- Detailed presentation of the categories according to the PAL.

Table n°3: Categories according to PAL

Categories	n=120	Percentage %	PAL
High	24	20%	2 ,14
Moderated	66	55%	1,94
Low	30	25%	1,59

The results recorded in the table above show that 55% of our sample have a moderate PAL with an average score of 1.94, while 30% have a low PAL with an average of 1.59, who do not reach the level of physical activity favourable to health in accordance with the recommendations of international health authorities (WHO). Only 20% of students have a high PAL of 2.14.

5 -2- Results relating to the physical dimension of the questionnaire

5 -2-1- Results of the physical health items:

Practicing a physical and sports activity allows me to:

Table n°4: Scores related to the physical dimension of health.

N°		Mean	Score	Median
1	be in good health	4.43	**32.52±5.05**	**30**
2	maintain and improve my physical fitness	3.78		
3	better listening to my body	3.66		
4	develop my physical condition	3.05		
5	improve my physical qualities	3.41		
6	improve my tolerance to effort	3.17		
7	maintain my physical appearance	3.11		
8	be freer in my movements	3.25		
9	feel better about my body	3.31		
10	express myself better physically	3.21		

The results recorded in the table above, show that the average score for each statement related to the physical aspect of our questionnaire is above the median, the highest score recorded is 4.43 points, while the lowest score is 3.05 points. It should be noted that the overall score obtained by all students is expressed with the average (32.52±5.05). This shows the homogeneity of sample, as well as the superiority of this score to the median, which is 30.

5-3- Results relating to the psychological dimension of the questionnaire

5 -3-1- Results of items related to psychological health:

The practice of physical and sports activity allows me to :

Table n°5: Scores relating to the psychological dimension of health.

N°	Item	Scores	Score	Median
11	feel psychological well-being	4,90	32.4±5.1	30
12	have pleasant and positive sensations.	3,89		
13	to have fun and to take pleasure	3,77		
14	to feel comfortable and to relax	3,01		
15	have confidence in my abilities	3,24		
16	decompress psychologically	3,27		
17	getting to know myself better (strengths and weaknesses)	3,05		
18	reduce feelings of depression and nervousness	3,14		
19	express myself better in a group	3,11		
20	build relationships with others	3,28		

The results recorded in the table above show that the average score for each statement relating to the psychological aspect of our questionnaire is higher than the median, the highest score recorded is 4.9 while the lowest score is 3.01 points. It should be noted that the overall score obtained by all students is expressed with the average (32.48±5.10). This shows the homogeneity of sample as well as the superiority of this score to the median, which is 30.

5 -4- Results of the correlations between the different variables:

Table 6: PAL correlations with different dimensions of health.

	PAL	Physical health	Psychological health	Physical and psychological health
PAL	1	0.75	0.77	0.78
Physical health	0.75	1	0.85	/
Psychological health	0.77	0.85	1	/
Physical and psychological health	0.78	/	/	1

Significance at alpha = 0.001

The results recorded on the table above shows a strong positive correlation, significant at the threshold $\alpha \leq 0.001$, between the (PAL) level of physical activity and physical health of adolescents in school (R=0.75). There is also a significant positive correlation between the level of physical activity (PAL) and psychological health (R= 0.77). In the same vein, the data collected in this study confirm a significant positive correlation between (PAL) and physical and psychological health (R=0.78). A final significant positive correlation between physical and psychological health is also noted (R=0.85).

6 - Discussion and interpretation of the results:

***Discussion of the results relating to question 1*:** The results obtained show that our sample has a physical activity level (PAL) with a score of (1.89), which is very close to the lower limit of (1.80). The detailed analysis of the results shows that 25% of the sample presents a low level of physical activity (PAL), which is of the order of (1.59). We also note that 55% present a moderate level of physical activity (PAL) with a score of (1.94). Only 20% of the members of our sample recorded a high level of activity (PAL). Bearing in mind that the level of physical activity is considered by the World Health Organization (WHO) to be a factor favourable to health, it is very urgent to take the necessary measures to provide our children with opportunities to participate in physical activities. The main aim of physical and sports education is to combat the relative decrease in physical activity of pupils, and consequently the increase in sedentary behavior (Hills et al. 2007).

These results can be explained by the increasingly sedentary lifestyle, the lack of practice time due to the students' busy schedules, the lack of possibility of access to practice with a significant demographic increase (supply and demand), not to mention socio-cultural considerations that can

forge negative social representations towards the practice of sports in general and female practice in particular.

***Discussion of data for question 2*:** The results of the study show a significant positive relationship between (PAL) and the physical dimension of health (R= 0.75). Indeed, the practice of PSA is strongly encouraged nowadays; its beneficial effects on health have been demonstrated by the World Health Organization (WHO), which recommends regular practice throughout life providing "a complete state of physical, mental and social well-being" in active subjects (Taylor 2000). It can also be a means of preventing health risks, and several studies (Riddoch and Boreham 2000; Taylor 2000) have demonstrated a close relationship between the level of physical activity (PAL) and diseases such as diabetes, cardiovascular accidents, hypertension, stress, anxiety, osteoporosis, certain cancers and obesity.

The study shows that the practice of sport enables students to maintain and develop their physical condition. While knowing that a person's physiological qualities, like many other attributes, are largely determined by his or her genetic predispositions. Physical fitness can be improved through regular practice of appropriate physical activities (Sallis and Patrick, 1994). Pupils have expressed that they are more attuned to their bodies, as regular physical activity raises young people's interest in their health and makes them responsible for their personal hygiene (Salaun. 2011). Research has indicated that regular physical activity has many health benefits, so PA is associated with a reduced risk of obesity (Leduc et al. 2014), especially when combined with appropriate nutrition and healthy lifestyle habits.

Physical activity improves physical qualities and allows a better tolerance to effort. Cardiovascular function depends on the level of physical activity (PAL), during physical exercise the muscles need a greater supply of oxygenated blood than in a state of rest, this increase in blood circulation is achieved by increasing the activity of the myocardium, the PA allows this muscle to be solicited and makes it progress. Physical activity is now recommended in the field of cardiovascular diseases, both as prevention and to limit the consequences when they are installed (INSERM 2008).

Discussion of the data relating to question 3: This hypothesis states that the level of physical activity (PAL) of students is positively correlated with the psychological dimension of health. Indeed, a significant positive correlation (R=0.77) was recorded between these two variables. The regular practice of physical and sports activity is associated with an improvement in mental health (Inserm2008), and can be a preventive and therapeutic means against depression, phobias, stress,

anxiety, etc. (Inserm2008). (Alfermann et al. 2000) observed that regular physical activity is more effective than relaxation in reducing negative moods; it also provides a sense of fun and pleasure. Similarly (Wankel. 1993) confirms that the greater the pleasure associated with physical activity, the better the benefits for psychological well-being. For (Berkman. 2001) it is identified as a major reason for young people to practice sport. PSA is a safe and effective way to reduce the level of tension in adolescents, (Richard, H.cox.2013) states that increasing the secretion of chemicals serving as neurotransmitters allows for the improvement of psychological state.

The positive repercussions of physical practice for adolescents are particularly in terms of self-esteem and self-image by focusing on their strengths, providing them with opportunities to try new things and master activities (Decamps. 2012). Similarly (Pascal et al. 2009) verified that PSA has a protective effect on body image as well as benefits for self-esteem. Physical activity also helps students to express themselves better in a group, as it allows the creation of social bonds (Michaud. 2001). A sense of belonging can then be experienced, as well as the development of a better relationship with their peers. By helping to reduce isolation, create a context for interaction with others and learn about cooperation and teamwork (Kino-Québec, 1998), since the social interaction that accompanies the practice of physical activity with friends and colleagues is very enjoyable and has the effect of improving mental health.

Discussion of data for question 4: This hypothesis states that students' physical activity levels (PAL) are positively correlated with physical and psychological health. Indeed, a significant positive correlation was recorded between these two variables (r=0.78). Leading an active life with a physical and psychological impact on the well-being of individuals, (Powell et al. 1987) explains that improvement in health status is closely linked to an increase in the PAL, by alleviating the health problems generated by a sedentary lifestyle.

Regular physical activity and sport is of paramount importance for the improvement of the health factor and for ensuring well-being. Physical and mental health are closely linked, there is no health without mental health (WHO). It is a state of complete physical, mental and social well-being, many mental disorders are associated with somatic disorders and many somatic illnesses can be accompanied by mental disorders. These findings are in line with the scientific literature. (Powell et al. 1987) has been able to demonstrate that improvement in health status is closely related to increased levels of physical activity (PAL). A significant positive correlation between physical and psychological health was also recorded as an indication (r=0.85). With these results we can say that hypothesis n°4 is confirmed.

7 - Conclusion

The practice of physical activity is important in the lives of adolescents and must be at the heart of current social concerns. Health professionals insist on the need to adopt an active lifestyle. This lifestyle habit helps to reduce the risk of various health problems that affect the quality of daily life. Indeed, physical activity is associated with a reduced risk of obesity, diabetes, cardiovascular disease and hypertension. In addition, it contributes to increasing self-esteem as well as reducing depressive and anxiety symptoms (Hill and Dishman, 2004). On a social level, it reduces isolation, creates a context for interaction with others and introduces cooperation and teamwork (Kino-Québec, 1998). This does not prevent a significant proportion of the population from not being sufficiently active to reap the benefits of physical activity, particularly among adolescents, since this period of life is associated with a gradual decrease in physical activity.

This research work has enabled us to address a specific problem, which is the level of physical activity (PAL) and its relationship to the physical and psychological health of adolescents attending school. The objective of this study is firstly to determine the level of physical activity (PAL) of this very important fringe of society, and secondly to study the nature of its relationship with physical and psychological health. In order to meet these objectives, the level of physical activity was assessed using the "24-hour recall" method, as well as the assessment of physical and psychological health, using a questionnaire constructed on the basis of statements relating to different aspects of well-being. The results of the present study led to the conclusion that:

- The level of physical activity (PAL) of pupils is insufficient in accordance with WHO recommendations.

- The level of physical activity (PAL) of the pupils is strongly linked to physical well-being and this through the improvement of physical qualities, a better tolerance of effort, etc....

- The level of physical activity (PAL) of the students is positively linked to mental health and this through the fact that physical practice promotes pleasant and positive sensations, the feeling of belonging to a group, a better self-esteem and a better relationship with classmates...etc.

- The physical activity level (PAL) of students is closely related to physical and mental health. Indeed, the higher the PAL, the better the impact, which can even alleviate health problems generated by a sedentary lifestyle, making it possible to say that the practice of sport is of paramount importance in improving the different aspects of health.

It is important to note that good PSA and lifestyle habits acquired during childhood and adolescence are more likely to be maintained throughout life. Therefore, improving young people's PSA is imperative for future health. With a view to improving young people's health through PSA, school

appears to be an opportunity to promote it, in order to inculcate a sporting culture, especially as it is the obligatory passage for all children regardless of their socio-economic and cultural background. It is imperative that this is achieved by raising awareness of the importance of physical and sporting activities in order to reap the expected benefits.

Given the beneficial effects of physical activity on the immediate and future health of young people, and the social benefits derived from it, the promotion of a physically active lifestyle should be a matter for all: parents, health professionals, public policy makers, those responsible for school and sports programs, etc. With a view to increasing the level of physical activity of young people, we have made the following recommendations:

- All children should be physically active through a variety of physical activities that fit harmoniously into their lifestyle: sport, structured training and physical education...etc.

- Large-scale strategies to increase physical activity among children and adolescents must respect their profile, their sources of motivation, targeting the young people's environment and the facilitating conditions.

- School curricula should include a daily period of PA (PES classes, extra-curricular or other activities) focusing on fun and learning motor skills, from a health education perspective.

- Outside of school, young people should be encouraged to participate in PSAs that will provide them with fun while learning motor skills.

- Parents should encourage their children to go outside to play, teach them basic motor skills and introduce them to PSA. The amount of time that youth can spend on low-activity recreation should be limited to a reasonable level.

- Sports facilities and equipment in educational institutions, as well as those in municipalities, should be made accessible to all young people.

- Young people who are overweight should be suggested activities that lead to a significant increase in energy expenditure, an appropriate diet and a change in lifestyle habits.

- The development of sports supervision structures should be encouraged at all levels of practice. Those responsible for initiating, leading or training young people should have the knowledge required to be able to play a full role in developing young people's social skills.

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