Clinical Validation of the "Sedentary Lifestyle" Nursing Diagnosis in Secondary School Students

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Abstract

This study clinically validated the nursing diagnosis of "sedentary lifestyle" (SL) among 564 Brazilian adolescents. Measures of diagnostic accuracy were calculated for defining characteristics, and Mantel–Haenszel analysis was used to identify related factors. The measures of diagnostic accuracy showed that the following defining characteristics were statistically significant: "average daily physical activity less than recommended for gender and age," "preference for activity low in physical activity," "nonengagement in leisure time physical activities," and "diminished respiratory capacity." An SL showed statistically significant associations with the following related factors: insufficient motivation for physical activity; insufficient interest in physical activity; insufficient resources for physical activity; insufficient social support for physical activity; attitudes, beliefs, and health habits that hinder physical activity; and insufficient confidence for practicing physical exercises. The study highlighted the four defining characteristics and six related factors for making decisions related to SL among adolescents.

Keywords

adolescents, clinical validation, nursing diagnosis, sedentary lifestyle

Sedentary lifestyle (SL) is a highly prevalent risk factor for cardiovascular diseases, and studies have shown that more than 70% of adolescents are insufficiently active (Michaliszyn & Faulkner, 2010; Sanaeinasab, Saffari, Nazeri, Zarchi, & Bradley, 2013). Despite the high frequency, the lack of consensus on the definition and/or characterizing criteria makes it difficult to determine the occurrence of SL. In recent years, multiple authors have conducted studies about SL in adolescents using different approaches and measurement techniques (Bak-Sosnowska & Skrzypulec-Plinta, 2012; Gür, Yurt, Bulduk, & Atagöz, 2014; Hamel, Robbins, & Wilbur, 2011; Kelly, Melnyk, & Belyea, 2012). These authors identified a low physical activity level among adolescents across different countries and described possible causes and consequences. Furthermore, some studies have emphasized that adolescents have difficulty meeting guidelines for physical activity in intervention studies (L. L. Lee, Kuo, Fanaw, Perng, & Juang, 2011; Minges, Chao, Nam, Grey, & Whittemore, 2015).

Unfortunately, these multiple approaches make comparisons difficult, and the diagnostic standards for SL remain unclear. One study about nutritional knowledge in an educational and regular physical activity program among teenagers used the self-reporting of physical activity to conclude that educational initiatives in dietary habits and physical activity proved to be effective in encouraging teenagers to eat healthier and to adopt an active lifestyle (Tse & Yuen, 2009). In Sweden, researchers investigated the prevalence of overweight and obesity in children and adolescents (6–16 years), measuring the time spent watching television and sitting in front of the computer to characterize an active lifestyle (Garmy, Clausson, Nyberg, & Jakobsson, 2014). Another study about risk factors and obesity among adolescents used an adapted version of the International Physical Activity Questionnaire to assess moderate and vigorous activity over a 7-day period (Liou, Liou, & Chang, 2010). Finally, physical activity among Jordanian adolescents (14–17 years) was measured using the Leisure-Time Exercise Questionnaire to assess the self-reporting of mild, moderate, and strenuous time for leisure physical activity that was performed for

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15 min during a typical week (Hamaideh, Al-Khateeb, & Al-Rawashdeh, 2010). Thus, authors and organizations may potentially define sedentarism simply as a lack of physical exercise, while other authors focus on physical activities in leisure time and/or the quantity of daily physical activities.

The NANDA International (NANDA-I), an association of nurses that is responsible for developing and updating the most commonly used taxonomy of nursing diagnoses worldwide, included SL on the taxonomy. This taxonomy defined SL as a life habit characterized by a low physical activity level (Herdman & Kamitsuru, 2014). The SL is classified with Evidence Level 2.1, which corresponds to a first-level nursing diagnosis in the taxonomy. Nursing diagnoses with Evidence Level 2 should be clinically validated in exposed populations to define the elements that represent their causes and consequences.

Few clinical validation studies have been conducted on the SL nursing diagnosis, particularly in adolescents. The first study to examine SL as a possible diagnosis was based on content validation performed by experts who identified four defining characteristics and eight related factors (Guirao-Goris, Piña, & Campo, 2001). In 2004, SL was introduced in the NANDA-I taxonomy, and, later, another content validation study identified two other related factors (Guirao-Goris & Duarte-Climents, 2007).

Currently, the structure of the SL nursing diagnosis on the NANDA-I taxonomy includes the following defining characteristics: physical deconditioning, average daily physical activity less than recommended for gender and age, and preference for activity low in physical activity. In addition, the taxonomy includes the following five etiological or related factors for the occurrence of SL: insufficient knowledge of health benefits associated with physical exercise, insufficient interest in physical activity, insufficient training for physical exercise, insufficient motivation for physical activity, and insufficient resources for physical activity (Herdman & Kamitsuru, 2014).

This diagnosis has been studied in people with hypertension using the NANDA-I taxonomy structure to identify its relationship with sociodemographic characteristics and to measure the diagnostic accuracy of their defining characteristics (Guedes, Lopes, Moreira, Cavalcante, & Araujo, 2010; Guedes, Moreira, Martins, Araújo, & Lopes, 2011). Recently, a conceptual analysis proposed some changes to the SL nursing diagnosis that were submitted for content validation by experts. These experts recommended the addition of the following three new defining characteristics: overweight, low performance in instrumental activities of daily living, and nonengagement in leisure time physical activities. In addition, the authors recommended dividing physical deconditioning into the following three elements: diminished respiratory capacity, diminished muscle strength, and diminished flexibility of joints (Guedes, Lopes, Cavalcante, Moreira, & Araujo, 2013; Moreira, Guedes, Lopes, Cavalcante, & Araujo, 2014)

Previous studies have also included a review of related factors described in the NANDA-I taxonomy that recommend incorporating the following six related factors: insufficient social support for physical activity; attitudes, beliefs, and health habits that hinder physical activity; insufficient confidence for practicing physical exercise; impaired physical mobility; activity intolerance; and reports of pain.

These new defining characteristics were evaluated in a clinical validation study using diagnostic accuracy measures in people with high blood pressure, and the authors found the following five defining characteristics to be statistically significant: low performance in instrumental activities of daily living, diminished respiratory capacity, average daily physical activity less than recommended for gender and age, nonengagement in physical leisure time activities, and preference for activity low in physical activity (L. C. G. Martins et al., 2014).

Despite a high SL prevalence among adolescents, these diagnostic revisions have not been clinically validated in this age-group, and the diagnostic accuracy of the defining characteristics and the causal relationships among the related factors in this population remain unknown. To address this knowledge gap, the present study had the following aims: (1) to verify the clinical validity of the SL nursing diagnosis in adolescents, (2) to identify the prevalence of the SL nursing diagnosis, (3) to measure the diagnostic accuracy of their defining characteristics, and (4) to verify the associations between the related factors and the nursing diagnosis. The results generated from this study may help nurses screen adolescents for SL and identify the main causes for physical inactivity. This knowledge would allow the development of school-based intervention programs to stimulate the adoption of a physically active lifestyle among adolescents.

Method

Study Design

This cross-sectional study was conducted in 564 adolescents who were 14–19 years of age and attended seven public schools located in northeastern Brazil. The Advisory Committee on Research Ethics at the Federal University of Ceará approved the study. Participants and their parents were provided with information detailing the study, including voluntary participation, confidentiality, anonymity, and their right to withdraw from the study at any time without negative impact. The data were collected after informed consent was obtained from the adolescents and their parents.

Sample and Procedures

The sample size was estimated from a confidence level (CI) of 95%, a conjectured sensitivity of 85% for the most important indicators, a precision of the CIs constructed at 5%, and an estimated prevalence of SL of 40%. To allow for refusal or missing data, 15% was added to the estimated sample size.

A multistage sampling procedure was used to recruit the adolescents. Initially, a cluster sampling was used between the schools that belonged to each of the six administrative regions of the city. In the second stage, a percentage of adolescents proportional to the total number of students enrolled in each school was obtained by systematic sampling. Adolescents were excluded if they had any medical condition that prevented or hindered participation in physical activities.

Measures

We used a questionnaire and physical assessment to identify all the defining characteristics and related factors described in a previous study (Moreira et al., 2014). A set of specific conceptual and operational definitions were developed for each variable based on the following five instruments: the Youth Risk Behavior Surveillance, the Rating Scale of Social Support for Physical Activity, the Self-Efficacy Scale for Exercise, the InteliHealth® Questionnaire, and a questionnaire on Motivation for Physical Exercise.

The Youth Risk Behavior Surveillance is a questionnaire composed of 11 items that evaluates regular exercise and the hours spent watching television and/or playing video games (Centers for Disease Control and Prevention, 2013). The Rating Scale of Social Support for Physical Activity is a scale that assesses the support received by the individual to practice physical activity. This scale has demonstrated a strong psychometric performance and allows a separate investigation of different sources of support including friends and family (Reis, Reis, & Hallal, 2011). The Self-Efficacy Scale for Exercise consists of 12 items and assesses the confidence to be physically active for at least 6 months (Sallis, Pinski, Grossman, Patterson, & Nader, 1988). The InteliHealth (2011) questionnaire consists of 12 items that include information on physical activity. Finally, the Motivation for Physical Exercise questionnaire investigates confidence and an individual's motivation to be physically active for at least 6 months (M. O. Martins & Petroski, 2000).

The defining characteristic "average daily physical activity less than recommended for gender and age" was considered to be present when the adolescent reported choosing unscheduled activities unintentionally, activities with small energy expenditure and with a frequency, intensity and duration below the recommendation for the gender (Guedes et al., 2013). The defining characteristic "preference for activity low in physical activity" was identified from reports of being in front of the television, computer, or video games for a period ≥ 4 hr a day without performing physical exercises through virtual simulators.

A low performance in instrumental activities of daily living was identified from reporting difficulty in performing tasks such as shopping, performing work activities, and household chores. Adolescents were also asked about performing activities during leisure time, type of leisure activity, and time spent in performing these activities to identify nonengagement in physical activities during leisure time. Diminished respiratory capacity was evaluated based on reports of chest discomfort, leg pain, dyspnea, dizziness, vertigo, and fatigue soon after the start of physical activity.

Diminished muscle strength was considered to be impaired if the individual presented with a range of movement limited by any different resistance force of gravity (Campbell, 2013; Seidel et al., 2011). Diminished flexibility of joints was measured using a Sanny® pendulum fleximeter, and we evaluated the maximum physiological range of each joint related to physical exercises (Leighton, 1987).

Overweight was defined as a body mass index above the 85th percentile (World Health Organization Multicentre Growth Reference Study Group, 2006) and was measured with a portable digital anthropometric scale with 0.1 kg undergraduate and a capacity of 180 kg. The height was measured using a Sanny stadiometer fixed on a wall with a graduation of 0.1 cm and a maximum score of 210 cm measured from the ground base.

The presence of the related factor "insufficient knowledge of health benefits associated with physical exercise" was determined by values less than four on the InteliHealth (2011) questionnaire. Insufficient motivation for physical activity; insufficient confidence to practice physical exercise; and attitudes, beliefs, and health habits that hinder physical activity were identified by an average score lower than three for specific items of the Self-Efficacy scale for exercise (Sallis et al., 1988).

Sporadic reporting of no physical activity during the week or practicing only sporadically identified insufficient interest in physical activity. Insufficient training or resources for physical exercise was identified by a report of a lack of these resources for physical activity. Insufficient social support for physical activity was identified by a maximum score of 3 on the Social Support Scale (Reis et al., 2011).

Impaired physical mobility was identified from a range of joint motions associated with the report of difficulty for physical activity. Activity intolerance was defined by the presence of dyspnea, discomfort, and/or abnormal heart rate during the efforts reported by adolescents. Finally, reports of pain were identified based on reports of daily painful sensations that made it difficult to exercise.

Data Analyses

A diagnostician panel composed of eight nurses with experience in researching nursing diagnoses, interventions or outcomes, and teaching or clinical practice for at least 6 months conducted the diagnostic inference process. This group received a 4-hr training session on SL, defining characteristics and related factors, and previous studies about diagnostic validation methods.

After training, the nurses received 12 clinical fictitious cases to identify the presence/absence of the diagnosis. These cases were replicated randomly twice. Efficiencies, false-positive rates, false negative rates, and trends were calculated from the diagnostic inferences made by the nurses. Diagnosticians were considered to be approved when they reached values higher than 0.8 for efficiency, less than 0.1 for false positive and negative rates, and values between 0.8 and 1.2 for the trend (Lopes, Silva, & Araujo, 2012).

The diagnosticians were divided into four pairs who were responsible for the diagnostic inference of 141 cases per pair. Each nurse made these assessments independently, and the occurrence of the SL diagnosis was established by absolute agreement between the nurse diagnosticians. In cases where there was disagreement between diagnosticians, they discussed the disagreement to obtain a consensus.

After diagnostic inference, the data were statistically analyzed using R software Version 3.1. The descriptive analysis included the frequency of qualitative variables and measures of central tendency and dispersion for quantitative variables. The normal distribution was evaluated using the Lilliefors test. The diagnostic accuracy measurements (sensitivity, specificity, and diagnostic odds ratio) of the clinical indicators were calculated based on the diagnosticians' consensus. The interpretation of the accuracy measurements followed recommendations from the specialized literature (Lopes et al., 2012). The association between SL and its etiologic factors, adjusted by gender, was evaluated using the Mantel–Haenszel method. All of the analyses were reported based on a significance level of .05.

Results

The adolescents presented with a mean age of 16.18 years (± 1.13), 52.1% were females, and the prevalence of SL in adolescents was 48.6%. Females presented with SL twice as frequently as males ($\chi^2 = 18.74$, $df = 1$, $p < .001$, 95% CI [1.51, 2.97]).

Defining characteristics often above 40% were preference for activity low in physical activity (59.9%), diminished respiratory capacity (55.3%), and average daily physical activity less than recommended for gender and age (49.1%). Diminished muscle strength was not observed in this sample. Reports of pain (65.2%) and insufficient resources for physical activity (61.3%) were identified as related factors in more than 40% of the sample. Impaired physical mobility and activity intolerance were not found in this study (Table 1).

The following four defining characteristics showed diagnostic accuracy measures with statistical significance: average daily physical activity is less than recommended for gender and age, preference for activity low in physical activity, nonengagement in leisure time physical activities, and diminished respiratory capacity. However, only the first characteristic showed high levels of both sensitivity and specificity. The defining characteristics preference for activity low in physical activity and diminished respiratory capacity presented with values slightly above 60% for sensitivity. Conversely, "nonengagement in physical activities in leisure time" showed a value above 70% for specificity (Table 2).

Statistically significant associations were found between SL and the related factors "insufficient motivation" ($p < .001$); "insufficient interest" ($p = .007$); "insufficient resources" ($p = .014$); "insufficient social support" ($p = .001$); "attitudes, beliefs, and health habits" that hinder physical activity ($p = .002$); and "insufficient confidence" ($p < .001$).

In a stratified analysis by gender, the following three related factors showed an increase in the likelihood of adolescents of both genders having SL: insufficient motivation, insufficient social support, and insufficient confidence to practice physical exercise. In addition, males had an increased chance of developing SL in the presence of the following three other etiological factors: insufficient interest; insufficient resources; and attitudes, beliefs, and health habits that hinder physical activity. The related factors "insufficient knowledge of health benefits associated with physical exercise" and "reports of pain" were not statistically associated with SL for any gender (Table 3). Impaired physical mobility and activity intolerance were not found in this sample.

Discussion

The prevalence of SL identified in this study (48.6%) was lower than that found in another study on 1,551 Iranian adolescents aged 12–14 years. Those authors found that the prevalence of physical inactivity ranged from 77.4% to 87.1%, depending on how physical activity was assessed (Sanaeinasab et al., 2013). Furthermore, comorbidities have been associated with the development of sedentary behaviors among adolescents with type 1 diabetes at rates close to 80% (Michaliszyn & Faulkner, 2010). Brazilian male adolescents are commonly motivated to be physically active in their spare time, particularly through soccer and other sport activities. This fact can be explained by the reduced prevalence found in our sample compared with other studies. Other studies on the barriers to physical activity reported more minutes of vigorous physical activity among boys compared with girls (Robbins, Sikorskii, Hamel, Wu, & Wilbur, 2009).

In our study, the chance of developing SL was 2 times higher in girls, which was similar to previous studies (Al-Kandari, Vidal, & Thomas, 2008; Fermino, Rech, Hino, Añez, & Reis, 2010; Wu, Rose, & Bancroft, 2006). The high prevalence of SL has been a concern for researchers worldwide because of the increased risk of cardiovascular events in the future and demonstrates the importance of finding defining characteristics for the accurate and early identification of this diagnosis. Recently, exercise-deficit

Table 1. Frequency of Defining Characteristics and Related Factors of Sedentary Lifestyle Among Adolescents.

Variables	n	%	95% CI
Defining characteristics			
1. Preference for activity low in physical activity	338	59.9	[55.7, 63.9]
2. Diminished respiratory capacity	312	55.3	[51.1, 59.4]
3. Average daily physical activity less than recommended for gender and age	277	49.1	[44.9, 53.3]
4. Nonengagement in leisure time physical activities	215	38.1	[34.1, 42.3]
5. Overweight	97	17.2	[14.2, 20.6]
6. Diminished flexibility of joints	32	5.7	[3.9, 8.0]
7. Low performance in instrumental activities of daily living	28	4.9	[3.4, 7.2]
Related factors			
1. Reports of pain	368	65.2	[61.1, 69.1]
2. Insufficient resources for physical activity	346	61.3	[57.2, 65.3]
3. Insufficient motivation for physical activity	183	32.4	[28.6, 36.5]
4. Insufficient confidence for practicing physical exercise	183	32.4	[28.6, 36.5]
5. Insufficient social support for physical activity	76	13.5	[10.8, 16.6]
6. Insufficient interest in physical activity	66	11.7	[9.2, 14.7]
7. Attitudes, beliefs, and health habits that hinder physical activity	36	6.4	[4.6, 8.8]
8. Insufficient knowledge of health benefits associated with physical exercise	23	4.1	[2.7, 6.1]
9. Insufficient training for physical exercise	18	3.2	[1.9, 5.1]
Nursing diagnosis			
Sedentary lifestyle	274	48.6	[44.4, 52.8]

Note. N = 564.

Table 2. Diagnostic Accuracy of Defining Characteristics for Sedentary Lifestyle.

Defining characteristics	Se	Sp	DOR (95% CI)	p Value*
1. Average daily physical activity is less than recommended for gender and age	98.18	97.24	1,896.4 [612.7, 5,869.4]	<.001
2. Preference for activity low in physical activity	64.96	44.83	1.50 [1.07, 2.11]	.022
3. Overweight	16.79	82.41	0.94 [0.61, 1.46]	.889
4. Low performance in instrumental activities of daily living	6.57	96.55	1.96 [0.89, 4.34]	.131
5. Nonengagement in leisure time physical activities	52.19	75.17	3.30 [2.31, 4.72]	<.001
6. Diminished respiratory capacity	63.14	52.07	1.86 [1.32, 2.60]	<.001
7. Diminished flexibility of joints	7.30	95.86	1.82 [0.87, 3.80]	.149

Note. N = 564. Se = sensitivity; Sp = specificity; DOR = diagnostic odds ratio.
*χ^2 test.

disorder was described as an emergent health concern for school nurses due to the important effects on the adolescents' health, leading to early identification of sedentary youths and definitions of age-appropriate and enjoyable physical activities that are consistent with individual needs, abilities, and interests (Faigenbaum, Gipson-Jones, & Myer, 2012).

In this context, the defining characteristic average daily physical activity less than recommended for gender and age showed the best diagnostic accuracy among adolescents. This defining characteristic refers to many aspects related to decision making, such as personal preferences, security, opportunity, and social group (Chen et al., 2012). Thus, the decision to work out is strongly influenced by the culture of adolescents who may prefer recreational activities such as video games or interactions through social networks that prove to be alluring and easily accessible and seem to produce a misleading sense of physical security (Garmy et al., 2014; Ibrahim, Ali, & Sivarajan, 2010; Jelastopulu,

Kallianezos, Merekoulias, Alexopoulos, & Sapountzi-Krepia, 2012).

A preference for activity low in physical activity is another defining characteristic that is strongly related to the cultural environment of adolescents. Currently, there seems to be great value and investment in sedentary forms of fun and less involvement of young people in outdoor physical activities, which seems to be affecting youth participation in physical activities. This preference can be associated with Internet addiction and causes physical/psychosocial behavior (Datar, Nicosia, & Shier, 2013; Gür et al., 2014).

Other authors have found that adolescents usually report physical activities as being interesting, but half of these adolescents are not physically active during their spare time (Bak-Sosnowska & Skrzypulec-Plinta, 2012; R. L. T. Lee, Loke, Wu, & Ho, 2010). Furthermore, the time spent by adolescents watching television, using the computer, and playing video games consumes most of their leisure time (Kimbro, Brooks-Gunn, & Mclanahan, 2011). These facts

Table 3. Association Between SL and Its Related Factors Adjusted by Gender Using the Mantel–Haenszel Method.

	Sedentary Lifestyle				
	Female		Male		
Related factors	Presence	Absence	Presence	Absence	Mantel–Haenszel Analysis
1. Insufficient knowledge of health benefits associated with physical exercise					
Presence	9	5	6	3	$p = .202$, $OR = 1.90$ [0.79–4.55]
Absence	160	120	99	162	
2. Insufficient motivation for physical activity					$p < .001$, $OR_F = 1.76$ [1.06–2.89],
Presence	67	34	43	39	$OR_M = 2.24$ [1.32–3.80]
Absence	102	91	62	126	
3. Insufficient interest in physical activity					$p = .007$, $OR_F = 1.78$ [0.88–3.59],
Presence	29	13	15	9	$OR_M = 2.88$ [1.21–6.87]
Absence	140	112	90	156	
4. Insufficient resources for physical activity					$p = .014$, $OR_F = 1.12$ [0.69–1.82],
Presence	110	78	74	84	$OR_M = 2.30$ [1.37–3.86]
Absence	59	47	31	81	
5. Insufficient training for physical exercise					$p = .861$, $OR = 1.03$ [0.39–2.69]
Presence	6	4	3	5	
Absence	163	121	102	160	
6. Insufficient social support for physical activity					$p = .001$, $OR_F = 2.33$ [1.12–4.84],
Presence	31	11	20	14	$OR_M = 2.54$ [1.22–5.28]
Absence	138	114	85	151	
7. Attitudes, beliefs, and health habits that hinder physical activity					$p = .002$, $OR_F = 2.34$ [0.82–6.61],
Presence	15	5	12	4	$OR_M = 5.19$ [1.63–16.56]
Absence	154	120	93	161	
8. Insufficient confidence for practicing physical exercise					$p < .001$, $OR_F = 1.71$ [1.04–2.83],
Presence	66	34	44	39	$OR_M = 2.33$ [1.37–3.95]
Absence	103	91	61	126	
9. Reports of pain					$p = .440$, $OR = 1.17$ [0.82–1.67]
Presence	129	87	59	93	
Absence	40	38	46	72	

Note. $N = 564$.

explain the statistical relationship between SL and the clinical indicator "nonengagement in physical activities in leisure time" that was demonstrated in the present study.

Another important defining characteristic for SL was diminished respiratory capacity. This characteristic can be related to the lack of adequate training or practice exercises that improve respiratory capacity because some exercises are only directed toward strength and/or flexibility (Chung, Chung, & Chen, 2008; Ibrahim et al., 2010; Michaliszyn & Faulkner, 2010). However, a previous study showed that uncomfortable perceptions of exertion during initial efforts to increase physical activity likely discourage future activity (Robbins, Pender, Ronis, Kazanis, & Pis, 2004). Therefore, future studies are recommended to use specific tests for measuring respiratory capacity and its influence on the consequences of SL among adolescents.

Regarding the related factors identified in this study, nine showed a statistical relationship with SL. Insufficient social support has been shown in previous studies but was not included in the NANDA-I (Martin et al., 2008). Some authors note that a lack of social support from family and friends is reported by adolescents, particularly females, as

a reason to avoid physical activities (Fermino et al., 2010; Kelly et al., 2012; R. L. T. Lee et al., 2010; Robbins et al., 2009). Although the Mantel–Haenszel analysis confirms effect differences by gender, our data extend the relationship of social support with SL because the chance of developing the diagnosis was slightly higher among males.

The effect of gender differences on the occurrence of SL was also identified among individuals who reported insufficient motivation. Some authors have noted that motivation is a psychological aspect as important as physical limitations for performing exercises, and adolescents may tend to become involved in athletic practices if these are associated with aspects such as health, fitness, and esthetics (R. L. T. Lee & Loke, 2011; R. L. T. Lee et al., 2010; Robbins et al., 2004).

Although insufficient interest is another cause of SL associated with female gender in previous studies (Liou et al., 2010; Wu et al., 2006), the present study only found a statistically significant relationship in males. Furthermore, reports of interest have been associated with continuity of exercise (Hamel et al., 2011; L. L. Lee et al., 2011; Wu & Pender, 2002), for example, interest is one aspect that can

influence both the adoption and maintenance of a healthy lifestyle.

Another factor associated only with males was insufficient resources. Previous studies have also noted that lack of time, money, an appropriate place to practice, equipment, and climate have been reported by adolescents as barriers to physical exercise. In addition, moderate economic status has recently been associated with Internet addiction and other low-intensity physical activities (Gür et al., 2014; Maglione & Hayman, 2009). Furthermore, some of these factors seem to be inherent in current societal contexts, in which the child is subjected to multiple school and after-school activities that reduce the time for leisure and sports activities (Fermino et al., 2010).

Males were also affected by attitudes, beliefs, and health habits that hinder physical activity, and other authors have associated this etiologic factor with SL (Aubert et al., 1998; Bak-Sosnowska & Skrzypulec-Plinta, 2012; Robbins et al., 2009). One example that brings together these three aspects is a study that investigated lifestyle behaviors and psychosocial well-being among 241 primary school students. The results showed that nearly half of primary school students are confident about their own beliefs and values in life, and male students were less likely to demonstrate health awareness than females (R. L. T. Lee et al., 2010). This attitude can lead these adolescents to have unrealistic perceptions about their true lifestyle.

Many values and beliefs are related to developing self-confidence in practicing physical exercises among adolescents. Adolescence is a psychosocial developmental period in which it is common to experience doubts about one's capabilities and to seek self-affirmation, and approximately one third of students who perceive themselves to be overweight use unhealthy methods to lose weight (Wu et al., 2006). This perception affects the self-efficacy for developing physical activity and can create feelings of frustration or shame, which becomes a barrier to adoption of a healthy lifestyle (Robbins et al., 2004; Robbins et al., 2009). This finding is a possible explanation for the relationship between insufficient confidence and SL that was found in this study among both genders.

Although we found statistical relationships with a large number of clinical indicators and etiologic factors, one must consider some limitations in this study. The cross-sectional design limits conclusions about the clinical validity of these elements, particularly the related factors. Some factors may form causal chains that cannot be properly identified with the design. In addition, the use of diagnosticians as a reference standard for diagnostic inference, even if they are properly trained and evaluated, incurs incorporation bias and can affect the estimates of sensitivity and specificity of the defining characteristics. However, some studies have described the use of diagnosticians as an adequate strategy when there is no perfect gold standard (Bertens et al., 2013; Rutjes, Reitsma, Coomarasamy, Khan, & Bossuyt, 2007). Another relevant point is the influence of sociocultural factors that can change among countries or even regions. Thus, other clinical validation studies are needed to confirm or refute our findings.

Implications for Practice

The use of standardized nursing diagnoses language allows comparability among different studies and for defining and testing interventions among the users. Thus, school nurses can use the results of this study to define consistent criteria for evaluating SL among adolescents. In addition, the clinical indicators validated in our sample can be useful to verify the outcomes sensitive to nursing interventions serving as a feedback for nurses. The data presented in this article can also be useful in educational programs for nurses in order to train and establish their ability to define relevant clinical characteristics in favor of identifying SL among adolescents and their supposed risk/causal factors.

The four validated defining characteristics can assist in the clinical assessment of nurses and provide a diagnostic screening of adolescents. This screening can guide the identification of groups that require clinical monitoring to prevent the emergence of other nursing diagnoses such as obesity and overweight. In addition, the six identified related factors can be used to guide the implementation of educational and/or motivational programs for physical exercise among adolescents. Thus, nurses should seek interventions that stimulate the interest and motivation of adolescents to exercise. These interventions can be based on the relationship between active lifestyle and healthiness and/or body aesthetic aspects that are appreciated by younger people.

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