



THE NOLA PENDER MODEL FOR ADOLESCENT HEALTH PROMOTION: AN INTEGRATIVE REVIEW O MODELO DE NOLA PENDER PARA A PROMOÇÃO DA SAÚDE DO ADOLESCENTE: REVISÃO INTEGRATIVA

EL MODELO DE NOLA PENDER PARA LA PROMOCIÓN DE LA SALUD DE LOS ADOLESCENTES: UNA REVISIÓN INTEGRADORA

 Daniela Bulcão Santi¹
 Iara Sescon Nogueira¹
 Vanessa Denardi Antoniassi Baldissera¹

¹Universidade Estadual de Maringá - UEM, Centro de Ciências da Saúde, Departamento de Enfermagem, Maringá, PR - Brazil.

Corresponding Author: Daniela Bulcão Santi
E-mail: danielabsanti@gmail.com

Authors' Contributions:

Conceptualization: Daniela B. Santi; **Data Collection:** Daniela B. Santi; **Investigation:** Daniela Bulcão Santi; **Methodology:** Daniela B. Santi; Iara S. Nogueira; **Project Management:** Daniela B. Santi; Iara S. Nogueira; Vanessa D. A. Baldissera; **Supervision:** Vanessa D. A. Baldissera; **Validation:** Iara S. Nogueira; Vanessa D. A. Baldissera; **Visualization:** Daniela B. Santi; Iara S. Nogueira; Vanessa D. A. Baldissera; **Writing - Original Draft Preparation:** Daniela B. Santi; **Writing - Review and Editing:** Iara S. Nogueira; Vanessa D. A. Baldissera.

Funding: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Código de Financiamento 001.

Submitted on: 07/11/2022
Approved on: 03/15/ 2023

Responsible Editors:

 Bruna Figueiredo Manzo
 Tânia Couto Machado Chianca

ABSTRACT

Objective: to analyze the applicability of Nola Pender's Health Promotion Model (HPM) for the adolescent public. **Methodology:** integrative literature review with search in online databases LILACS, MEDLINE, CINAHL, COCHRANE, EMBASE and SciELO library, answering the following question: what is the applicability of HPM in the care of adolescents in recent times? **Results:** 27 scientific articles were selected, whose main contributions were listed in the categories of the referred model itself. The study made it possible to glimpse the complexity of factors that involve the itinerary of adolescent health promotion and the pertinence of this theory for Nursing practice. **Final considerations:** the Nola Pender Model is practical, dynamic, relevant and allows the elaboration of a care plan aimed at promoting adolescent health.

Keywords: Health Promotion; Adolescent; Models, Nursing; Nursing Theory; Health Education.

RESUMO

Objetivo: analisar a aplicabilidade do Modelo de Promoção da Saúde (MPS) de Nola Pender para o público adolescente. **Metodologia:** revisão integrativa da literatura com busca nas bases de dados on-line LILACS, MEDLINE, CINAHL, COCHRANE, EMBASE e biblioteca SciELO, respondendo à seguinte questão: qual a aplicabilidade do MPS na atenção aos adolescentes em tempos recentes? **Resultados:** foram selecionados 27 artigos científicos, cujas principais contribuições foram elencadas nas categorias do próprio modelo referido. O estudo possibilitou vislumbrar a complexidade de fatores que envolvem o itinerário da promoção da saúde do adolescente e a pertinência dessa teoria para a prática de Enfermagem. **Considerações finais:** o Modelo de Nola Pender é prático, dinâmico, relevante e permite a elaboração do plano de cuidado direcionado à promoção da saúde do adolescente.

Palavras-chave: Promoção da Saúde; Adolescente; Modelos de Enfermagem; Teoria de Enfermagem; Educação em Saúde.

RESUMEN

Objetivo: analizar la aplicabilidad del Modelo de Promoción de la Salud de Nola Pender a la población adolescente. **Metodología:** revisión integrativa de la bibliografía con búsqueda en las bases de datos online LILACS, MEDLINE, CINAHL, COCHRANE, EMBASE, y biblioteca SciELO, respondiendo a la siguiente pregunta: ¿Cuál es la aplicabilidad del MPS en la atención a los adolescentes en tiempos recientes? **Resultados:** fueron seleccionados 27 artículos científicos, cuyas principales contribuciones fueron listadas en las categorías del propio modelo. El estudio permitió vislumbrar la complejidad de los factores que envuelven el itinerario de promoción de la salud para adolescentes y la relevancia de esta teoría para la práctica de enfermería. **Conclusiones:** El Modelo de Nola Pender es práctico, dinámico y pertinente, y permite el desarrollo de un plan de atención dirigido a la promoción de la salud del adolescente.

Palabras clave: Promoción de la Salud; Adolescente; Modelos de Enfermería; Teoría de Enfermería; Educación en Salud.

How to cite this article:

Santi DB, Nogueira IS, Baldissera VDA. The Nola Pender Model for adolescent health promotion: an integrative review. REME - Rev Min Enferm. 2023[cited _____];27:e-1507. Available from: <https://doi.org/10.35699/2316-9389.2023.40440>

INTRODUCTION

Adolescence is defined by the World Health Organization (WHO) as the second decade of life, comprising the age group from 10 to 19 years.¹ Lifestyle and risk and health protection practices are factors that influence the development of diseases. Such factors must be supported along with adolescents, as they experience a transition phase from childhood to adulthood, permeated with biological, cognitive, emotional and social transformations.²

Nursing theories instrumentalize professional care in a systematic, comprehensive and dialogical way, in order to deal with the specificities and multiplicities of individuals and the community, which includes care for adolescents. With a proposal to integrate Nursing with behavioral science, Nola Pender, professor emeritus at the School of Nursing at the University of Michigan, United States, developed the Health Promotion Model (HPM). This model identifies the factors that influence healthy behaviors and is a guide to explore the complex biopsychosocial process, motivating people to engage in health-promoting behaviors.³

This model addresses three components: i) individual characteristics and experiences; ii) behavior-specific cognitions and affect and; iii) behavioral outcome.³ Some studies aimed to describe aspects of this model in different populations, as well as to test the relationships between its components or between these components and other variables.⁴ In 2006, an integrative review on the use of the HPM with adolescents brought together five studies, and the majority only addressed physical activity as a health-promoting behavior.⁵

Thus, as a gap in the literature, there was a lack of a compilation that shows the current scientific productions that have used the HPM with the adolescent public. Thus, this study emerged from the following research question: what is the applicability of the HPM in the care of adolescents in recent times? Therefore, the objective was to identify in the literature the applicability of Nola Pender's Health Promotion Model for the adolescent public.

METHODS

It was an integrative literature review. This method favors covering a wide range of available knowledge on a topic, contributing to a Nursing practice based on scientific evidence.⁶

The process was developed in stages foreseen in the integrative review method, as follows: i) identification of the theme and selection of the research's guiding question; ii) establishment of criteria for inclusion and exclusion of studies; iii) definition of the information to be

extracted and evaluation of the studies included in the review; iv) analysis and interpretation of results; and v) presentation of the revision.⁶

The search took place in May 2022, in the electronic databases Latin American and Caribbean Health Sciences Literature (LILACS), EMBASE, Medical Literature Analysis and Retrieval System (MEDLINE) - via PubMed, a Current Index to Nursing and Allied Health Literature (CINAHL) - via EBSCOhost, Cochrane, and the Scientific Electronic Library Online (SciELO) virtual library.

The guiding question elaborated was: what is the applicability of the HPM in the care of adolescents in recent times? Applicability concerns the main characteristics of these studies in the use of the HPM with this specific public. In the search for evidence, the following Descriptors in Health Sciences (DeCS)/Medical Subject Headings (MeSH) were used based on the PICO (Population, Interest and Concept) strategy: P - *adolescente/adolescent* OR *saúde do adolescente/adolescent health*; I - *promoção da saúde/health promotion*; and C - the keyword "Pender". The author's last name was included in the search terms in order to refine the results, reaching specifically studies that used this Nursing theory. In addition, the synonyms indicated according to each database were also added. The elaboration of these search strategies is shown in Table 1.

Based on the search strategies, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)⁷ strategy was used as a guide for selection. The inclusion criteria used were as follows: time frame of the last 17 years (2006-2022), considering the publication of a previous compatible integrative review, as well as the review of the theoretical model itself;^{3,5} international or national original articles; and with free access available in full. Review or dissertation articles, duplicates, those that did not understand the guiding question and those that did not have adolescents as the majority of the researched public were excluded - considering the WHO definition of adolescence, individuals aged between 10 and 19 years old.¹

Among the articles identified as eligible, their titles and abstracts were carefully read. From the sample of studies selected for reading in full, identification data were extracted (type of research, title, author, year, country, objective, subjects and results). Concomitantly, through the filing technique, the interpretative reading made it possible to relate the contributions of each article with the components of the model. Thus, the articulation of these findings was reproduced in the HPM itself.

Table 1 - Search strategies used in the databases on the applicability of Nola Pender's Health Promotion Model in adolescent care, 2022

Database	Search Strategies
EMBASE SCOPUS CINAHL	#1 "Adolescent" OR "Adolescence" OR "Adolescent Health" #2 "Health Promotion" #3 "Pender" OR "Pender Health Promotion Model" Strategy: #1 AND #2 AND #3
MEDLINE COCHRANE LILACS	((Adolescent OR Adolescents OR Adolescence OR Teens OR Teen OR Teenagers OR Teenager OR Youth OR Youths OR Female Adolescent OR Female Adolescents OR Male Adolescent OR Male Adolescents OR Adolescent Health OR Teen Health OR Adolescent Well Being OR Adolescent Wellbeing OR Adolescent Well-Being) AND (Health Promotion OR Health Promotions OR Promotion of Health OR Promotional Items OR Promotional Item OR Wellness Programs OR Wellness Program OR Health Campaigns OR Health Campaign) AND (PENDER))
SCIELO	(*Adolescente) OR (Saúde do adolescente) AND (Promoção da saúde) AND (Pender)

The construction and application of the search strategies were carried out by the first and second authors, guided by a shared, editable virtual spreadsheet, in which the pertinence of each included article was ratified.

Given the specificities, convergences and divergences raised in the selected articles, the data were analyzed and discussed from the perspective of Nola Pender's Health Promotion Model.³ As for ethical aspects, the knowledge produced by the authors of the articles that make up this review.

RESULTS

A total of 27 articles were selected for this review, 20 from EMBASE, 3 from MEDLINE, 2 from LILACS, 1 from CINAHL and 1 from SCOPUS, as shown in Figure 1.

Table 2 shows the summary of the characteristics of the selected studies that used Nola Pender's Health Promotion Model aimed at adolescents.⁸⁻³⁴

The use of Nola Pender's Health Promotion Model with adolescents in different cultural contexts and health issues was observed to be relevant. Regarding the place of study, application and use of the theory on a global scale was observed, with a greater number of publications in countries in the Middle East (A1-A2, A12, A17-A22, A25, A27) and Asia (A3-A5, A7, A9, A11, A16), followed by North America (A6, A8, A13, A15, A26), South America (A10, A14, A24) and Central America (A23). The context of the studies included educational institutions (A1-A3, A6-A7, A9-A12, A15-A22, A24-A25, A27), health services (A4, A13, A26), recreation/welcoming (A8, A14) and the home itself (A5, A23).

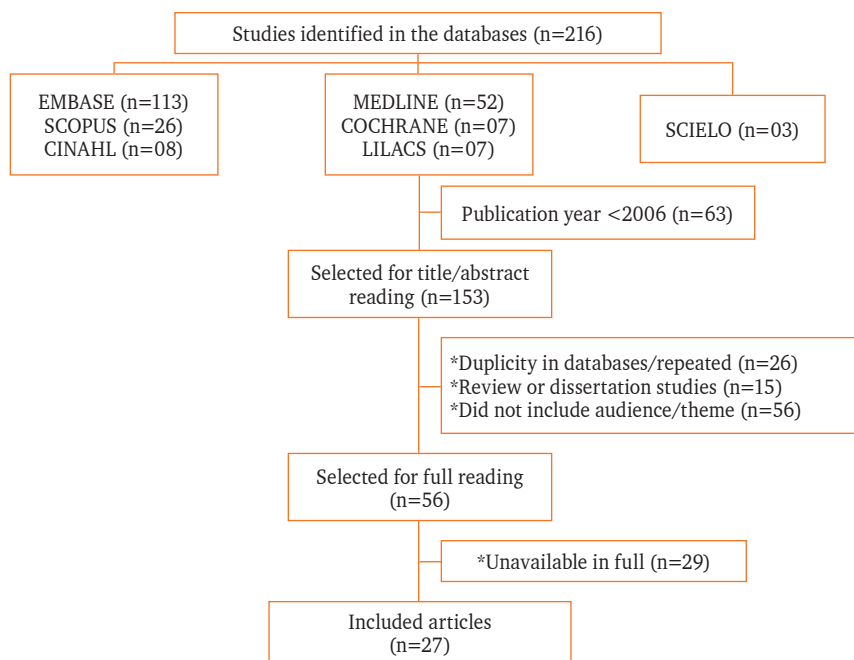


Figure 1 - Flowchart of the article selection process in the databases, 2022.

With regard to the number of participants, the studies ranged from 1 (A23, A26) to more than 1,000 adolescents (A25). Some had gender specificity, with 11 studies conducted only with females (A6, A10, A12-A15, A17-A19, A21, A27) and 4 with males only (A11, A22, A23, A26).

As for the type of research implemented, there were 20 quantitative studies (A1-A3, A5-A9, A11, A15-A22, A24-A25, A27), 3 qualitative (A4, A12, A14), 2 case

studies (A23, A26) and 2 experience reports (A10, A13). As for the design, there was a predominance of cross-sectional and descriptive studies, with 8 quasi-experimental (A2-A3, A5-A7, A15, A19, A27). It was possible to observe studies more focused on surveying factors and influences of health-promoting behaviors than participatory and interventional approaches.

Table 2 - Characteristics of selected studies (2006 a 2022)

Base	Title	Author / year	Type	Place / Country	Objective	Participants	Main outcomes
A1 EMBASE	The role of correlated factors based on Pender health promotion model in brushing behavior in the 13-16 years old students of Guilan, Iran ⁸	Haghi et al., 2021	Quantitative	Guilan (Iran)	Determine the roles of HPM factors in brushing behavior	761 adolescents	Educational interventions should emphasize commitment, with the action plan and self-efficacy
A2 EMBASE	Effect of a nutritional education intervention on breakfast consumption among preparatory school students in Egypt ⁹	Elseifi; Abdelrahman; Mortada, 2020	Quantitative	Zagazig (Egypt)	Evaluate the effect of nutritional education on breakfast consumption	244 adolescents	The intervention group had a positive effect, with an increase in the frequency and quality of breakfast
A3 EMBASE	Effect of model-based training by nurses on the promotion of sleep patterns among students in the middle school ¹⁰	Topan; Gözen, 2020	Quantitative	Zonguldak (Turkey)	Evaluate the effect of HPM in Nursing interventions for sleep patterns	84 adolescents	At the third measurement (3 months later), there was a significant difference in the intervention group on bedtime habits
A4 EMBASE	Living with diabetes: perceived barriers of adolescents ¹¹	Gürkan; Bahar, 2020	Qualitative	West Region (Turkey)	To determine perceived barriers to home care in adolescents with type 1 diabetes	18 adolescents	Barriers included school, friends, family, fear of complications, lack of information, personal characteristics, among others
A5 EMBASE	Effects of a home-based Nursing intervention programme among adolescents with type 1 diabetes ¹²	Gürkan; Bahar; Böber, 2019	Quantitative	İzmir (Turkey)	To investigate the effects of a home Nursing intervention program on the health outcomes of adolescents with type 1 diabetes mellitus	71 adolescents	Self-efficacy, frequency and responsibility in controlling diabetes and glycated hemoglobin levels improved in the intervention group
A6 EMBASE	Predicting physical activity among urban adolescent girls: a test of the health promotion model ¹³	Voskuil; Robbins; Pierce, 2019	Quantitative	Middle West (United States)	Test hypothetical HPM relationships as a means of predicting moderate to vigorous physical activity	517 adolescents	Self-efficacy was the only variable with a significant effect on PA*
A7 EMBASE	The effect of training provided for obese adolescents based on health promotion model on their healthy lifestyle behaviors and life quality ¹⁴	Yavuz; Hacıoğlu, 2018	Quantitative	Rize (Turkey)	To determine the effect of training provided to obese adolescents based on the HPM on their healthy lifestyle behaviors and quality of life	114 adolescents	The intervention reduced risk factors, BMI**, increased healthy behaviors and quality of life
A8 EMBASE	Use of theory to examine health responsibility in urban adolescents ¹⁵	Ayres; Pontes, 2018	Quantitative	New Jersey (United States)	Examine factors that may influence responsibility for health among adolescents	122 adolescents	Significant relationship between responsibility for health and health-promoting behaviors and neighborhood perception

Continue...

...continuation

Table 2 - Characteristics of selected studies (2006 a 2022)

Base	Title	Author / year	Type	Place / Country	Objective	Participants	Main outcomes
A9 EMBASE	Structural model of factors relating to the health promotion behavior of reproductive health among Indonesian adolescents ¹⁶	Kholifah et al., 2018	Quantitative	Surabaya (Indonesia)	Explore factors related to reproductive health promotion behavior through structural equation modeling	108 adolescents	Affection, competing demands, preferences, and empowerment were related to maintaining reproductive health behavior
A10 CINAHL	<i>Tecnologia educacional baseada em Nola Pender: promoção da saúde do adolescente</i> ¹⁷	Santos et al., 2018	Experience report	Juazeiro do Norte (Brazil)	To present an educational technology, composed of two teaching strategies, about vaccination against HPV	157 adolescents	Interventions with educational technologies are more effective for knowledge and autonomy
A11 EMBASE	Structural equation modeling on smoking cessation intention in male technical high school students ¹⁸	Do; Choi, 2017	Quantitative	(Korea)	Develop and test a structural model on intention to quit smoking in technical high school boys	413 adolescents	Self-efficacy and environmental factors have an indirect effect on the intention to quit smoking
A12 MEDLINE	Teenage girls' experience of the determinants of physical activity promotion: a theory-based qualitative content analysis ¹⁹	Borhani et al., 2017	Qualitative	Minudasht (Iran)	Exploring adolescents' experiences on the determinants of PA promotion	44 adolescents e 06 teachers	Perceived barriers, situational influences and self-efficacy were considered more important
A13 MEDLINE	Development of an interactive pregnant adolescent nutrition education workshop ²⁰	Wise et al., 2017	Experience report	(United States)	Describe the development of an evidence-based nutrition education program	08 pregnant adolescents	It is important that a workshop be grounded and provide cooking practice, peer education, contact with professionals, use of technology and gifts
A14 LILACS	<i>Empoderamento de adolescentes femininas abrigadas: saúde sexual na perspectiva do Modelo Teórico de Nola Pender</i> ²¹	Penna et al., 2016	Qualitative	Rio de Janeiro (Brazil)	Describe sexual attitudes and behaviors and analyze their repercussions on sexual health	08 adolescents	Increased use of condoms and perception of sexual vulnerability
A15 EMBASE	Examining reach, dose, and fidelity of the "Girls on the Move" after-school physical activity club: a process evaluation ²²	Robbins et al., 2016	Quantitative	Middle West (United States)	Assessing the reach, dose, and loyalty of an after-school PA club	752 adolescents	Contributing factors: incentives and variety of activities. Complicating factors: managing behavioral issues, limited space, climate, and trainer participation
A16 EMBASE	The adolescent lifestyle profile scale: reliability and validity of the Turkish version of the instrument ²³	Ardic; Esin, 2015	Quantitative	Istambul (Turkey)	Translate the Lifestyle Profile Scale into Turkish and assess its psychometric properties	890 adolescents	The scale can be used as a practical guide to assess behaviors and lifestyle
A17 EMBASE	Factors predicting the physical activity behavior of female adolescents: a test of the health promotion model ²⁴	Mohamadian; Ghannae; Arani, 2014	Quantitative	Isfahan (Iran)	Determine relationships between HPM variables to explain PA behavior	495 adolescents	FA predispose:- Greater self-efficacy (main), self-esteem, positive affect and social support; - Lower perceived barriers
A18 EMBASE	Developing and testing a measurement tool for assessing predictors of breakfast consumption based on a Health Promotion Model ²⁵	Dehdari et al., 2014	Quantitative	Qom (Iran)	Develop an instrument to measure HPM constructs in terms of breakfast consumption and identify which were predictors	100 adolescents	The following were predictors of breakfast consumption: high self-efficacy, previous behavior, fewer perceived barriers and competing demands

continue...

...continuation

Table 2 - Characteristics of selected studies (2006 a 2022)

Base	Title	Author / year	Type	Place / Country	Objective	Participants	Main outcomes
A19 EMBASE	Effect of nutrition education intervention based on Pender's Health Promotion Model in improving the frequency and nutrient intake of breakfast consumption among female Iranian students ²⁶	Dehdari et al., 2014	Quantitative	Qom (Iran)	To determine the effectiveness of the nutrition education intervention in improving breakfast frequency and nutrients	100 adolescents	The effect of nutritional education was more significant in the intervention group
A20 EMBASE	Tracking of physical activity during middle school transition in Iranian adolescents ²⁷	Taymoori; Berry Lubans, 2012	Quantitative	Sanandaj (Iran)	Examine changes in PA behavior, psychological factors, and associated interpersonal influences during the transition from high school to the university	844 adolescents	The level of PA decreased more among female adolescents. Thus, they reported less perceived benefits, self-efficacy and more barriers
A21 EMBASE	Predicting health-related quality of life by using a health promotion model among Iranian adolescent girls: a structural equation modeling approach ²⁸	Mohamadian et al., 2011	Quantitative	Kashan (Iran)	To investigate the relationships between self-efficacy, barriers, social support, health-promoting lifestyle and health-related quality of life	500 adolescents	Self-efficacy, barriers and social support had the greatest influence on quality of life, with self-efficacy being the most influential
A22 EMBASE	Evaluation of the Health Promotion, Model to predict physical activity in Iranian adolescent boys ²⁹	Taymoori; Lubans; Berry, 2010	Quantitative	Sanandaj (Iran)	Evaluate HPM as a means of predicting PA	515 adolescents	Self-efficacy, commitment to the plan, and pleasure were associated with PA. Competing demands were inversely related to commitment
A23 LILACS	Application of Nola Pender's model to a sedentary teenager ³⁰	Martínez, 2010	Case study	Mexico City (Mexico)	Analyze and monitor health-promoting behaviors	01 adolescent	Improved diet and PA practice, with adequacy of BMI
A24 EMBASE	Schoolchildren's physical activity: analysis according to Pender's theoretical model of health promotion ³¹	Guedes et al., 2009	Quantitative	Fortaleza (Brazil)	Describe the habits and analyze the practice of PA and its determinants	79 adolescents	Most adolescents practiced PA outdoors. Sedentary people had a higher prevalence of overweight and obesity
A25 MEDLINE	Application of the health promotion model to predict stages of exercise behaviour in Iranian adolescents ³²	Taymoori et al., 2009	Quantitative	Sanandaj (Iran)	Evaluate HPM as a means of predicting PA	1,073 adolescents	Barriers faced by girls should be considered for appropriate interventions
A26 SCOPUS	Celiac disease. A guide to successful diagnosis and treatment ³³	Thom et al., 2009	Case study	(United States)	Present a case using HPM-based assessment questions for health promotion	01 adolescent	It is possible to work with patients to develop interventions that incorporate necessary lifestyle changes
A27 EMBASE	A school-based randomized controlled trial to improve physical activity among Iranian high school girls ³⁴	Taymoori et al., 2008	Quantitative	(Iran)	To evaluate the post-intervention and six-month follow-up effects of a personalized PA intervention based on the HPM and transtheoretical model	161 adolescents	Participants in the intervention groups had a positive short-term effect

Note: *PA - Physical Activity; **BMI - Body Mass Index

Data collection in these studies took place through questionnaires prepared by the researchers (A1-A3, A9, A18-A20) and/or specific standardized scales that corresponded to the HPM constructs (A5-A8, A11, A15-A17, A21- A22, A25, A27). Others resorted to interviews and clinical examinations (A4, A12, A14, A23-A24, A26). In A10 and A13, the HPM was developed based on interactive strategies. Therefore, there was a methodological diversity in the use of the HPM.

Considering that the HPM is not limited to a specific health behavior, several topics were addressed from the perspective of promoting adolescent health, namely: physical activity (A6, A12, A15, A17, A20, A22-A25, A27), nutrition (A2, A4-A5, A7, A13, A18-A19, A23, A26), general health (A8, A16, A21), sexuality (A9-A10, A14), smoking (A11), sleep pattern (A3) and toothbrushing (A1). Thus, determining health-promoting behaviors and the effect of MPS-based interventions with adolescents was the main objective of the analyzed productions.

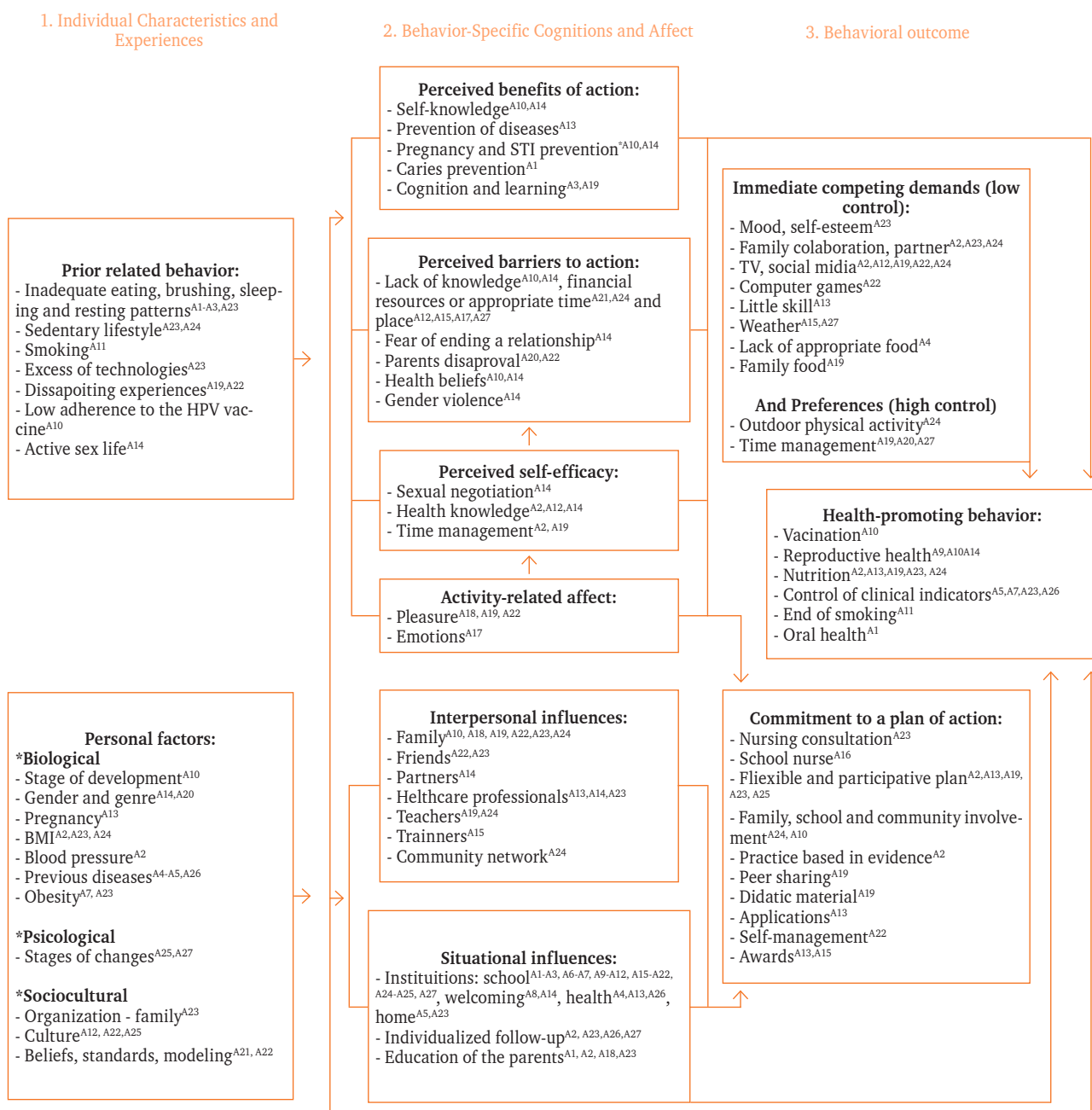


Figure 2 - Diagram of Nola Pender's Health Promotion Model aimed at adolescents based on the studies that make up this integrative review. Brazil, 2022.

Despite the research considering the dialogue of the three components of the MPS, some covered only a specific component, such as: i) individual characteristics and experiences (A14, A24); and ii) behavior-specific cognitions and affect (A21, A22).

It can be verified, through this review, that adolescents make up a group susceptible to various health risk behaviors, that self-efficacy is a relevant factor in the application of the HPM and that healthy practices should be encouraged and supported in family, social networks and health. In addition, this compilation favored a broad view of issues on adolescent health promotion, which were listed in a model built from this integrative review (Figure 2).

DISCUSSION

Nola Pender, based on theoretical assumptions of social learning and human motivation, addresses, through the HPM, three components and their respective categories. They may or may not lead the individual to engage in health-promoting behaviors. Thus, from the perspective of adolescent health, the articles in this review allowed discussing this issue, as follows.

Component: Individual characteristics and experiences

The first component comprises two categories: *Prior Related Behavior* and *Personal Factors*. Their understanding is of fundamental importance, as they establish a situational analysis of the habits and living conditions of adolescents.³

The *Prior Related Behavior* category concerns previous practices and habits or in the past.³ It was learned that the population of the articles analyzed, published between 2006 and 2020, may be composed of people born between the 1990s and 2010s, integrating a historical context “millennial”, the so-called Digital Generation or Generation Y. Coming from the technological era, they have peculiarities in affective, family, health, education, among others.³⁵

With easy access to information - but not always of good quality -, adolescents may be susceptible to risky behaviors, such as those listed in this category (Figure 2). On the other hand, using the digital tools themselves to interact and promote health by revealing different themes can be a relevant alternative, since it considers the experience and skill that this generation has with technologies.^{3,35}

As for *Personal Factors*, the HPM encompasses biological, psychological and sociocultural issues, which can

be inherited or acquired.³ In the social imaginary, there is the premise that adolescents are healthy, since they use little health services. However, the current generation suffers from problems such as obesity and risky behavior (alcohol, drugs, accidents and unsafe sex), as well as contemporary environmental insecurities.²¹

Psychological factors include self-esteem, self-motivation and perceived health status.³ Mental health must be strongly considered, since, in addition to the stress inherent in the transition to adulthood, the context of unprecedented economic and technological changes results in additional psychological burdens.^{35,36} An example of this is the pandemic situation of COVID-19, in which adolescents, despite not representing a risk group for complications of the disease, suffered numerous impacts related to restrictions and social isolation in an even more pronounced way than adults.³⁶

Sociocultural factors include race, ethnicity, acculturation, education and socioeconomic level.³ It is important for nurses to use sensitivity in order not to stereotype and competently care for this very diverse population segment.³⁵ This multiplicity of factors was considered in the review articles due to the peculiarities regional, showing the importance of getting closer to the adolescent, to the detriment of prescriptive and compulsory approaches.

Component: Behavior-specific cognitions and affect

This component is central to the HPM, being fostered by six categories that represent cognitions, that is, specific understandings and perceptions about behavior that can affect commitment. They are: benefits, barriers, self-efficacy, affection, interpersonal and situational influences.

These categories and their connections favor the understanding of the perspectives that emerge in adolescence and are likely to be elaborated by Nursing care.³ Therefore, it is of fundamental importance that they be analyzed, given that, at this stage of life, the simultaneous changes in the social environment and brain functions can shape each other.³⁶

Considering the categories *Perceived benefits of action* and *Perceived barriers to action*, the number of perceptions presented in each of them can guide behavior change. This is because people commit more easily to behaviors that provide benefits.³

The benefits of health behaviors can be (re)cognized by adolescents in the opportunity to access health services, experience and learn about the health-disease process, as well as by sharing experiences among peers (A10, A14, A19). Barriers relate to negative perceptions and difficulties in adopting a behavior, whether real or

imaginary. They occur both internally, from the individual himself/herself, and externally, that is, in relation to cultural, political, social issues, among others.³

Often, it may not be possible to exclude certain barriers; therefore, educational interventions with verbal persuasion strategies and emotional stimuli in order to recognize and elaborate them can contribute (A1). The propositions listed in these categories make it possible to abstract that adolescents may have several concrete barriers and that making the benefits attractive and feasible should be the focus of health promotion actions.

Self-efficacy corresponds to the ability perceived by the person to perform a certain conduct.³ Self-efficacy is a significant predictor of health-related behaviors (A1, A6, A12, A17-A18, A20-A22). In this category, some practices were listed that denote skills to organize and implement the process of a behavior. It should be noted that the promotion of a sense of competence must consider the different characteristics (gender, ethnicity, socioeconomic) and aptitude, involving adolescents in their specificities in activities with which they have an affinity, so as not to generate frustration (A23).

The category *Activity-related affect* means the feelings and emotions that permeate the behavior, either before, during or after its performance.³ Personal satisfaction is a determinant in the continuity of health practices, which is why participatory educational strategies that rescue the ludic can be tools that motivate learning and behavior (A10). In a study based on the HPM, the proposal to walk a dog, for example, increased the levels of physical activity and enthusiasm of adolescents with orthopedic limitations.³⁸

The HPM recognizes *Interpersonal and situational Influences* and, for the adolescent public, highlighting such aspects is essential, as at this stage there is a tendency to share the behavior of peers.³ *Interpersonal Influences* are related to what other individuals have in terms of knowledge about behavior, beliefs or attitudes that can increase or decrease the adolescent's commitment to adopt a health-promoting behavior.³ In this category, several family and social actors were scored, such as family, friends, partners and health professionals; it is also relevant to consider the media contacts that establish significant influences.³⁵

Situational Influences refer to the various contexts, which can facilitate or hinder, directly or indirectly.³ In this category, several situations were brought up by the articles, such as the school environment, the health service and the home, denoting the multiplicity of contexts in which HPM can be applied. Thus, incorporating and

acting in these spaces, in their territorial and socio-environmental dimensions, can contribute to resourcefulness, emancipation and an expanded view of reality.³⁵

Component: Behavioral outcome

This last component of the HPM deals with the execution of the agreed healthy behavior. The *Commitment to a plan of action* category initiates the behavioral event as well as its management. It is important that it be constructed in a participatory manner, since, during its implementation, other demands not previously listed may arise, which is why they must be checked and elaborated again.³

Such demands refer to those identified in the *Immediate competing demands (low control) and Preferences (high control)* category, and the process of building self-care takes place between such imposed forces. In this category, it is evident, for example, that there may be low control over the family's food choices (A2, A23) and high control over the practice of physical activity and use of health services (A10, A14, A24).

The examples in the *Health-Promoting Behavior* category list the healthy practices adopted and demonstrate the overcoming of difficulties and prejudices that kept them susceptible to risky behavior. In this category, the exercise of self-care was seen at the individual level, in relationships, in health and education services.

It should be noted that, in the long term, such behaviors reflect numerous health benefits, with individual and collective repercussions. Finally, this model seeks to achieve behavior to improve health throughout the life cycle and is not limited to disease prevention, mainly because it does not include fear or threat as a source of motivation, but the construction of an authentic activity of health promotion.³

As for the limitations of this study, it is pointed out that the analysis in the selected databases may not have included other relevant studies. Furthermore, an analysis of the scientific rigor of the studies was not carried out.

FINAL CONSIDERATIONS

The articles that make up this review ratify the applicability of the HPM as a potential tool for promoting adolescent health. Its components make it possible to identify risk and protective factors for health, as well as the management and agreement on healthy behaviors throughout a dynamic process, which is the life cycle. Adolescents, sometimes seen as adults, sometimes seen as children, can often have their autonomy weakened, but the HPM is relevant, as it seeks to recognize the person's vulnerabilities and support them in health promotion.

Nola Pender's Model stands out as an important theoretical and methodological framework for care practice, construction of Nursing policies and science aimed at promoting adolescent health. Health care for this public is still neglected, due to prejudices that point to the lack of care or restrictive and prescriptive behaviors. Unfortunately, this has an impact on adolescent health, given the increasingly alarming numbers of diseases and risky behaviors in this age group.

A knowledge gap was identified in studies that address all HPM components in a participatory manner among adolescents, being a proposal for future studies. It is assumed that this type of research allows for (re)cognition beyond the results indicated in the categories of this review, in view of the singularities that permeate the construction of autonomy, striving for the scientific commitment to share and build knowledge.

REFERENCES

- World Health Organization. Adolescent Health [Internet]. 2023[cited 2022 Jan 24]. Available from: https://www.who.int/health-topics/adolescent-health#tab=tab_1
- Vieira CENK, Dantas DNA, Miranda LSMV, Araújo AKC, Monteiro AI, Enders BC. School Health Nursing Program: prevention and control of overweight / obesity in adolescents. *Rev Esc Enferm USP* [Internet]. 2018[cited 2022 May 24];52:e03339. Available from: <https://doi.org/10.1590/S1980-220X2017025403339>
- Pender NJ, Murdaugh CL, Parsons MA. Health promotion in Nursing practice. 7a ed. Londres: Pearson; 2014.
- Aqtam I, Darawwad M. Health Promotion Model: an integrative literature review. *Open J Nurs* [Internet]. 2018[cited 2022 May 5];8:485-503. Available from: <https://doi.org/10.4236/ojn.2018.87037>
- Srof BJ, Velsor-Friedrich B. Health promotion in adolescents: a review of Pender's Health Promotion Model. *Nurs Sci Q* [Internet]. 2006[cited 2022 May 5];19(4):366-73. Available from: <https://doi.org/10.1177/0894318406292831>
- Mendes KDS, Silveira RCCP, Galvão CM. Integrative literature review: a research method to incorporate evidence in health care and Nursing. *Texto & Contexto Enferm* [Internet]. 2008[cited 2022 May 5];17(4):758-64. Available from: <https://doi.org/10.1590/S0104-07072008000400018>
- Moher D, Liberati A, Tetzlaff J, Altman DG, PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Int J Surgery* [Internet]. 2010[cited 2022 May 5];8(5):336-41. Available from: <https://doi.org/10.1371/journal.pmed.1000097>
- Haghi R, Ashouri A, Karimy M, Rouhani-Taneaboni N, Kasmei P, Pakdaman F, et al. The role of correlated factors based on Pender health promotion model in brushing behavior in the 13-16 years old students of Guilan, Iran. *Ital J Pediatr* [Internet]. 2021[cited 2022 May 5];47(111). Available from: <https://doi.org/10.1186/s13052-021-01063-y>
- Elseifi OS, Abdelrahman DM, Mortada EM. Effect of a nutritional education intervention on breakfast consumption among preparatory school students in Egypt. *Int J Public Health* [Internet]. 2020[cited 2022 May 5];65(6):893-903. Available from: <https://doi.org/10.1007/s00038-020-01439-7>
- Topan A, Gözen D. Effect of model-based training by nurses on the promotion of sleep patterns among students in the middle school. *J Turk Sleep Med* [Internet]. 2020[cited 2022 May 5];7(2):96-104. Available from: <https://doi.org/10.4274/jtstm.galenos.2019.68077>
- Gürkan KÇ, Bahar Z. Living With Diabetes: perceived barriers of adolescents. *J Nurs Res* [Internet]. 2020[cited 2022 May 10];28(2):e73. Available from: <https://pubmed.ncbi.nlm.nih.gov/32168173/>
- Gürkan KÇ, Bahar Z, Böber E. Effects of a home-based Nursing intervention programme among adolescents with type 1 diabetes. *J Clin Nurs* [Internet]. 2019[cited 2022 May 10];28(23-24):4513-24. Available from: <https://doi.org/10.1111/jocn.15040>
- Voskuil VR, Robbins LB, Pierce SJ. Predicting physical activity among urban adolescent girls: a test of the health promotion model. *Res Nurs Health* [Internet]. 2019[cited 2022 May 10];42(5):392-409. Available from: <https://doi.org/10.1002/nur.21968>
- Yavuz AY, Hacıoğlu N. The effect of training provided for obese adolescents based on health promotion model on their healthy lifestyle behaviors and life quality. *Progr Nutr* [Internet]. 2018[cited 2022 May 10];20(1):146-60. Available from: <https://doi.org/10.23751/pn.v20i1.6301>
- Ayres CG, Pontes NM. Use of theory to examine health responsibility in urban adolescents. *J Pediatr Nurs* [Internet]. 2018[cited 2022 May 10];38:40-5. Available from: <https://doi.org/10.1016/j.pedn.2017.09.011>
- Kholifah SN, Yumni H, Minarti, Susanto T. Structural model of factors relating to the health promotion behavior of reproductive health among Indonesian adolescents. *Int J Nurs Sci* [Internet]. 2017[cited 2022 May 10];4(4):367-73. Available from: <https://doi.org/10.1016/j.ijnss.2017.10.001>
- Santos AS, Viana MCA, Chaves EMC, Bezerra AM, Gonçalves JJ, Tamboril ACR. Educational technology based on Nola Pender: promoting adolescent health. *Rev Enferm UFPE on line* [Internet]. 2018[cited 2022 May 15];12(2):582-8. Available from: <https://doi.org/10.5205/1981-8963-v12i2a22609p582-588-2018>
- Do ES, Choi E. Structural equation modeling on smoking cessation intention in male technical high school students. *J Korean Acad Nurs* [Internet]. 2017[cited 2022 May 12];47(2):211-21. Available from: <https://pubmed.ncbi.nlm.nih.gov/28470158/>
- Borhani M, Sadeghi R, Shojaeizadeh D, Harandi TF, Vakili MA. Teenage girls' experience of the determinants of physical activity promotion: a theory-based qualitative content analysis. *Electronic Physician* [Internet]. 2017[cited 2022 May 15];9(8):5075-82. Available from: <http://dx.doi.org/10.19082/5075>
- Wise NJ, Cantrell MA, Hadley F, Joyce K. Development of an interactive pregnant adolescent nutrition education workshop. *J Perinat Educ* [Internet]. 2017[cited 2022 May 10];26(3):154-64. Available from: <https://doi.org/10.1891/1058-1243.26.3.154>
- Penna LHG, Ribeiro LV, Ramos KAA, Félix FO, Guedes CR. Empoderamento de adolescentes femininas abrigadas: saúde sexual na perspectiva do Modelo Teórico de Nola Pender. *Rev Enferm UERJ* [Internet]. 2016[cited 2022 May 10];24(5):e27403. Available from: <https://doi.org/10.12957/reuerj.2016.27403>
- Robbins LB, Ling J, Toruner EK, Bourne KA, Pfeiffer KA. Examining reach, dose, and fidelity of the "Girls on the Move" after-school physical activity club: a process evaluation. *BMC Public Health* [Internet]. 2016[cited 2022 May 10];16:671. Available from: <https://doi.org/10.1186/s12889-016-3329-x>
- Ardic A, Esin MN. The Adolescent Lifestyle Profile Scale. *J Nurs Res* [Internet]. 2015[cited 2022 May 15];23(1):33-40. Available from: <https://doi.org/10.1097/jnr.0000000000000052>
- Mohamadian H, Ghannae AM. Factors predicting the physical activity behavior of female adolescents: a test of the health promotion model. *J Prev Med Public Health* [Internet]. 2014[cited 2022 May 10];47(1):64-71. Available from: <https://doi.org/10.3961/jpmph.2014.47.1.64>

25. Dehdari T, Rahimi T, Aryaeian N, Gohari MR, Esfeh JM. Developing and testing a measurement tool for assessing predictors of breakfast consumption based on a health promotion model. *J Nutr Educ Behav* [Internet]. 2014[cited 2022 May 18];46(4):250-8. Available from: <https://doi.org/10.1016/j.jneb.2013.12.007>
26. Dehdari T, Rahimi T, Aryaeian N, Gohari MR. Effect of nutrition education intervention based on Pender's Health Promotion Model in improving the frequency and nutrient intake of breakfast consumption among female Iranian students. *Public Health Nutr* [Internet]. 2014[cited 2022 May 10];17(3):657-66. Available from: <https://doi.org/10.1017/S1368980013000049>
27. Taymoori P, Berry TR, Lubans DR. Tracking of physical activity during middle school transition in Iranian adolescents. *Health Educ J* [Internet]. 2012[cited 2022 May 21];71(6):631-41. Available from: <https://doi.org/10.1177/0017896911419341>
28. Mohamadian H, Eftekhari H, Rahimi A, Mohamad HT, Shojaiezade D, Montazeri A. Predicting health-related quality of life by using a health promotion model among Iranian adolescent girls: a structural equation modeling approach. *Nurs Health Sci* [Internet]. 2011[cited 2022 May 21];13(2):141-8. Available from: <https://pubmed.ncbi.nlm.nih.gov/21595808/>
29. Taymoori P, Lubans D, Berry TR. Evaluation of the health promotion model to predict physical activity in Iranian adolescent boys. *Health Educ Behav* [Internet]. 2010[cited 2022 May 28];37(1):84-96. Available from: <https://doi.org/10.1177/1090198109356407>
30. Martínez FT. Aplicación del modelo de Nola Pender a un adolescente con sedentarismo. *Rev Enferm Neurol* [Internet]. 2010[cited 2022 May 10];9(1):39-44. Available from: <https://www.medigraphic.com/pdfs/enfneu/ene-2010/ene101j.pdf>
31. Guedes NG, Moreira RP, Cavalcante TF, Araújo TL, Ximenes LB. Atividade física de escolares: análise segundo o modelo teórico de promoção da saúde de Pender. *Rev Esc Enferm USP* [Internet]. 2009[cited 2022 May 22];43(4):744-80. Available from: <https://doi.org/10.1590/S0080-62342009000400006>
32. Taymoori P, Niknami S, Berry T, Ghofranipour F, Kazemnejad A. Application of the health promotion model to predict stages of exercise behaviour in Iranian adolescents. *East Mediterr Health J* [Internet]. 2009[cited 2022 May 23];15(5). Available from: https://applications.emro.who.int/emhj/1505/15_5_2009_1215_1225.pdf?ua=1
33. Thom S, Longo BM, Running A, Ashley J. Celiac Disease: a guide to successful diagnosis and treatment. *J Nurse Pract* [Internet]. 2009[cited 2022 June 6];5(4):244-53. Available from: <https://doi.org/10.1016/j.nurpra.2008.09.002>
34. Taymoori P, Niknami S, Berry T, Lubans D, Ghofranipour F, Kazemnejad A. A school-based randomized controlled trial to improve physical activity among Iranian high school girls. *Int J Behav Nutr Phys Act* [Internet]. 2008[cited 2022 May 18];3(5)18. Available from: <https://doi.org/10.1186/1479-5868-5-18>
35. Johanson LC. Caring for patients of the millennial generation: considerations for nurses. *Nurs Forum* [Internet]. 2017[cited 2022 May 29];52(3):207-10. Available from: <https://pubmed.ncbi.nlm.nih.gov/27943314/>
36. Lamblin M, Murawski C, Whittle S, Fornito A. Social connectedness, mental health and the adolescent brain. *Neurosci Biobehav Rev* [Internet]. 2017[cited 2022 May 29];80:57-68. Available from: <https://doi.org/10.1016/j.neubiorev.2017.05.010>
37. Wang C, Pan R, Wan X, Tan Y, Xu L, McIntyre RS, et al. A longitudinal study on the mental health of general population during the COVID-19 epidemic in China. *Brain Behav Immun* [Internet]. 2020[cited 2022 May 17];87:40-8. Available from: <https://doi.org/10.1016/j.bbi.2020.04.028>
38. Viztum C, Kelly PJ, Cheng AI. Hospital-based therapy dog walking for adolescents with orthopedic limitations: a pilot study. *Compr Child Adolesc Nurs* [Internet]. 2016[cited 2022 May 11];39(6):256-71. Available from: <https://doi.org/10.1080/24694193.2016.1196266>