The Precede-proceed Model Implementation in Preventive Oral Health Programs for School-aged Children: A Scoping Review

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Abstract

The results of the Indonesian National Basic Health Research (RISKESDAS) in 2018 showed that the proportion of oral disease reached 54% between the 5 and 9-year age group and 41.4% between the 10 and 14-year age group. The possible cause of the problem is that the health programs need to be improved and run more effectively. Based on L.Blum's theory, health programs is considered as a primary factors that influence health. The precede-proceed model (PPM) is one of the planning models to create and assess health programs. This scoping review aims to summarize the scientific literature regarding the implementation of PPM applied to preventive oral health programs for school-aged children. A systematic search in the PubMed and ProQuest databases was conducted to identify relevant studies. The keywords used were oral health, dental health, preventive, schoolchildren, and precede planning model. The initial searched identified 43 articles, 4 articles were selected as they fulfilled inclusion criteria. Three studies applied 8 phases of the PPM, meanwhile, only one study used 4 phases. Most of the studies revealed that oral health programs-based on the PPM significantly improved oral health-related behaviour, which involves children, parents, teachers, and school.

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Introduction

The proportion of dental problems in Indonesia is still high, based on the results of the Indonesian National Basic Health Research (RISKESDAS) in 2018, 45.3% population suffer from caries and the prevalence of dental caries in East Java was 42.4%. In addition, it also showed that the proportion of dental and oral problems in the group of 5-9 year was 54% and group of 10-14 year age was 41.4%.[1]

According to Hendrik L. Blum, four factors affect community health status: genetic factors, behavioral/lifestyle factors, environmental factors (social, economic, demographic), and the availability of healthcare service facilities, including health programs.[2] The same as dental caries in children, which is strongly influenced by genetic factors. Biological and genetic factors are also fundamental factors that determine a person's health.[3]

Another factor that affects oral health is behavioral factors that maintain oral health, especially the parental influence on children's oral health behavior.[4–9] Changes in parental behavior are needed to support children's oral health. According to the preliminary theory, there are eight phases to make health program planning, implementation, and evaluation; which are social, epidemiological, educational/ecological, administrative/policy evaluation, intervention planning, implementation, process, impact, and performance assessment. Changes are in the third and fourth phases, where three components influence a person's behavior change in terms of the fourth phase of the theory (educational phase), where three components determine behavior change, i.e. predisposing factors (knowledge, attitudes, beliefs, personal perceptions, self-esteem, efficacy), supporting factors (health service facilities), and reinforcing factors (social support, economy, empathy for doctors, nurses).[10–15]

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Many studies use the Lawrence-Green precede-proceed theory on behavior, the causes of caries from behavioral factors, one of which is the study of Dimitropoulus et al. (2018)[16], which uses three stages in the precede-proceed model (PPM) to establish school-based preventive oral health intervention, aims to change dental health behavior in school children and parents. Research by Ghaffari et al. (2021)[17], also uses the precede-proceed theory, involving school children, parents, and school teachers for the dental and oral health of elementary school-aged children in Iran. The aim of this literature review is to identify the implementation of PPM in preventive oral health programs for school children.

Materials and methods

We use a systematic review of the existing article to answer the question – how to implement the PPM on preventive oral health programs for school children? Specific criteria were used for this review: all experimental studies (RCT, quasi-experimental), only English language, no duplicate studies, and study subjects included school-aged children.

A systematic search in the PubMed and ProQuest databases was conducted to identify eligible studies with keywords based on the title. We use both databases because they are both large, and PUBMED focuses explicitly on pharmacy and biomedicine. We created a sensitive electronic search technique to anticipate an extensive range of phrases for potentially pertinent papers. Each database's subject titles were distinct (MeSH for PubMed). We searched the database using PICO (Population, Intervention, Comparison, Outcome) with specific keywords: oral health, dental health, preventive, schoolchildren, and precede planning model.

The selection of articles through the prism flowchart stage (Figure 1), the identification stage of articles with keywords based on PICO (Pubmed) obtained 43 articles, then the filtering stage for the number of articles after the duplication was deleted, 5 years, scholarly journal, free full text obtained 23 articles, the number of articles filtered by title and abstract, similarity obtained 5 articles, the number of articles with filters (preventive oral health, schoolchildren, PPM) The number of articles from other databases ProQuest was 2 articles, and articles that entered the inclusion stage or were included in the review were 4 articles and discussions were held with other authors.

Data from the four selected articles were then tabulated and extracted from all information related to the articles such as title, authors, study design, PICO, population, intervention, exposure, outcome, results, and conclusions.

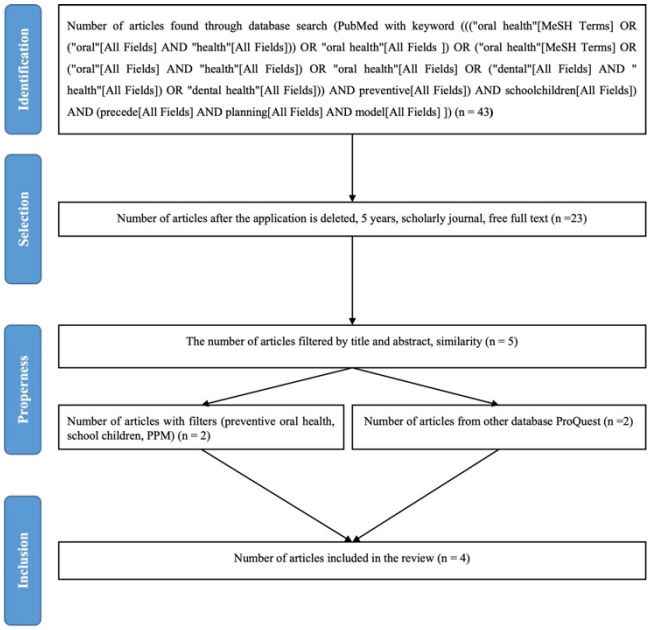

Figure 1. Flow diagram of the articles selection.

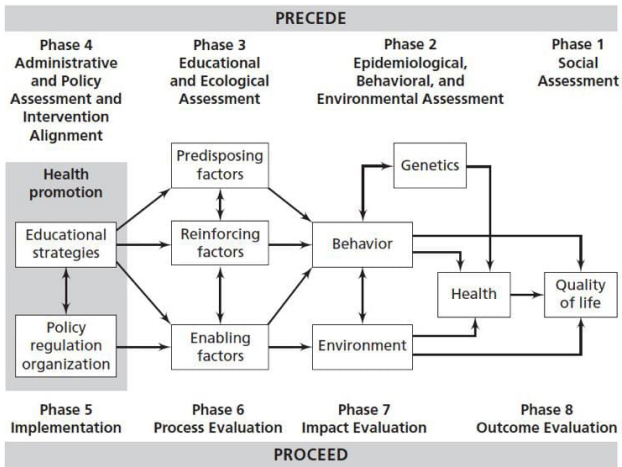

Figure 2. Lawrence-Green precede-proceed theory (Glanz et al., 2008)[10]

Results

The initial searches identified 43 articles. After the examination screening based on the published within the last five years and full text free, 23 articles were obtained. Only four studies,

which fulfil inclusion criteria, were included in this review (Table 1).

Discussion

A PPM for school-based oral health prevention programs is helpful because it involves children, parents, teachers, and the school.[20–23] This planning model consists of 8 stages, starting from identification, program planning, and implementation, and the results will also be evaluated with this model.

In Glanz et al. (2008)[10], Lawrence Green's theory consists of four stages of planning, one stage of implementation, and three stages of evaluation (Figure 2). There are eight stages in this theory, namely:

a. Stage 1: Social evaluation, participatory planning, and situation analysis

The first stage's goal is to investigate the public's understanding of their perspective on a topic through participation and various objective and subjective sources of information. Planners can better understand the community by conducting focus groups with community members, interviews with community leaders, observations, and surveys. This stage outlines the community's needs and wants, as well as its strengths and areas for improvement, as well as its openness to change. The idea of mapping is an original strategy that works for this level. Concept mapping reveals how individuals perceive and feel about a subject or problem.[10]

b. Stage 2: Epidemiological, behavioral, and environmental evaluation

Health difficulties, problems, and desires related to a health problem are identified through epidemiological examination. Secondary data sources for epidemiological information include medical records, national health surveys, and data from smaller geographic areas (to see genetics that can identify high-risk groups for intervention). There are three levels to view behavioral determinants concerning health issues: community, interpersonal, and individual. Environmental determinants include social and physical environmental elements that are external to the individual, such as additional health education, community mobilization tactics, and decision-makers involvement.[10]

c. Stage 3: Educational and ecological assessment

This stage involves identifying predisposing, reinforcing, and enabling factors after choosing pertinent environmental and behavioral elements for intervention. Determinants of rational conduct and motivators of behavior, such as information, attitudes, beliefs, preferences, abilities, and self-efficacy beliefs, are predisposing variables. Social support, peer pressure, and the behavior of health workers are examples of reinforcing factors that follow behavior that depends on rewards or rewards received when engaging in specific behaviors. Enabling factors, on the other hand, are precursors to behavior and environmental changes that can cause motivation and environmental policies to materialize, such as health programs and health services.[10]

The three stages of the theory of change (individual, interpersonal, and community) can be helpful at this stage. At the individual level, face-to-face education and counseling about information health and predisposing factors are most appropriate because they can help identify messages for direct communication channels like mass media. Indirect communication (via social networks) and techniques are the most suitable interpersonal level for reinforcing variables (train-the-trainer models, development of community support). Reinforcing factors, which propose alterations in the setting (organization, rules, laws, and regulations), which promote behavior change, are acceptable at the community level.[10]

d. Stage 4: Administrative and policy assessment and intervention arrangement

This fourth stage is where program components (interventions) are chosen and prioritized according to the previously established determinants. In order to implement the program, it is necessary to determine the facilities, organizational obstacles, resources, and policies required. At a macro level, organizational and environmental systems can affect program outcomes (interventions from enabling factors for an environmental change), as well as at a micro level by looking at individuals, friends, and families that can influence (interventions of predisposing, reinforcing, and enabling factors), are essential to consider.[10]

- Predisposing factors facilitate/predispose the behavior, manifested in knowledge, attitudes, beliefs, beliefs, values, etc.
- The availability or lack of health facilities or facilities, such as health centers, medicines,

and medical equipment, are examples of supporting factors (enabling factors), which are factors that facilitate behavior and are reflected in the physical environment, the mother's healthy behavior, and the availability or absence of supportive factors.

- The attitudes and behavior of health professionals or other officers, who serve as reference groups for community behavior, are examples of reinforcing factors, which are factors that encourage the behavior.
- Stage 5: Implementation
- Stage 6: Assessment
- Stage 7: Impact evaluation
- Stage 8: Outcome evaluation[4]

Stage 5 is the stage where the health promotion program is ready to be implemented. Data collection is carried out to evaluate the program's process, impact, and outcome, which includes the final three stages in the precede-proceed planning model (stages 6-8). This version combines two stages, namely epidemiological assessment and behavioral and environmental assessment.

Findings and possible mechanisms

According to the review of the four articles' findings, the PPM helps develop, implement, and evaluate health programs in schools, particularly dental and oral health. This is because this model's components include data from social, epidemiological, environmental, educational, ecological, and administrative factors, and policies that influence the development of oral health programs.

Conclusions

Most of the studies revealed that oral health programs-based on the PPM significantly improved oral health-related behaviour, which involves children, parents, teachers, and school. However, our research is limited to the use of this PPM in preventive dental health activities in school children, and the population and sample numbers vary.

Declaration of Interest

The authors report no conflict of interest.

Study (author, year)	P (population)	I (intervention, prognostic factors, exposure)	C (comparison, intervention) method	O (outcome)	Goal, conclusion
Stewart R et al., (2022)[18]	Elementary school students in rural eastern Bertie County of North Carolina	PRECEDE element compromises social, epidemiological, environmental, educational, ecological, administrative, and policy components, which literate the evolution of the oral health intervention. PROCEED element compromises actualization and assessment.	7 stages of the PPM: social assessment, epidemiological and environmental evaluation, educational and ecological evaluation, administrative and policy evaluation, development and applying, assessment process, and impact evaluation	The oral health intervention cultivated the significance of: intercultural competence and motivational interviewing; organize events at school; program promotion between schools; program evaluation; guarantee all children undergo follow-up care; and insurance reimbursement, admission, and continued buildup of the community-academic partnership.	School-based oral health intervention are able to enlarge the way to care for at-risk children, as well as to upgrade knowledge. Implementing the PPM has proven suitable for enlarging, applying, and assessing school-based oral health programs.
Ghaffari M et al., (2021)[6]	250 elementary school students, parents, and school teachers.	Phase 1 – 4: Focus group discussion (FGD) and interview method, by identifying predisposing, enabling, and reinforcing factors connected to dental and oral health. The tutoring program consists of sessions for students with toothbrush sessions, for parents, and for teachers.	Precedes : Qualitative stage: Stages 1 – 4: FGD and interview methods, by identifying predisposing, enabling, and reinforcing factors connected to difficulties. Proceed assessment and result of the program on behavior and factors that affect oral health. Stages 4 and 5: program design and implementation.	Factors that influence tooth brushing behavior in children can be identified. There are 7 predisposing factors, 5 enabling factors, and 2 reinforcing factors.	To develop, actualize, and assess an interference according to a PPM for oral and dental health in elementary students in Iran.

			Stages 6 and 7: evaluation results, were not discussed.		
Dimitropoulos, Y et al., (2018)[5]	Pilot project 3 schools for 12 months for local aboriginal children.	Interventions for children in schools consist of 4 components: Daily toothbrushing at school Handed out free fluoridated toothbrushes and toothpaste Community dental health education at school Installation of water filters and coolers for the water bottle program. The educational intervention was carried out 4 times by oral health therapists and local aboriginal dental assistants.	There are three stages in the PPM applied to evolve a school-based preventive oral health program. Stage 1: Caries prevalence data (DMF-T) and DMF-t. Result of phase one, made a health promotion program with leaflets given to aboriginal elders, teachers, and principals in three elementary schools. Moreover, the program is approved for implementation. Stage 2: Create a health promotion program with 4 interventions. Stage 3: Implementation for 12 months in three elementary schools.		Provide the local aboriginal community to be able to increase oral health
Bab N et al., (2022)[19]	This research was quasi-experimental study was run on 100 mothers with children aged 3–6 years.	A questionnaire was made, including the following aspects: demographic characteristics, predisposing factors (oral health-related knowledge), attitude, perceived threats, perceived benefit questions, self-efficacy, enabling factors (perceived barriers questions and perceived behavioral control), reinforcing factors (family support and reinforcement). The response scale was according to a Likert scale from "Definitely Agree" to "Definitely Disagree," and "I can definitely do it" to "I can't do it at all."	The experimental instrument was established and accepted according to the model phases in the form of demographic characteristic, predisposing, enabling, and reinforcing components. In the stage five, interfere planning program was conducted in 30 days. Moreover, follow-up was conducted 2 months after the last coaching session.	After applying for the program, a notable change was remarked between the experimental and control group in predisposing, enabling, reinforcing factors, and oral health-related behaviors. Furthermore, implementing the planned educational program resulted in 30.4% of changes in oral health-related behavior.	The PPM is suggested to be used to conceive, actualize, and evaluate oral health programs.

Table 1. Summary of the selected articles.

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