

# Effectiveness of Health Education Models and Approaches in Creating Awareness on Oral Diseases Among Adolescents- a Systematic Review

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## Abstract

**Aim:** To assess effectiveness of Health education models and approaches in creating awareness about oral diseases among adolescents. **Methods:** An electronic search in Medline (through PUBMED) and EBSCO databases yielded 327 publications, out of which 14 were included in this review. All randomized controlled trials and non-randomized trials conducted among adolescents aged 10-15 years between 2006 to 2016 published in English language with full text was included. Each publication was reviewed and critically appraised by two independent researchers according to a set of validity criteria (CONSORT and TREND guidelines). We used the PICO tool for interrogation of the literature and finding an answer, which helps to break down the query into Population, Intervention, Comparison, and Outcome. **Results:** Out of 33 studies obtained, 14 studies fulfilled the inclusion criteria with a validity score of 18 using CONSORT and TREND checklists. These studies were categorized based on theoretical models and approaches. **Conclusions:** The present systematic review demonstrated the effectiveness of social theoretical model in bringing about the change, however a thorough systematic review focusing on specific model and specific disease and specific outcome will be more beneficial.

**Key Words:** Health Education Model, School Children, Oral Diseases, Health Education Approaches

## Introduction and Background

Oral health is an integral part of general health, absence of which adversely affects quality of life<sup>1-3</sup>. Oral diseases directly may affect only the oral cavity, but their consequences affect the entire human body<sup>4</sup>. It is a major public health problem for developed countries and is still a burden for developing countries due to unorganized and limited resources<sup>5</sup>. However oral diseases are not life threatening, but its treatment is often expensive<sup>6</sup>. Most of the oral diseases like dental caries, periodontal disease and oral cancer are preventable if appropriate awareness is created about the disease and its

treatment at an early age<sup>4</sup>.

Adolescence is one such important phase which has an influence in learning many habits and developing health perceptions due to secondary socialization<sup>7</sup>. Studies have shown that schools are the perfect setting for promoting oral health awareness to adolescents in an efficient and effective way which continues during adulthood as well<sup>8,9</sup> with a ripple effect to peers, teachers, parents and community<sup>7,10</sup>. It is a challenge to enable adolescents to develop good oral health behaviors.

To address this issue, various methods have been worked out in the promotive, preventive

and therapeutic approaches. Health promotion is mainly focused on creating awareness through health education. Studies have shown that different interventions have been explored starting from traditional approaches to adopting various theoretical models such as health belief model, trans theoretical model and social cognitive theory for health education and have shown to improve decision making skills and self-esteem<sup>11-13</sup>. Studies on theory based health education have shown positive results when compared to traditional approaches; however such studies are very limited. Systematic reviews on health education models and approaches have shown improvement in knowledge among adults<sup>14,15</sup>. There was no literature available on theoretical model based health education showing effectiveness in knowledge, attitude and practice for adolescents group. Hence it still remains unclear whether theoretical based health education is effective. Therefore there is a need to assess the effectiveness of theoretical based health education on oral diseases among adolescents through systematic review.

#### **Aim:**

To assess the effectiveness of health education models and approaches in creating awareness about oral diseases among adolescents.

#### **Objectives:**

i. To explore the available literature on oral health education models and approaches for creating awareness among adolescents

ii. To assess the effectiveness of health education models and approaches

#### **Methods**

We have followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement<sup>16</sup>

#### **Ethical Committee Approval:**

Not required as this is a systematic review.

#### **Search Strategy**

An electronic search in MEDLINE (through PubMed) and EBSCO was carried out using Medical Subjects Headings (MeSH) terms “health education model”, “school children”, “oral diseases” and “health education approaches”. All electronically identified records were scanned by title, abstract and / or keywords by both authors and full-text articles were included.

#### **Publication Selection:**

#### **Inclusion Criteria:**

- A. Original research articles conducted among adolescents aged between 10 to 16 years based on theoretical models/ approaches
- B. English language publications only
- C. Studies published between 2006 and 2016 (10 years) only in Indexed journals
- D. Study designs: Interventional

#### **Exclusion Criteria:**

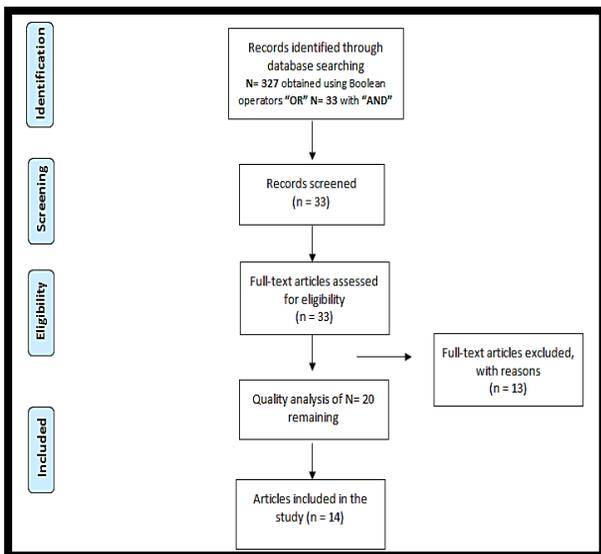
Literature from conference proceedings, dissertations and government reports are excluded.

#### **Quality Assessment and Data Extraction**

The baseline searches were carried out by two authors and the selection of papers was done on the basis of the title, keywords and abstract. Those studies that were obviously irrelevant and not fulfilling the criteria were excluded. Only full text articles obtained were considered. The decisions about the eligibility and data recording based on PICO method which included the query into Population, Intervention, Comparison, and Outcome was done independently with no disagreements. Finally 20 studies were critically appraised according to set validity criteria (CONSORT and TREND checklist)<sup>17,18</sup>. The validity score of 18 was set which resulted in 14 studies for the final review.

A qualitative review of the objectives of each study, its nature, type and the number of participants and the outcome of the studies was recorded.

16,100 studies were identified in databases based on the key words in the first hit. Of this, 327 studies obtained using Boolean operators “OR” and 33 studies obtained using “AND”. From these only 20 studies using theoretical models and approaches were selected (Fig. 1). Of these only 14 were considered in the study and are grouped based on different theoretical models or approaches: a. Studies based on **Fig.1**



**Fig.1 Flow chart of selection process of articles included for the review**

Social cognitive theory, b. Studies based on Trans theoretical model, c. Studies based on Health belief model, d. Studies based on Communication-behavior change model and e. Studies based on school-based programs.

## Results

This review focused on theory based school interventions for oral diseases among

adolescents as shown in Table 1. Among the 14 studies, 4 studies are from developed and the remaining from developing countries. The sample size ranged from 30 to 7698 and follow up ranged from 1 week to 2 years (Table 1).

Out of the 4 studies based on social cognitive theory, 2 studies<sup>19,20</sup> with 6 months follow-up showed improvement on cancer awareness ranging from 2.7 to 6.8 and one study with 2 years follow-up showed decreased smoking habit by 11% and chewing tobacco by 28%<sup>21</sup>. Amongst the 4 studies, one study with 2 years follow-up showed contradictory results with overall negative results and only peer-led intervention showed 37.5% improvement<sup>22</sup>.

Out of the 2 studies based on Trans theoretical model (TTM), one study<sup>23</sup> with one year follow-up showed 37% improvement in smoking cessation and another with 24 weeks follow-up showed increase in self-efficacy from 16.27 to 26.29 in oral hygiene status<sup>24</sup>. Similarly there was significant increase in mean score from 24.1 to 59.1 on oral health status when the study was based on health belief model<sup>25</sup>. Study done using Communication-behavior change model with 6 months follow-up showed more than 40% increase in knowledge about oral hygiene status<sup>9</sup>. 3 studies are done on school-based smoking prevention programs, 2 studies<sup>26,27</sup> have shown significant improvement ranging from  $3.9 \pm 0.6$  to  $7.8 \pm 2.01$  and one study<sup>28</sup> showed mean reduction smoking attitude scores by 9.9 points. A study based on Motivational interviewing with 8 months follow-up focused on ban of tobacco habits showed positive results by 73%<sup>29</sup> and theory based self-regulatory approach showed increase in self-efficacy mean score from 6.91 to 8.58<sup>10</sup>. Role of repetition and reinforcement showed improvement in oral health status by 73%<sup>30</sup>.

**Table 1. Different theory based school interventions for oral diseases among adolescents**

Location	Authors	Year	Sample Size		Study type	Follow up	Theoretical construct	Outcome measures	Results
			Intervention	Control					
Developed countries	Hubbard, G. et al <sup>19</sup>	2015	1646	1577	Cluster RCT	6-months	Social cognitive theory	Cancer awareness	2.7 times increase
	Kyle, R.G. et al <sup>20</sup>	2013	290	132	RCT	6 months	Social cognitive theory	Cancer awareness knowledge	Significantly increased (4.6 to 6.8, p<0.001)
	Hedman et al <sup>29</sup>	2010	120, 142	120	Intervention trial	8 months	Motivational interviewing	Ban on tobacco habits	Positive results by 73%
	Erci, B <sup>23</sup>	2012	30	30	Experimental	1 year	Transtheoretical model	Smoking cessation	cessation was 37% (U=262.50, p=0.001)
Developing countries	Perry, C.L. et al <sup>21</sup>	2009	6365	7698	RCT	2 years	Social cognitive theory	Smoking tobacco	Decreased 11%-Smoking and 28% in chewing tobacco
	Haleem, A. et al <sup>22</sup>	2012	333,333, 341, 326	324	Cluster RCT	2 years	Social cognitive theory	Oral health	Peer-led showed significant OHB score of 37.50%
	Gholami, M. et al <sup>10</sup>	2014	69	97	Cluster RCT	4 weeks	Self-Regulatory Intervention	Self-efficacy	Significant increase in mean from 6.91 to 8.58
	Haleem, A. et al <sup>30</sup>	2016	333, 341	333	Cluster RCT	1 year	Repeated and reinforced OHE	Oral hygiene and oral health behaviour	73 % reported positive after 6 months
	Yekaninejad MS,etal <sup>25</sup>	2012	131, 127	134	RCT	3 months	Health belief model	Oral Hygiene Status	Significant increase in mean from 24.1 to 59.1
	Hashemian, et al <sup>24</sup>	2012	153	153	Experimental	24 weeks	Transtheoretical model	Self-efficacy	16.27 to 26.29
	Gauga,A. et al <sup>9</sup>	2013	100	-	Intervention trial	6 months	Communication-behavior change model	oral hygiene status	>40% increase in knowledge
	Tahlil, T. et al <sup>26</sup>	2013	122, 109, 117	128	RCT	1 week	School-based smoking prevention programs	School-based smoking prevention programs	Significant improvement of $\beta = 3.9 \pm 0.6$
	Tahlil, T. et al <sup>28</sup>	2015	299	128	Cluster RCT	6 months	School-based smoking prevention	Smoking prevention programs	Mean reduction smoking attitude scores by 9.9 points
Verma, A. et al <sup>27</sup>	2015	720	-	Intervention trial	1 week	School-based short-term educational intervention program	Smoking prevention	Significant increase from $5.9 \pm 1.87$ to $7.8 \pm 2.01$	

## Discussion

### Summary of Main Results

This systematic review was conducted to assess the effectiveness of health education models and approaches in creating awareness about oral diseases among adolescents. The outcome measures were assessed with improvement in oral-health knowledge, attitude, practices and behaviours based on health education models or approaches. .

### Overall Completeness and Applicability of Evidence

A total of 20 studies were retrieved, out of which 11 were excluded based on validity scoring (CONSORT and TREND checklist)<sup>17,18</sup>. 14 studies with a score of 18 or more were retained. These studies were identified to be sufficient to address the objectives of the review. Study participants were defined as adolescents aged between 10 to 16 years. The type of intervention was health education based on various models and approaches. The review includes studies from both developed and developing countries.

Oral diseases remained still a burden in developing countries<sup>31</sup>. Dental health education has been considered to be an important and integral part of dental health services and has been delivered to individuals and group<sup>32</sup>. In this review many health education models and approaches for oral health awareness and have been identified. The health educational interventions used in present review have varied significantly based of different models and approaches. Adolescents in these studies have shown improvement in their either in all or anyone of the oral health-related knowledge, attitude and behaviours as compared to control group.

### Effectiveness of Health Education Models and Approaches

The methods adopted for interventions ranged from face to face lectures to interactive sessions including role-play and the media used varied between chalk and board, power point

presentations, leaflets, pamphlets to audio visual aids. The intervention was delivered by trained personnel, peers and dentists.

Studies based on social cognitive theory: Two studies have showed positive results which were led by trained personnel<sup>19,20</sup>. This was similar to a study by Kelly et al showed improvement in the school based brief interventions in smoking due to use of motivational technique<sup>33</sup>. Similarly other studies but in different health areas have shown positive effects after interventions<sup>34-37</sup>. Another study showed decrease in tobacco consumption due to the multicomponent school-based intervention, very high program participation, strong research design and use of reliable and valid measures of tobacco use which had follow-up for 2 years<sup>21</sup>. Another study showed contradictory results however peer-led interventions to have better outcome compared to the teacher-led and dentist-led<sup>22</sup>.

Studies based on TTM: Both the studies have shown positive impact on improvement, one in increased self-efficacy which is attributed to the educational programmes and group discussions<sup>24</sup>. These findings were supported because self-efficacy was accepted as an important anticipating factor and a valuable determinant for change of behaviour<sup>38,39</sup>. In another study the smoking cessation in the experimental group was 37% as positive transition was seen between stages<sup>23</sup>. Chapman-Novakofski and Karduck (2005) showed similar improvement due to increased self-efficacy<sup>40</sup>. It means that self-efficacy is the strongest factor in anticipation of change of behaviour in a person.

Study on self-regulatory: It focused to evaluate effects of changes in self-efficacy mediated between treatment conditions and behavioral outcomes<sup>10</sup>. Intention formation and self-efficacy seem to play an instrumental role in this change. A similar study by Millar MG in 2011 shown intention and self-efficacy were predictors of dental flossing<sup>41</sup>.

Study focused on of repeated and reinforced OHE (RR-OHE), showed 30 % effective improvement in oral hygiene behavior<sup>30</sup>. Results not only reconfirmed significance of repetition

and reinforcement in school-based OHE but also highlighted the important role the trained teachers and peers can play and hence in enhancing the cost-effectiveness, sustainability and availability of school-based OHE. Similar study focused on repetition and reinforcement program and employed Patient Hygiene Performance (PHP) index to measure behavioral change and showed a positive percent change of 31.53%<sup>42</sup>. In School-based short-term educational approach proved effective in increasing knowledge about tobacco use, which influenced positive changes in attitudes and practices<sup>26-28</sup>. Oral health promotional intervention program of Gauba et al. in 2013 positively influenced oral health related practices and parameters of oral health<sup>9</sup>. Both the studies suggested that the intervention had a major positive impact ( $P < 0.001$ ).

This review showed that studies done in schools among adolescents were effective and health promotion in the form of health education was a salient feature in most of the effective studies.

#### **Limitations and strengths:**

There are few limitations in this review. There is large variation with respect to sample size and duration of follow up which may have influenced our results. The strength is to provide a broader view of the evidence regarding different oral diseases which are school based theory interventions.

#### **Conclusions:**

The present systematic review demonstrated the effectiveness of social theoretical model in bringing about the change in oral diseases. However a thorough systematic review focusing on specific model and specific disease and specific outcome will be more beneficial which will facilitate the researchers to choose one particular model. Suggestions for future directions:

Since multiple models and approaches and multiple outcomes are used, may be specific theory and specific outcome may be effective to generate evidence based results in future. Future research should focus on the further examination

of existing health educational theories. It is required to identify and explore health educational theories most applicable to attain sustained improvements in behaviour by long-term follow up. It is also recommended to test health educational theories systematically to promote healthy behaviour among adolescents.

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#### **Conflict of Interest: None Declared**

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