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"Effectiveness of traditional and advanced modes of health education on improving KAP & oral hygiene status among orphanage school children"- "A Systematic Review "

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Abstract

Introduction – The objective of the study was to review the effectiveness of oral health education using traditional and advanced modes on improving KAP and oral hygiene status among orphanage school children".

Materials & methods – The evidence on children's oral hygiene behaviors and their related health impacts, therapies to improve these behaviors, conditions, outcomes, and impediments to improvement have been carefully reviewed. PubMed, Google Scholar, Scopus, Elsevier, science direct, Medline, Research Gate, and bibliographic databases were searched for the articles from (2011–2023). Clinical trials conducted among 5 to 16 years old children were included. The publications were grouped based on their outcome measures: (i) Knowledge, attitude & practice component (ii) plaque and gingival health (iii) DMFT. The quality assessment was done using Higgins and Green. Cochrane Reviewer's Handbook 2009.

Results: A total of 988 references were identified, among them, 350 references were identified by literature search using Boolean operators, and the relevance of each article was determined by examining the title and abstract components in detail. Finally, 17 articles were selected for qualitative synthesis.

Conclusion: This review concluded that conventional oral health education methods were found to be less effective than advanced methods. These advanced methods reduced the plaque and gingival component & increase the knowledge, attitude, and practice component, of oral health-related practices among children.

Keywords: Intervention, game-based methods, flash-card method, Plaque control.

Introduction

Health education is part of health promotion and disease prevention initiatives to promote children's health and well-being. In particular dental health education, is utilized as a method to develop knowledge and awareness, which may influence attitudes and practices towards healthy oral hygiene.^[1] Children's knowledge, attitude, and behaviour towards good oral hygiene are influenced by an integrated health education and health promotion strategy^[2]. Children's psychological and behavioural changes can be influenced by educational initiatives. ^[2]

According to studies, the prevalence of untreated dental caries significantly decreased after oral health education.^[4] Children benefit from oral health education by changing their oral hygiene behaviors. Early oral health education is crucial since it will cause behavioral changes that will begin during the formative years.^[5] Also, assist children in developing healthy dental hygiene habits that will benefit them throughout their lives.^[6] It can be presented in many different ways, including through conventional means like pamphlets, flashcards, lectures, and tooth model demonstrations as well as through advanced methods like cartoon animations, video-based training, peer group training, PowerPoint presentations, games, and app-based teaching approaches^[7-10]. Therefore, it's essential to determine which strategy works best for enhancing children knowledge on oral hygiene and dental health.

As a result, the purpose of this review is to investigate the effectiveness of oral health education utilizing traditional and advanced techniques on increasing KAP and oral hygiene status in children."

Methodology:

Data extraction:

The Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) statement was referred to and used as a guide for quality reporting of this systematic review and the methodology is based on the Cochrane Handbook of systematic reviews for Interventions version 5.1.0.^[11] Population – children; Intervention– Health education; Comparison– Studies which compare both traditional & advanced health education methods; Primary outcome–Improvement in knowledge, attitude, practices, Plaque and gingival health. Secondary outcomes were the incidence of dental caries, tooth pain, and tooth loss. ^[12-16]

A Comprehensive Literature search was performed using PubMed/Medline, Google Scholar, Cochrane central register of controlled trials, Research Gate, Elsevier and grey literature were utilized as electronic databases, and a literature search was accomplished on articles from the respective database from January 2001 to December 2020, using a combination of various MeSH terms and free text words. The following bibliographic databases were searched: MEDLINE/PubMed [2001 – 2020] Fig.1.

("oral health education"[MeSH Terms] OR ("oral health"[All Fields] AND "education"[All Fields]) OR "oral health education"[All Fields]) AND ("oral health promotion"[MeSH Terms] OR ("oral health"[All Fields] AND "promotion"[All Fields]) OR "oral health promotion"[All Fields]) AND ("effect"[All Fields] OR "effecting"[All Fields] OR "effective"[All Fields] OR "effectively"[All Fields] OR "effectiveness"[All Fields] OR "effectivenesses"[All Fields] OR "effectives"[All Fields] OR "effectivities"[All Fields] OR "effectivity"[All Fields] OR "effects"[All Fields]) AND ("interventions"[All Fields] OR "intervention "[All Fields] OR "interventive"[All Fields] OR "methods"[MeSH Terms] AND "children"[All Fields])

In this review, studies using randomized controlled trials, cross-sectional and Interventional studies were included, with randomization done at both group and individual levels (Fig.1). The age of the participants ranged from 5 to 16 years were included ^[17-20]. Educational interventions carried out by dental professionals like dentists, dental hygienists / dental assistants were considered. (Fig.1). The

primary outcomes of the study were improvement in knowledge, attitude, and practices regarding oral health, plaque accumulation, and gingivitis, and its effectiveness was assessed by changes in the amount of plaque component and gingival bleeding. Secondary outcomes were the incidence of dental caries, tooth pain, and tooth loss (Fig.1).

Study selection

Baseline searches were carried out by three review authors. The agreement and disagreement related to the selection of papers were solved by sticking to more number of keywords matching and in critical cases by voting for authors. Selection of papers was done based on the title, Keyword, Mesh term, and abstract, and decisions regarding the eligibility criteria were carried out independently by the review authors. The abstract and title of the study were assessed and critically reviewed by three independent reviewers who were experts in this field. Reports that were completely irrelevant (according to trial design/duration of the study/participants or interventions performed/comparison group) were not considered^[21]. The full text of the articles was evaluated for inclusion in the study. (Fig.1). If information is not relevant or inclusion criteria were not available or if the title was relevant but the abstract was not available, then the full text of the report was obtained. When disagreements between researchers arose, the eligibility criteria for selection / the schemes used for codification were reviewed by a third reviewer, who was experienced in the content of a review, to make the final decision on the selection process, whether to include the study/ not. Literature was also included based on hand search & cross-references in the selected articles that fit into eligibility criteria^[21].

Inclusion criteria (Fig.1)

1. Children aged 5–16 years were included.
2. RCT, cross-sectional and interventional studies which are published in the English language
3. Articles from January 2001 to December 2020, reporting on different modes of oral health education intervention for socially handicapped children/school children.
4. Studies assessing the outcome of Knowledge, attitude, behavioural status plaque scores, gingival scores, and dental caries status.

Exclusion criteria (Fig.1)

1. Interventions not Performed by oral healthcare professionals.
2. Interventions performed other than the institution and school setting.
3. Interventions other than those expected for this study, which is not targeting primarily dental health education
4. Participants received any kind of restorative care treatments
5. Articles not found by bibliographic commutation
6. Age of participants different from those expected for the study
7. No evidence of primary data

Control of bias assessment:

The quality assessment of included trials was undertaken independently as a part of the data extraction process. Quality assessment was done using Higgins and Green. Cochrane reviewer's handbook 2009 ^[21]. Bias risk was assessed by 4 major domains: Method of Randomization, concealment of allocation; blinding, and incomplete outcome data. The unit of analysis was every class/school/ institution or the individuals /group being included (Table.1).

We have planned to identify the variations among study outcomes, interventions, and bias. Data concerning the details of the study design, quality of the study, participants, intervention, and outcomes were independently extracted and summarized in evidence tables (Table.2,3). Data synthesis was carried out using descriptive synthesis with a summary of the characteristics of each included study. (Table.3)

Results:**Description of selected studies**

The original research searched 988 studies out of which 195 were shortlisted and finally, only 17 studies got selected for systematic review. (Fig.1) Some were rejected due to duplication; others were due to the confined exclusion and inclusion criteria mentioned. (Fig.1)

Improvement in DMFT score:

P.R.Geethapriya et al.^[8] assessed the effectiveness of three different modes of health education interventions on the oral health status of children and compared the two frequencies of reinforcements and concluded that children who received the game mode every 3 months, had a higher number of filled primary teeth when compared to the children who received the reinforcement alone for 6 months. All three modes were effective in improving the oral health status among school children. Game mode creates the highest impact followed by drama mode and flashcard mode. (Table.2,3).

Improvement in oral hygiene status:

Liliya Doichinova et al.^[9] assessed the effectiveness of different methods of oral hygiene training in children and concludes improvement in the oral hygiene status of children with individual training, followed by group training with motivational materials. (Table.2,3).

Roshni Mukhi et al.^[10] assessed the effectiveness of OHE methods on oral hygiene knowledge, attitude, and status of 7–10-year-old school children, and concluded the decline in OHI-S scores from baseline to one month in all three different groups. The video group shows a highly significant improvement in oral hygiene scores and a decrease in debris and calculus scores. (Table.3,4).

BJ John et al. ^[11] assessed the impact of three different modes of health education methods among preschool children and concluded a significant improvement in the (DI-S) scores in all the groups except the control group. (Table.4,5).

Yogesh Kumar et al. ^[12] compared the effectiveness of conventional and game-based teaching on the level of oral health knowledge and practices among 7 to 10-yr old schoolchildren and concluded that there was a significant increase in oral hygiene scores and a decrease in debris scores. Gema Nazri Yanti et al. ^[14] assessed the effectiveness of health education, using the cartoon video method and concludes that the cartoon method was effective in decreasing oral hygiene scores among children. (Table.4,5).

Javad Ramezaninia et al. ^[17] compared the effectiveness of three different modes of tooth brushing education via lecture, video, and pamphlet among adults. The Lowest PI score was observed in all three different groups. Tooth brushing education given via pamphlet, lecture, and video method reduced the plaque index with the same effectiveness. Navin Anand Ingle et al. ⁽²⁰⁾ assessed the effect of oral health education among 8–10yr old school children. Four weeks after HE children PCR % were changed and concludes that educational intervention is effective in bringing about changes in oral health-related behavior. (Table.4).

Improvement in Knowledge, Attitudes, and oral hygiene Behaviours:

This analysis indicates that knowledge and attitude could be improved through health education, with ten studies, showing the positive effects. Children in the experimental group tend to improve in their behavior than those in the control group. (Table.4,5).

Combination

Programs aimed at a combination of the outcomes reveal that short-term results were better and shorter follow-up times were more effective than longer follow-up.^[22] The outcomes reported were a reduction in plaque and gingival scores ^[23-25] (Table.5).

Discussion:

Childhood is the crucial stage in which children develop lifelong sustainable behaviors, attitudes, and belief towards their carrier.^[25] Once they developed, they are deeply ingrained and highly resistant to change.^[26] It is well established that habits learned during the early stage of life will be retained for the entire part of life. Good oral health practices are necessary from childhood to create positive dental hygiene behavior.^[26]

Health education is the most economical and best-known source for health promotion and disease prevention measures among the younger population.^[27] It encompasses all the strategies for providing better oral health status to children and it is an essential part of health promotion measures, to build individuals with adequate knowledge, and able to recognize healthier lifestyles^[27]. Education and entertainment can be well integrated to create the process of learning a joyful experience for the children.^[28] It helps the decision-makers to develop habits and minimize the risk behavior among children.

Results of the present review were consistent which concludes, most of the studies reviewed in this process showed a significant improvement in plaque score, gingival score, knowledge, attitude, and practice scores. There is a need for more systematic reviews on this topic to evaluate the effectiveness of different modes of delivering oral health education among children. By standardizing the outcome variable systematically, it enables us to review future programs and formulate public health programs.^[28]

Limitations were, however, searching for technical reports, articles from committees, literature from the conference, and preprints were not possible, and it is conceivable that some relevant data was left behind. This may have been attributed to some publication bias and the included cross-sectional studies in this review had methodological and generalizability constraints of their own.

Conclusion:

This review concluded that conventional OHE methods like pamphlets, flashcards, lectures, Tooth model demonstration, flip charts, and Powerpoint presentations slides, were found to be less effective than the advanced methods like Game-teaching method, audio-visuals method, cartoon animated video method, App-based teaching methods among orphans. Both conventional and advanced methods improved the oral hygiene status but newer methods seem to be more effective in improving the oral hygiene status of orphanage children.

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Fig.1– FLOW-CHART FOR SELECTION OF STUDIES:

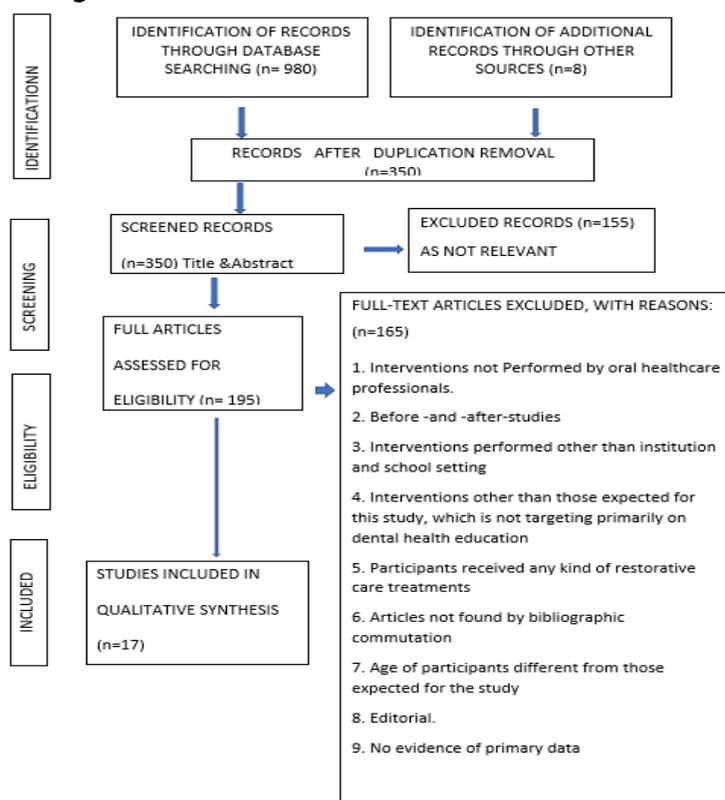


Table 1: Criteria for studies selection:

1. Randomisation?
2. Blinding
3. Control group?
4. Trial design
5. Sample size calculation
6. Inclusion & exclusion criteria
7. Statistical analysis
8. Research aims?
9. 'n' for each group?
10. Intervention details?
11. Outcome measures of the study?
12. Outcome measures objectively measured?
13. Means and SD
14. Follow-up mentioned?
15. Informed consent?
16. Ethical consent?

Table 2: Summary of oral health education interventions and outcomes in children

Sl.NO	Author	Year of Publication	Title	Type of Intervention	Location	Duration of Intervention	Type of study	Sample	Outcome Measured	Results
1	P.R.Geethapriya <i>et al.</i>	2019	Effectiveness of different modes of school dental health education on the oral health status of children – an interventional study with 2-year follow-up	Group A –Drama Group B– Games Group C– Flashcard method	school children suburban area, Tiruchengode, Namakkal district, Tamil Nadu, India.	2-year study	Interventional study	109 (Group A) 133 (Group B) 11 (Group c)	OHI-S, DMFT, OHRQoL	Game mode SDHE every 3 months had a significantly higher number of filled primary teeth compared to children who received the reinforcement every 6 months.
2	Liliya Doichinova <i>et al.</i>	2014	Assessment of the effectiveness of Different Methodologies for Oral Hygiene Training	Group A– Motivational materials and audio-visuals, Group B – education in the group, Group C– Individual education	–	1 month study	Interventional study	20(Group A); 20(group B) 20(Group C)	OHI-S	Improvement in oral hygiene to be the most significant in children with individual training, followed by the group trained with motivational materials and children educated in a group.
3	Neha Singh <i>et al.</i>	2015	Impact evaluation of two methods of dental health education among children of a primary school in rural India	Group A – Demonstration, pamphlet, Audio-visual aids; Group B– demonstrations, pamphlet	Primary school in Maharashtra	6 months	RCT	100 (Group A) 99 (Group B)	Knowledge, practice components	A significant difference in the impact of health education using integrated modes of pamphlets distribution, demonstrations, and A-V aids (group A) as compared to demonstrations and pamphlets distribution only (group B).
4	BJ John <i>et al.</i>	2013	Evaluation of different health education interventions among preschoolers: A randomized controlled pilot trial	Group A–dentist; Group B –class teachers trained by the dentist Group C–dental residents dressed mimicking the	KSR Matriculation Higher Secondary School, Tiruchengode, India.	3 months	RCT	25(Group A), 25(Group B) 25(Group c) 25(Group D)	DI-S	Drama as a method of health education can have a bigger impact on the oral health attitude and practices of the preschoolers.

				cartoon characters Group D- control group						
5	Yogesh Kumar et al.	2015	Effect of Conventional and Game-based Teaching on Oral Health Status of Children: A Randomized Controlled Trial	group A- Flashcard method; Group B-Play-way method, connect the dots game combined with flashcards.	-	3 months	RCT	Group A -30 Group B -30	Debris index score, the Knowledge component	Both groups showed a decrease in oral hygiene scores from baseline with group B showing highly significant reduction. The mean increase in knowledge score was also significantly better in group B (p < 0.05).
6	Sahbanatul Missiriya et. al.	2013	Effect of Animated Presentation in Knowledge on Personal Hygiene among Children at Government Primary School, Thiruvellore	Group A- Animation video Group B-Control group	Government Primary School, Thiruvellore, India.	Pre-test and post-test	Quasi experimental design	50(Group A) 50(Group B)	Knowledge component	No significant association between knowledge level and the selected demographic variables in experimental and control group
7	Roshni Mukhi et.al	2004	The effectiveness of a 6-year oral health education programme for primary schoolchildren	Group A: conventional flash card method Group B: educated with flash card and game based (connect the dots) method; Group C: Video demonstration method.	-	1 month	RCT	50(Group A), 50(Group B) 50(Group C)	OHI-S	The cartoon video animation method and connect the dots game method was an effective and sustainable intervention aids in delivering oral health education messages compared to the traditional flash cards method.
8	Mohd Zulkarnain Sinor et al.	2011	Comparison between Conventional Health Promotion and Use of Cartoon Animation in Delivering Oral Health Education	Group A- Conventional method; Group B-Cartoon animation method	preschool children in Hulu Terengganu District.	few weeks	Interventional study	33(Group A) 33 (Group B)	Knowledge, Attitude, Practice components	cartoon animation as a medium was more effective and sustainable in delivering oral health education messages compared to traditional method.
9	Abdulhadi Ibrahim Ali Alhayek et.al	2018	The Effect of Conventional Oral Health Education versus Animation on the Perception of Saudi Males in Primary School Children	Group A- Conventional Group B- animation group	primary schools in Saudi Arabia;	Pre-test and post-test	Interventional study	375(Group A) 375(Group B)	Knowledge component	Statistical analysis show proximate result for both groups of methods was noticed with each to have merit and demerit.
10	Javad Ramezani et.al	2018	Comparison of the Effect of Toothbrushing Education Via Video, Lecture and Pamphlet on the Dental Plaque Index of 12-Year-Old Children	Group A-no intervention; Group B-Lecture; Group C-Video; Group D- Pamphlet	Public and private schools in Babol, north of Iran.	2 months	Cluster RCT	32(GROUP A) 32(Group B); 32(Group C) 32(Group D)	Plaque index	Tooth brushing education via lecture, video and pamphlet reduced the dental plaque index with the same effectiveness.
11	Ayub Irmadani Anwar et.al	2020	Effectiveness of counseling with cartoon animation audio-visual methods in increasing tooth brushing knowledge	cartoon animated audio-visual methods	children aged 10-12 years old at Toddopuli Superior Primary School in Makassar City, Indonesia.	Pre-test post test	Cross-sectional study	82	Knowledge, attitude component	Counseling with cartoon animation audiovisual method effectively increases the knowledge of brushing teeth of children aged ten to twelve years.

			children ages 10-12 years							
12	Naseem Shah et.al	2016	Effectiveness of an educational video in improving oral health knowledge in a hospital setting	Educational video	Outpatient Department, CDER, AIIMS.	Pre-test post test	Cross-sectional study	109	Knowledge component	knowledge score was statistically significant after exposure to an educational video film in a hospital setting
13	Navin Anand Ingle et.al	2011	Effect of short oral health education intervention on oral hygiene of 8-10 years old school children, Maduravoyal, Chennai	Computer-based oral health education	school children, Maduravoyal, Chennai	Pre test post test	Interventional study	120	Plaque index, PCR %	short computer based oral health education is effective in bringing about oral health related behaviour change.
14	Uma N. Maheswari et.al	2014	Effects of conventional vs game-based oral health education on children's oral health-related knowledge and oral hygiene status-a prospective study	Group A- Conventional; Group B-Game based oral health education	school children,	3 months	Prospective study	30(Group A) 30 (Group B)	DI-S, Knowledge component	The knowledge scores of both the younger and older groups of children increased considerably when the game-based teaching intervention was used.
15	Gema Nazri Yanti et al	2017	Effectiveness of dental health education using cartoons video showing method on knowledge and oral hygiene of deaf children in Yayasan Karya Murni Medan	cartoon animated video	deaf students of SLB Karya Murni Medan, Indonesia	1 week	Clinical experimental study	92	OHI-S, Knowledge	Dental health education using cartoon video showing method are effective in increasing knowledge and decreasing oral hygiene score in deaf children.
16	AM D'Cruz et.al	2012	Impact of oral health education on oral hygiene knowledge, practices, plaque control and gingival health of 13- to 15-year-old school children in Bangalore city	Group A-Lecture ppt; Group B-Lecture ppt and tooth brushing demonstration; Group C-no intervention	school children in Bangalore city	9 months	Double-blind Interventional Study	Group A -150 Group B- 150 Group C - 300	Turesky-Gilmore-Glickman modification of Quigley Hein plaque index, gingival index	Significant reductions in mean plaque index and gingival index scores in the experimental groups. The control group did not show any significant improvement.
17	Azhar Malik ET AL	2017	Implementation of Game-based Oral Health Education vs Conventional Oral Health Education on Children's Oral Health-related Knowledge and Oral Hygiene Status	Group I- Conventional method; Group II-Game based health education method.	elementary school in Lucknow, Uttar Pradesh, India.	3 months	Randomezed controlled trial	75(Group I) 75 (Group II)	Plaque index, the Knowledge component	better scores were seen in group II compared to group I at both the follow-ups.

Table 3: Risk of bias assessment (Higgins and Green. Cochrane reviewer's hand book 2009)

Sl.No	Study	Randomization	Allocation Concealment	Assessor Blinded	Dropouts described	Risk Of Bias
1.	Effectiveness of different modes of school dental health education on the oral health status of children – an interventional study with 2-year follow-up	NO	YES	YES	YES	LOW
2.	Assessment of the Effectiveness of Different Methodologies for Oral Hygiene Training	NO	NO	NO	NO	HIGH
3.	Impact evaluation of two methods of dental health education among children of a primary school in rural India	YES	NO	YES	NO	MODERATE
4.	Evaluation of different health education interventions among preschoolers: A randomized controlled pilot trial	YES	NO	NO	NO	HIGH
5.	Effect of Conventional and Game-based Teaching on Oral Health Status of Children: A Randomized Controlled Trial	YES	NO	NO	YES	MODERATE
6.	Effect of Animated Presentation in Knowledge on Personal Hygiene among Children at Government Primary School, Thiruvellore	YES	NO	NO	NO	HIGH
7.	The effectiveness of a 6-year oral health education program for primary schoolchildren	YES	NO	NO	YES	MODERATE
8.	Comparison between Conventional Health Promotion and Use of Cartoon Animation in Delivering Oral Health Education	NO	NO	NO	YES	
9.	The Effect of Conventional Oral Health Education versus Animation on the Perception of Saudi Males in Primary School Children	NO	NO	NO	NO	HIGH
10.	Comparison of the Effect of Tooth brushing Education Via Video, Lecture and Pamphlet on the Dental Plaque Index of 12-Year-Old Children	YES	NO	NO	NO	HIGH
11.	Effectiveness of counseling with cartoon animation audio-visual methods in increasing tooth brushing knowledge children ages 10-12 years	NA	NA	NA	NA	NA
12.	Effectiveness of an educational video in improving oral health knowledge in a hospital setting	NA	NA	NA	NA	NA
13.	Effect of short oral health education intervention on oral hygiene of 8-10 years old school children, Maduravoyal, Chennai	NA	NA	NA	NA	NA
14.	Effects of Conventional vs Game-based Oral Health Education on Children's Oral Health-related Knowledge and Oral Hygiene Status – A Prospective Study	YES	NO	NO	NO	HIGH
15.	Effectiveness of dental health education using cartoons video showing method on knowledge and oral hygiene of deaf children in Yayasan Karya Murni Medan	NO	NO	NO	NO	HIGH
16.	Impact of oral health education on	YES	NO	YES	YES	LOW

	oral hygiene knowledge, practices, plaque control and gingival health of 13- to 15-year-old school children in Bangalore city					
17.	Implementation of Game-based Oral Health Education vs Conventional Oral Health Education on Children's Oral Health-related Knowledge and Oral Hygiene Status	YES	NO	NO	NO	HIGH

TABLE-4: Outcome assessment

AUTHOR	STATISTICAL ANALYSIS	Outcomes measured	Papers + effect	Papers - effect
P.R.Geethapriya <i>et al.</i>	Mentioned	OHI-S, DMFT, OHRQoL	Yes	No
Liliya Doichinova <i>et al.</i>	Mentioned	OHI-S	Yes	No
Neha Singh <i>et al.</i>	Mentioned	Knowledge, practice components	Yes	No
BJ John <i>et al.</i>	Mentioned	DI-S	Yes	No
Yogesh Kumar <i>et al.</i>	Mentioned	Debris index score, the Knowledge component	Yes	No
Sahbanathul Missiriya <i>et al.</i>	Mentioned	Knowledge component	No	Yes
Roshni Mukhi <i>et al.</i>	Mentioned	OHI-S	Yes	No
Mohd Zulkarnain Sinor <i>et al.</i>	Mentioned	Knowledge, Attitude, Practice components	Yes	No
Abdulhadi Ibrahim Ali Alhayek <i>et al.</i>	Mentioned	Knowledge component	Yes	No
Javad Ramezaninia <i>et al.</i>	Mentioned	Plaque index	Yes	No
Ayub Irmadani Anwar <i>et al.</i>	Mentioned	Knowledge, attitude component	Yes	No
Naseem Shah <i>et al.</i>	Mentioned	Knowledge component	Yes	No
Navin Anand Ingle <i>et al.</i>	Mentioned	Plaque index, PCR %	Yes	No
Uma N. Maheswari <i>et al.</i>	Mentioned	DI-S, Knowledge component	Yes	No
Gema Nazri Yanti <i>et al.</i>	Mentioned	OHI-S, Knowledge	Yes	No
AM D'Cruz <i>et al.</i>	Mentioned	Turesky-Gilmore-Glickman modification of Quigley Hein plaque index, gingival index	Yes	No
Azhar Malik <i>ET AL</i>	Mentioned	Plaque index, the Knowledge component	Yes	No

TABLE-5

Table 5: Effectiveness of studies			
Category	Papers Included	Studies with Significant effect	Studies without significant Effect
Knowledge, attitude and practice component	10	8	2
Gingival health status	1	1	-
Plaque component	4	4	-
OHI-S	4	4	-
Caries increments	3	3	-