



A REVIEW ON PREVALENCE OF SCHOOL-BASED ARECA NUT AND TOBACCO AWARENESS INTERVENTION AMONG CHILDREN

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ABSTRACT

Tobacco and areca nut use among school children has become a serious problem in developing countries. Although the prevalence of potentially malignant disorder and malignancy are common, literature about awareness of tobacco and areca nut use is scanty. Most of these conditions can be prevented if educated at early age. But there are very few publications with the interventions at school levels. The purpose of this paper is to systemically review the studies published to know the prevalence of areca nut and tobacco use in school children. 227 articles were identified through electronic database (Pub Med/Medline-65, SCOPUS-35, Google Scholar-137) and 31 by manual searching, and 198 articles remained after duplicates removal. Around 165 articles excluded after thorough review of titles and abstracts, and 33 full text articles were assessed for eligibility. 16 full text articles were excluded because they were review articles, studies in combination with other mode of intervention, adult population, outcome not specified. Finally 17 studies were selected that met the inclusion criteria. Paucity of literature regarding awareness about areca nut necessities the future research to control and prevent its habit. The validated, age specific, condition specific awareness instrument for both tobacco and areca nut is a need of an hour.

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INTRODUCTION

Aim and Background

The word ‘cancer’ evokes an unpleasant sense in the minds of all. Oral cancer is one of the most common causes of morbidity and mortality worldwide. Though aware about the carcinogenic and addictive nature of Areca nut and Tobacco, it is widely cultivated and consumed. Tobacco is consumed in smoking and smokeless forms. Chewable forms used are either alone or in combination of agents like lime, catechu, betel leaf etc.¹

Areca nut chewing is prevalent in South Asia (eg. India, Pakistan and Nepal), Southeast Asia (e.g. Cambodia, Vietnam, Taiwan, Malaysia, Indonesia, Papua New Guinea and Philippines) and Western pacific islands. It is commonly used psychoactive agent in the world in various forms.² Gutkha, kharra (mixture of tobacco along with areca nut, slaked lime, catechu and condiments), panmasala, mawa, mithi supari has become the preferred option to chew tobacco and areca nut in combination.^{3,4} In the oral cavity areca nut and tobacco causes potentially malignant disorders like oral leukoplakia, erythroplakia, OSMF etc.

and its use has been consistently linked to cardiovascular diseases and premature mortality deteriorating overall the quality of life.^{5,6}

As the prevalence of tobacco consumption is widespread, its prevention in the form of community based education programmes was experimented through decades^{7,8}. But the misconceptions regarding areca nut hinder people from its abstinence. For years, offering areca nut, pan is considered to be one of the rituals in India and other south Asian countries^{9, 10, 11, 12}.

So, the present review was planned with a research question, what is the prevalence of school-based areca nut and tobacco awareness intervention among children?

Method

Published articles along with cross references were screened from 1998 until 2018 in Pubmed /Medline, SCOPUS, Google Scholar databases. The search strategy was based on the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-analyses. The keywords used in search strategy for PubMed were: school- based education, school intervention, school awareness modules in combination to tobacco and areca nut use awareness, smoking, smokeless tobacco, betel nut, betel quid, gutkha, kharra use awareness, prevention in children, students, young adults, teenagers

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(Table 1). Knowledge, attitude and practice was assessed in the selected articles, so it is difficult to comment on certain items of the PRISMA checklist like risk ratio, differences in mean, risk of bias etc.

Table 1 Search strategy used in Pubmed

Sr No.	Keywords
1	School-based education(MeSH) and smoking(MeSH)
2	School intervention (MeSH) and Smokeless tobacco (MeSH)
3	School awareness modules(MeSH) and betel nut (MeSH)
4	School awareness modules (MeSH) and gutkha (MeSH)
5	Betel nut awareness modules (MeSH) and young adults(MeSH)
6	Tobacco awareness modules (MeSH) and students(MeSH)
7	Betel quid awareness modules (MeSH) and teenagers(MeSH)

With the consensus of both the authors the eligibility criteria were decided for the selection of articles. One reviewer has searched primarily for the school -based interventions for tobacco and areca nut use awareness and prevention studies. All cohorts, cross-sectional, randomised controlled trials were included in which school based intervention performed. Unpublished articles, letters to editor, review articles, books were excluded

Titles and abstracts, full text relevant articles were manually reviewed independently by another author and only full text articles were selected after assessing its eligibility. Articles published in English language were selected for ease of interpretation. The authors then selected seventeen final articles to include in this systematic literature review. For analysis, the following evidence was pooled as per PICO (Population, Intervention, Comparison, and Outcome): where P=number of schools and/or students, I=intervention method, C= comparison between study group and control and/or within same group before and after intervention and O= outcome of the studies (Table 2).

RESULTS

In total, two hundred and twenty seven articles were identified through electronic database (Pubmed/Medline-sixty five, SCOPUS- thirty five, Google Scholar-one hundred and twenty seven) and thirty one by manual searching, and one hundred

Table 2 Characteristics of studies included in the review

Sr.No.	No. of students	Age in years or std.	Intervention method for duration	Comparison with control Y/N Or other	Outcome reported	Researcher and year	Study year
1	1761	7 th grade	Four sessions	N	Knowledge has increased .Females were more strong with internal locus.	Yen LL ,Huey-Yi Lin ²⁶	1998
2	8388	Grade 3-12	HSP- From Sept 1984 to Aug 1999	Y	Attitude towards betel nut use has changed No significant difference in daily smoking.	Peterson A, Kanthleen K ¹⁸	2000
3	74	High school	Eight 50 minutes sessions over 6 weeks	y	No impact of intervention on the experimental group Did not smoke those students from intervention group who has attended complete sessions	Adelman WP, Duggan A K ¹⁹	2001
4.	1430	6 th grade	FLAVOR ,8weeks classroom sessions. Follow up after 1 year	Y	No significant difference in one year attrition rate both the groups	Unger J ¹³	2004
5	1821	Secondary grade	Smoking prevention program- 14 information lessons Vs Standard health education curriculum	Y	Significant effect on intervention group on the onset of weekly smoking.	Vartinen E, Pennanen M et al ²¹	2006
6.	1486	6 th -7 th grade	Universal and culturally tailored program	Y	Peer-assigned method has definitely better impact on the intention of smoking	Valente TW, Hoffman B ¹⁴	2006
7.	56	15years	Motivational Interview (MI)- one hour Vs	Y	MI intervention causes short term reduction in quantity and frequency of smoking.	Kelly A, Lapworth K ²²	2006
8.	8369	6 th and 8 th grade	Standard care/education Behavioural interventions repeated three times and follow up for 2 years (MYTRI) Project	y	Improved knowledge and attitude towards the smoking us habits.	Stigler MH ¹⁵	2007
9.	3157	6 th and 8 th grade	Multicultural program follow up after 2 years	y	Multicultural curriculum was effective among Hispanic students within predominantly Hispanic schools but not among Asian schools	Anderson Johnson ¹⁶	2007
10	1402	9 th ,10 th ,11 th grade	Smoking zine, tailored web-assisted tobacco intervention	Y	Reduces the intention to smoke and assist smokers to quit	Norman CD, Maley O ²⁰	2008
11.	1160	High school students	Computer based smoking prevention and cessation (ASPIRE)	Y	No significant difference toward improved smoking prevention.	Prokhrov A, Kelder S ²³	2008
12.	4731	High school students	Three interventions	Y	-Intervention group more likely to stop tobacco use than the non intervention. -Higher percentage of tobacco use than baseline in non smoking group.	Walsh M,LangerT, Kavangagh L ,	2010
13.	1851	6 th and 8 th grade	10 hour classroom sessions/year Assessed after1 year	Y	Intervention group shows confidence in staying away from tobacco	SorensenG ¹⁷	2012
14.	1031	10-21yr Mean 14.2 years	Health talks, information leaflets, posters	Y	Increased knowledge and attitude, but practice has no effect though the desire to quit has increased.	Odukoyo OO, Odeyemi KF ²⁴	2014
15.	55	9 th and 10 th std	Lecture with ppt and only lectue	Y	Improved knowledge in both the groups irrespective of the method used	Mathapathi N, Shenoy KS ²⁸	2014
16.	1114	Mean age 16 years	Anti-tobacco awareness program short film	Y	Knowledge has significantly increased in HS group but not in HSS	Jayakrishnan R, Geeth S ²⁵	2016
17.	NS	10 years and 16years	30 minutes lecture	Y	Improved knowledge in secondary but not in primary students	Chen G, Hsieh MY ²⁷	2018

and ninety four articles remained after duplicates removal. Around one hundred and sixty four articles excluded after thorough review of titles and abstracts, and thirty three full text articles were assessed for eligibility. Sixteen full text articles were excluded because they were review articles, studies with multiple mode of intervention, no method detail description on intervention method interventions in adult population, and outcome not specified. Finally seventeen studies were selected that met the inclusion criteria (Fig 1).

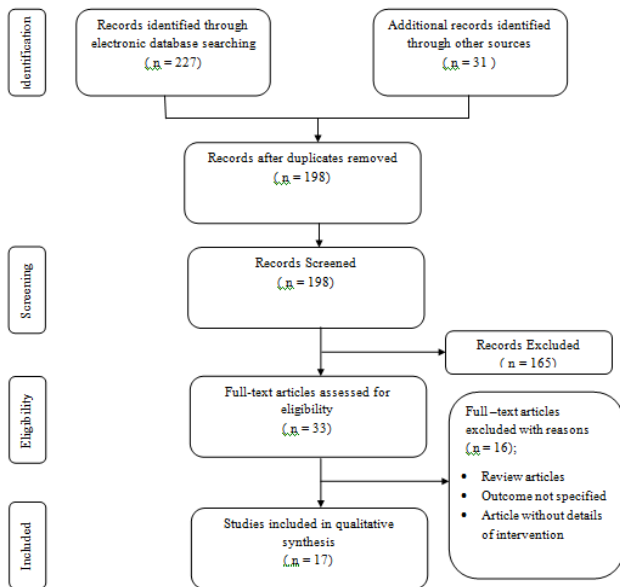


Fig 1 Flow chart showing systematic literature search for the present review

In the present literature review, we included studies based on the awareness or prevention education for tobacco and areca nut use in school children. We also discussed limitations and advantages of school based studies.

Characteristics of the enrolled studies

The only school- based intervention studies approaches for prevention of areca nut and tobacco use were selected, while the studies with, community based interventions were excluded.

In the included studies, Unger J in 2004¹³, Valente TW (2006)¹⁴, Stigler MH (2015)¹⁵, Johnson CA (2007)¹⁶ selected students in sixth grade, Sorensen G *et al*¹⁷ in 2012 selected eighth and ninth grade students. Peterson A *et al*¹⁸ in 2000 followed students from third grade to twelfth grade, i.e. from Sept 1984 to Aug 1999.

Eight randomised controlled trials (RCT) are discussed here which gave interventions in forty districts schools (Peterson *et al*)¹⁸, seventy four high schools (Adelman WP *et al*)¹⁹, sixteen middle schools (Unger JB *et al*)¹³, fourteen secondary schools (Norman CD)²⁰, twenty seven secondary schools (Vartiainen E)²¹, sixteen middle schools (Valente TW)¹⁴, three state high schools (Kelly AB)²², tenth standard students (Prokhorov A)²³. Rest other studies are cross- sectional where randomised sampling was used, including the cohort of students belonging to high school, middle school, secondary schools. Quasi experimental sampling was used by Sorensen G *et al*¹⁷, multistage sampling by Odukoyo O *et al*²⁴, Jayakrishnan R²⁵ while few studies followed the convenient sampling.

Number of students involved in the included studies was ranging from 55 being least to eight thousand three hundred

eighty eight the most. All the studies gave intervention to both boys and girls except Jayakrishnan R *et al*²⁵ in 2016 intervened male students considering the highest prevalence of tobacco in the male population.

Smoking prevention was a project done with most of the studies, while one each of betel nut, betel quid and alcohol. Single intervention study about areca nut prevention was in 1998 by Yen LL, *et al*²⁶ and in 2018 by Chen G *et al*²⁷ about betel quid.

Intervention method, duration and delivering person is different in almost all the included studies. Health talks, lectures, power point presentations, classroom sessions, leaflets, posters, computer assisted projects were the methods used in few of included studies. Specially designed tobacco program like HSPP (Hutchinson Smoking Prevention Project), FLAVOR (Fun Learning About Vitality Origin and Respect), multicultural or culturally tailored, ASPIRE (A Smoking Prevention Interactive Experience), a short film was also being used for intervention. Involvement of multiple factors which can prevent the students from habits with scientific psychology basis is the prominent concern for these studies. Prokhorov A *et al*²³ in 2008 implemented ASPIRE, a theoretically sound computer based smoking prevention cessation for high school students.

Resource person, school teachers, peer leaders among the students, research assistant, health educator were the mediators for knowledge transfer. Interventions were either single or multiple and divided as per week or month. Teachers, other school faculty, peer leaders amongst students delivered interventions after they received training by investigator in most of the studies (Yen LL 1998, Peterson A 2000, Adelman WP 2001, Vartiainen E 2006, Valente 2006, Sorensen 2012, Chen G 2018).^{26,18,19,21,14,17,27} Duration of each intervention as mentioned in the studies were 30 minutes, 50 minutes and 1 hour.

Out of 17, only four studies (Stigler MH 2007, Sorensen G 2012, Mathapathi N 2014, Jayakrishnan R 2016)^{15,17,28,25} are from India with English and predominant local language has been used as a language of communication. Rest other articles show the origin from European countries and is in English. Studies reported were from southern India region reflecting the prevalence of tobacco and areca nut habit there.

In the included studies, the comparison was made between control and intervention groups except in three studies (Yen LL 1998, Mathapathi N 2014, Chen G 2018)^{26,28,27} where the intervention was given to complete cohort and comparison was made between the pre and post intervention. All the studies have the ultimate aim to achieve the tobacco and areca nut free children.

There was increased Knowledge about tobacco after intervention in almost all studies except in Peterson A *et al*¹⁸, Unger JB *et al*¹³ in which shows no difference. Attitude and intention to use of tobacco was changed in almost all the studies. The knowledge about the tobacco ill effect has shown no difference in very young children after intervention in studies by Chen *et al*²⁷ and Jayakrishnan R *et al*²⁵.

DISCUSSION

Tobacco and areca nut are the real threats to the world. As compared to tobacco, areca nut use prevention awareness is

very less. The reason might be its familial and cultural acceptance since ancestors^{9,29}.

A school is a key location for educating children and they can become the best change mediator for family members as well as the community. Considering the key role of young generation much research work has done in the field of addiction. But specific work in the prevention of habits among children in school set up comparatively less in an Asian population to Western.^{30,31,32} This article is an attempt to review the literature systemically the evidence based data about the work done in the prevention of tobacco and areca nut habits in children by administering school based intervention.

This review includes the final seventeen articles which fulfils the inclusion and exclusion criteria. All the study states that the prevalence of tobacco and areca nut habits are more in adults, usually it starts with early ages. Moreover, if the habits start at earlier age becomes hard to quit. There are chances of multiple addiction habits a person may develop if exposed to these products at an early age.³³

Among different methods of interventions we chose to review the school based approach as to know about awareness programs in children.

There is a paucity of literature about the awareness and the intervention of Areca nut use in school children.³⁴ Hence it is utmost important to research in this aspect and develop a standardized and universally accepted tool for areca nut use prevention.

Project MYTRI by Stigler MH *et al* in 2007¹⁵ was school based multicomponent intervention for tobacco use prevention where they followed grade 6th and 8th std students for two years. The study results showed significant improvement in the attitude and practice of tobacco use among youngsters and suggested that tobacco deaddiction should be considered as a part multistrategy approach.

Motivational interview for one hour in study by Kelly AB (2006)²², an intervention by Walsh M (2010)³⁵, lecture in Mathapathi N (2014)²⁸, Chen G (2018)²⁷ and short film shown in study by Jayakrishnan R(2016)²⁵ are the intervention modes used for one time interaction in these studies.

Intervention given once may cause increase in the immediate knowledge but after a considerable time starts depleting its effect. Considering this fact many studies repeat the intervention like eight sessions over six weeks by Adelman WP *et al*¹⁹, 8 weeks sessions by Unger J *et al*¹³ and Johnson CA *et al*¹⁶, 14 information lessons by Vartinen E *et al*²¹, 5 weekly sessions in a semester and 2 booster sessions in the following semester by Prokhrov A²³.

Duration of per intervention session ranges from 30 minutes to one hour, considering the approximate time of the attention span of an average child.

Methods for implementation of programme message varied significantly between studies. The intervention used ranges from simple lecture, posters, pamphlets, charts, power point presentations. There were some tailored projects also which were predominantly focussed the smoking habit of tobacco. Kelly A *et al*²² performed motivational interview, Prokhrov A²³ prepared ASPIRE, computer based smoking prevention and cessation, FLAVOR by Unger J *et al*¹³ and HSPP by Peterson A.¹⁸

Norman CD *et al*²⁰ provided a novel web assisted interactive and integrated program where young minds were prevented from smoking. The intervention was five-stage interactive web site, Smoking Zine -<http://www.smokingzine.org>, integrated into a program which included a paper-based journal, a small group forms of motivational interviewing and tailored e-mails. Vartinen E *et al*²¹ included fourteen information lessons about smoking and refusal skills training led by an outside drama group. Adolescents attended five lessons a year during the first and second year and four lessons during the third year.

World Health Organization (WHO) and International Agency for Research on Cancer has classified areca nut (betel nut) as Group I carcinogen for causing precancerous and cancerous conditions especially in oral cavity. It has been observed that areca nut is extensively consumed throughout the world with significant public health and oral implications. Public perception plays major role in developing this habit. The level of awareness of ill effects of areca nut is minimum^{9,10}.

There are only two reported interventions for areca nut use prevention in school children. The intervention for areca nut use prevention to school children was done way back in 1998 by Yen LL *et al*²⁶ and the only study by Chen G in 2018²⁷ intervened the school students for both betel nut and tobacco.

English was the language used by most of the studies being their local language in Western population while Hindi along with English was used in Indian studies. In the schools of rural region predominantly the local language was used while English was used in urban and in western population.

In conclusion, increased prevalence of areca nut in Asian population and paucity of the awareness programs dictates the dire need to develop the specially designed intervention module for areca nut. The interventions prepared should take care of the age to which it is delivered as the outcome varies and should emphasize on behavioural and social factors. India is one such country with people of different religion and diversities, so the intervention should also be modified as per culture. Use of local language is utmost important and may enhance chances of improvement. Peer led and teacher led are also found to be good mediators for knowledge transfer. Repetition of the intervention is important to reinforce the information.

Future perspective

Paucity of literature regarding awareness about areca nut necessities the future research to control and prevent its habit. The validated, age specific, condition specific awareness instrument for both tobacco and areca nut is a need of an hour. This instrument should fulfil our dream of tobacco and areca nut free nations and finally as oral cancer free world.

Executive summary

1. There is negligible literature on awareness regarding areca nut use in children.
2. There is unavailability of awareness regarding areca nut use prevention for community in general and for children in specific.
3. Though Asian countries are more prevalent with chewing tobacco habit, very few studies on the awareness of tobacco use in children.
4. There is no uniform, standardised awareness tool for tobacco and areca nut use prevention.

5. Though found appropriate and effective school based intervention methods require more studies.

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