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A systematic review on the social context of smokeless tobacco use in the South Asian population: Implications for public health

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SUMMARY

Objectives: Smokeless tobacco (SLT) is an addiction resulting in serious health problems including cancers. The social context around SLT use among South Asians was reviewed to help inform interventions for its prevention and cessation.

Study design: Systematic review.

Methods: Electronic databases were searched to identify studies examining the social context of SLT use. As heterogeneous qualitative, quantitative and mixed method studies were included, meta-analysis was not appropriate.

Results: Of 428 studies identified, 17 were reviewed. These studies were conducted in India, Nepal, Pakistan and the UK between 1994 and 2009. SLT use among South Asians was culturally widely acceptable due to its association with socializing, sharing and family tradition (100% in Anwar *et al.*'s study). Other reasons for use were addiction, easy accessibility, low cost and lack of prohibitive legislation. SLT users had limited awareness of its association with oral cancer (29.3% in Ahmed *et al.*'s study); however, there was a distinct lack of knowledge regarding other health effects, such as cardiovascular disease (0.85%). Users attempted to quit (32.7% in Prabhu *et al.*'s study) but success was low (8.2%).

Conclusions: Cessation programmes for South Asians should address cultural acceptance, limited knowledge of health effects, inadequate legislation and controls, scarce social support and insufficient SLT cessation services.

Introduction

Tobacco is one of the greatest threats to global health today, and is used in various forms by approximately 2.2 billion adults around the world.[1] The World Health Organization (WHO) estimated that 4.9 million people worldwide died in 2000 due to tobacco.[2]

Tobacco use, both smoking and smokeless tobacco (SLT), is associated with increased risk of chronic and terminal diseases. These encompass periodontal diseases, oral and pharyngeal cancers, myocardial infarction, stroke, erectile dysfunction and problems in pregnancy, including stillbirth and low birth weight. SLT is an addiction for millions of people worldwide, and research indicates increasing use by young individuals in many countries.[3] SLT consumption involves chewing tobacco, often along with betel quid (betel leaf, areca nut, lime and cateche), and this is one of the most common addictions globally, particularly in Southern Asia.[4] Studies

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from the USA and UK have reported increasing rates of oral cancer due to persistent use of SLT among the minority immigrant population from Southern Asia.[5–7] According to WHO, cancer of the oral cavity is the 11th most common cancer worldwide,[8] while it is reported to be the fourth most common cancer in South-Central Asia.[9]

In the UK, oral cancer occurs at a significantly higher frequency among Asians compared with non-Asians.[10] A review of head and neck cancer registration identified oral cancer as a grave concern to the British public health.[11] While an estimated 4700 new cases are diagnosed annually, a report confirmed that 1592 individuals in the UK died of oral cancer in 2003.[12] The high frequency of oral cancer among the South Asian ethnic minority population is attributed to the habit of chewing SLT and/or betel quid.

Ebbert *et al.* summarized the evidence of effective interventions for the cessation of SLT use, and concluded that pharmacological interventions were ineffective for long-term abstinence, and behavioural interventions should be used instead.[13] To design culturally targeted cessation programmes for SLT use, a deep understanding of the users' views is essential. This systematic review, the first on this topic, reports the attitudes, beliefs and perceptions of the South Asian population towards SLT to aid development of effective culturally sensitive programmes for cessation.

Methods

A pilot search conducted to scope the literature indicated a paucity of data, hence broader search terms and inclusion criteria were considered for extensive and comprehensive results. A study protocol was followed for the searches conducted, after which experts in the field were contacted to identify information on ongoing studies to ensure comprehensive data. It was deemed necessary to review qualitative, quantitative and mixed method studies as the potential insights outweigh the difficulty in summarizing such different study designs.

The inclusion criteria used were

- attitudes and/or beliefs and/or perceptions towards SLT use (snuff/snus was not included);
- studies from any discipline or theoretical tradition that uses qualitative methods, quantitative methods and mixed methods;
- published and unpublished studies found by searches; and
- studies on South Asian populations (both SLT users and non-users), irrespective of their current geographic location but in free-living settings (i.e. excluding institutions).

The inclusion of studies was not restricted by language, publication date or country.

Search strategy

Electronic searches, using the search terms in Appendix A (example from Medline), were performed on 12 databases up to February 2010 [Medline (from 1966); Embase (from 1980); CINAHL (from 1937); ASSIA (from 1987); Global Health (from 1910); Index to Theses (from 1715); Dissertations & Theses (from 1861); PsycINFO (from 1806); Indmed (from 1985); Sociological Abstracts (from 1956); Web of Knowledge – includes Arts and Humanities Citation Index (from 1975), BIOSIS Previews (from 1926), Science Citation Index (from 1900), Social Sciences Citation Index (from 1956), Conference Proceedings Citation Index (from 1900); Google (for grey literature)]. Reference lists from relevant articles were investigated further. Online ethnic minority forums, CLAStalk-list and JISCmail, were contacted to identify studies and other ongoing research. Professor Raman Bedi and Professor Anne McNeil, experts in this field, were also contacted for additional information.

Hand searches were not conducted due to time and resource constraints and no obvious key journals. Fig. 1 illustrates the study selection and filtering process. Due to the unavailability of a standard quality assessment tool, studies were assessed based on their study methodology; however, this was not informative (assessment available from authors).

Data extraction and synthesis

Data extraction forms using tables for quantitative studies and textual summaries for qualitative studies were employed. As meta-analysis was not warranted, non-statistical analysis of quantitative studies and thematic synthesis of qualitative studies was integrated. Details of excluded studies are reported in Appendix B.

Results

Study characteristics and response rates

Table 1 describes the characteristics of the included studies: 14 were cross-sectional and employed questionnaires, two were qualitative and used interviews and focus groups, and one was mixed. The populations studied were Bangladeshi, Indian, Nepalese and Pakistani, while studies conducted in the UK analysed the combined South Asian population. Three studies included both SLT users and non-users,[14–16] while the other studies only considered SLT users. Sample size varied in each study from 45 to 1590. Most studies encompassed both sexes; however, two studies in the UK only included women[17,18] and one only included men.[19] With the exception of the study by Kotwal *et al.*, which involved users from the upper–middle class,[20] all studies comprised SLT users of low to middle socio-economic status. Eleven studies reported good response rates of over 60%, and the populations studied had a wide age range of 8–96 years.

Social context of SLT use

Quantitative

Table 2A displays the social context of using SLT.[16,21–23] SLT use by family members, teachers and friends was very common. Studies that compared the correlation of SLT users with non-users stated that these factors also act as predictors

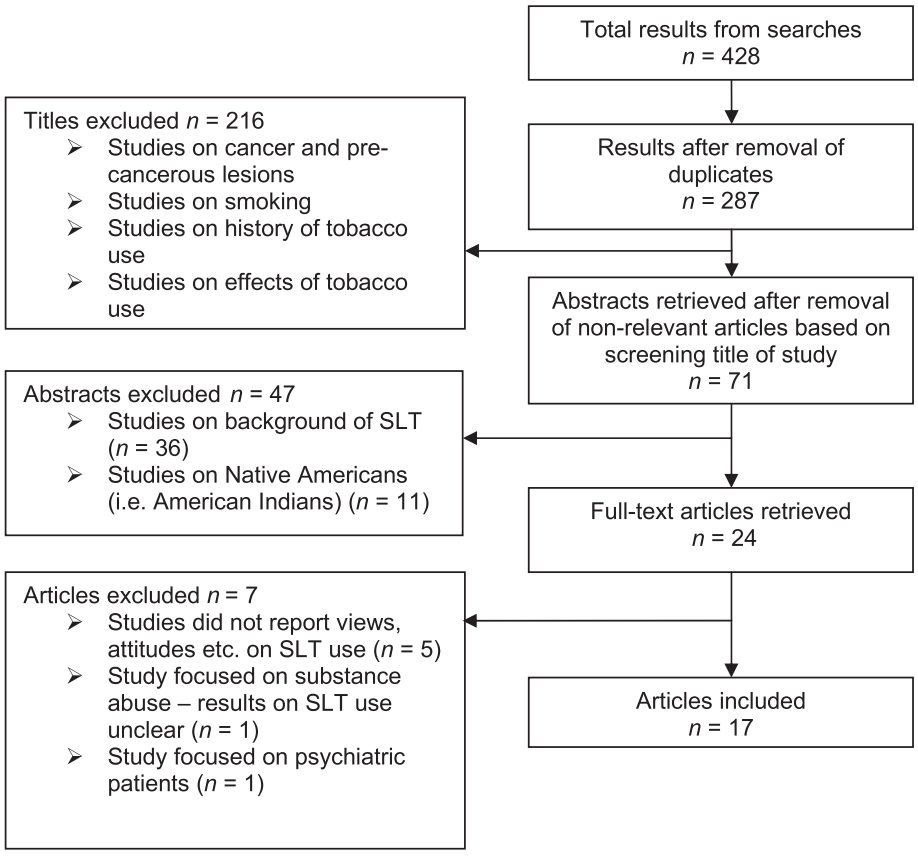

Fig. 1 – Flow chart describing the study selection process. SLT-smokeless tobacco; *n*-number of studies.

of use among adolescents.[16,21] Furthermore, Prabhu *et al.* reported that 81% of Bangladeshi teenagers in East London used SLT that was readily available at home.[24]

Qualitative

Four studies highlighted various influencing factors of SLT use.[14,15,25,26] Box 1A gives evidence on the wide cultural acceptability of SLT use as stated by users, teachers and authors. Figurative words (i.e. 'birthright', 'part of life') capture the cultural connotation this habit has among South Asians.

In addition, Sorensen *et al.* explained that adults were not concerned about children using SLT because they compared SLT products with 'candies' or confectionery,[15] while Tiwari *et al.* reported there were no sale restrictions in India and children were allowed to buy SLT for family members.[25]

Age at and reasons for commencement of SLT use

Quantitative

The mean age at commencement as reported by six studies was 15 years.[14,16,22–24,27] Tiwari *et al.* reported that boys (8–9 years) started the habit earlier than girls (12–13 years).[25] Some reasons for starting included peer pressure, cultural and social acceptance, low cost and easy availability, medicinal use (both general and oral health), physical and mental relaxation, aid to concentration, and marketing strategies involving role models.[14,22,25,27]

Qualitative

Box 1B gives evidence of peer pressure and misconceptions associated with the habit.[14,25] Additionally, studies conducted in India reported that amongst families where SLT use was a taboo, youngsters acquired the habit while living away from home (e.g. at university).[15] Pregnant women were reported to start SLT use to 'change the taste in their mouth'; however, they continued to use SLT postpartum due to addiction.[16]

Current reasons for SLT use

Quantitative

Reasons for current use are described in Table 2B.[17,18,20–22,24,25,28] In the UK, reasons for use varied widely; the main reasons were addiction (34.0–84.0%), taste (22.0–75.8%) and the perceived improvement of dental health (18.0–29.3%).[17,18,24] However, in the Indian subcontinent, peer pressure was the most likely reason for current use, ranging from 47% to 84.5%.[16,20,25]

Some of the more specific perceived health benefits reported included relief of abdominal problems (12.4%), enhanced digestion (13%), stress relief (reported by two studies: 34% and 67%) and oral hygiene aids.[16,17,20–22,24,25] It was also used to cope with frustration, depression, anger and boredom.[17] Ali *et al.* stated that 40% of users in Pakistan held the media responsible for promoting and encouraging SLT use.[22]

Table 1 – Characteristics of the studies included: authorship, location, study design and sampling characteristics by region and year of publication.

Author Year of study Year of publication	Study design Data collection method	Sample characteristics					
		Sample size	Ethnic group	Gender (%)	Socio-economic status (as reported in study)	Age range (years)	Response rate (%)
Studies Conducted in India							
Sharma *et al.*[28] 2002 2004	Cross-sectional Questionnaire	909	Indian	M = 68.9	Low–middle	61.7% < 40	67.2
Kotwal *et al.*[20] NR 2005	Cross-sectional Questionnaire	596	Indian	M = 54.8	Low–upper middle	14–17	91.6
Sorensen *et al.*[15] 2003–2004 2005	Qualitative 12 Focus groups	139	Indian	M = NR	Low–middle	NR	NR
Anwar *et al.*[16] NR 2005	Cross-sectional Questionnaire	124	Indian	M = 83.1	Low–middle	8–96	100
Tiwari *et al.*[30] NR 2006	Cross-sectional Questionnaire	1168	Indian	M = 50.5	Low–middle	20–64	89.4
Gunaseelan *et al.*[14] 2005 2007	Qualitative 15 Interviews 5 Focus groups	Int = 15 Fg = 30	Indian	M = 66.6	Low–middle	≥10	NR
Dongre *et al.*[25] 2008 2009	Mixed method Qualitative and quantitative	385	Indian	M = 47.5	Low–middle	15–19	92.0
Studies Conducted in Pakistan							
Shah *et al.*[21] NR 2008	Cross-sectional Questionnaire	370	Pakistani	M = 55.4	Low	10–16	NR
Ali *et al.*[22] 2006 2009	Cross-sectional Structured interview	502	Pakistani	M = 40.0	NR	≥15	91.0
Studies Conducted in Nepal							
Chandrashekar *et al.*[23] 2007 2008	Cross-sectional Questionnaire	1590	Nepali	M = 62.6	Low–middle	14–32	96.0
Studies Conducted in UK							
Summer *et al.*[17] NR 1994	Cross-sectional Questionnaire	296	Bangladeshi	M = 0	Low	25–68	98.6
Bedi *et al.*[27] NR 1995	Cross-sectional Questionnaire	334	Bangladeshi	M = N.R	Low	16–70	71.0
Ahmed *et al.*[29] NR 1997	Cross-sectional Questionnaire	140	Bangladeshi	M = 42.8	Low	≥25	46.0
Shetty *et al.*[26] 1996 1999	Cross-sectional Questionnaire	367	South Asians	M = 56.1	Low–middle	16–65	NR
Vora *et al.*[19] NR 2000	Cross-sectional Questionnaire	524	South Asians	M = 100	Low	16–87	NR
Prabhu *et al.*[24] NR 2001	Cross-sectional Questionnaire	204	Bangladeshi	M = 51.5	Low	12–18	70.0
Croucher *et al.*[18] 1998 2002	Cross-sectional Structured interview	242	Bangladeshi	M = 0	Low	18–60	73.0

NR-not reported; Fg-focus group; Int-interview; M-male.

Table 2 – Results from quantitative studies.

	Summary of results
A. Social context	
Anwar *et al.* (2005) India; *n* = 57	100% Used by family members
Chandrashekar *et al.* (2008) Nepal; *n* = 221	69.7% Used by teachers 43.4% Used by friends
Shah *et al.* (2008) Pakistan; *n* = 370	88.6% Used by family members 20.8% Used by teachers 98.1% Used by friends
Ali *et al.* (2009) Pakistan; *n* = 267	59.0% Used by family members
B. Reasons for current use of SLT	
Summer *et al.* (1994) UK; *n* = 284	22.0% Taste 34.0% Addiction 18.0% To improve oral health
Prabhu *et al.* (2001) UK; *n* = 58	35.0% Taste 16.7% To improve oral health 13.0% For health reasons 11.6% Helps concentrate – work/study 42.7% Others
Croucher *et al.* (2002) UK; *n* = 117	75.8% Taste 84.0% Addiction 29.3% To improve oral health
Anwar *et al.* (2005) India; *n* = 57	53.0% Peer pressure 24.1% For health reasons
Kotwal *et al.* (2005) India; *n* = 97	84.5% Addiction 34.1% For health reasons 18.9% Helps concentrate – work/study 41.9% Others
Dongre *et al.* (2008) India; *n* = 145	47.3% Peer pressure 22.0% Addiction 6.0% To improve oral health 6.0% For health reasons 4.0% Helps concentrate – work/study 32.7% Others
Shah *et al.* (2008) Pakistan; *n* = 370	34.9% Taste 34.6% Peer pressure 40.3% Addiction 23.2% Use by family members 13.0% Others
Ali *et al.* (2009) Pakistan; *n* = 267	31.0% Peer pressure 67.0% For health reasons 39.0% Helps concentrate – work/study 40.0% Others
C. Knowledge about harmful effects	
Ahmed *et al.* (1997) UK; *n* = 140	29.3% Cancer 52.1% Dental problems
Vora *et al.* (2000) UK; *n* = 524	50.0% Cancer
Prabhu *et al.* (2001) UK; *n* = 204	38.8% Cancer 81.1% Dental problems
Sharma *et al.* (2004) India; *n* = 909	78.4% Cancer
Dongre *et al.* (2008) India; *n* = 385	61.8% Cancer 38.4% Dental problems

Table 2 Appendix. (*continued*)

	Summary of results
D. Source of information	
Vora *et al.* (2000) UK; *n* = 173	29.1% Media/newspaper 30.4% Education institutes 7.2% Know someone harmed 15.6% Doctor/dentist 21.2% Others
Dongre *et al.* (2008) Indian; *n* = 385 [users (U) = 150; non-users (NU) = 235]	15.6% Parents (U 14.0%; NU16.6%) 37.1% Media/newspaper (U 33.3%; NU 39.6%) 30.4% Education institutes (U 17.3%; NU 38.7%) 11.4% Friends (U13.3%; NU 10.2%) 9.1% Others (U 2.6%; NU13.2%)
Shah *et al.* (2008) Pakistan; *n* = 370	57.4% Parents 19.2% Media/newspaper 15.4% Education institutes 12.7% Know someone harmed 9.5% Doctor/dentist 11.1% Others
E. Quitting	
Bedi *et al.* (1995) UK; *n* = 314	13.0% Quit successfully
Prabhu *et al.* (2001) UK; *n* = 58	36.2% Thought of quitting 32.7% Attempted to quit 8.2% Quit successfully
Zodpey *et al.* (1998) India; *n* = 286	45.9% Thought of quitting 22.4% Attempted to quit 10.9% Quit successfully
Chandrashekar *et al.* (2008) Nepal; *n* = 221	62.5% Thought of quitting 57.7% Attempted to quit
Ali *et al.* (2009) Pakistan; *n* = 267	33.3% Thought of quitting 33.3% Attempted to quit 0.0% Quit successfully

n-total number in the sample studied; SLT-smokeless tobacco.

Qualitative

It is evident from Box 1C that addiction and low cost of SLT products are the primary reasons for current use.[15] Sorensen *et al.* observed that some users were woken up at night by the urge to chew SLT as a result of its extremely addictive nature.

Perceived knowledge of harmful effects

Quantitative

Table 2C displays conflicting trends between studies in India and the UK in relation to the association between SLT use, cancer and poor oral health. A low level of awareness was detected between SLT use and cancer in the UK; however, there was more awareness of its association with dental problems. The contrary was observed in India.[19,24,29]

Some of the other harmful effects linked to SLT use were respiratory problems (percentage not reported), oral submucous fibrosis (3.5%) and cardiovascular disease (0.85%).[21,24,29] Furthermore, Shah *et al.* reported that 5% of users in Pakistan perceived the habit to be beneficial, while 13% were unaware that the habit was harmful.[21] In comparison with users, non-users appeared to be more aware of its association with cancer and other harmful effects including addiction, poor oral health and tuberculosis.[16,25]

Box 1 Results from qualitative studies.

A. Social context of smokeless tobacco (SLT) use

- *'Children learn about tobacco mostly from their parents, and from friends – they copy and imitate the habit of their parents.'* (Teacher)[15]
- *'[it is due to] tradition – it is inherited – Because their forefathers used it and their fathers used it, so they use it; it is their birthright.'* (Teacher)[15]
- *'The older people consider the habit to be part of life and are not alarmed by the fact that young kids indulge in high-risk behaviour.'* (Authors)[14]
- *'Family members and neighbours often ask young children to get tobacco (SLT) from nearby shops…'* (Authors)[25]
- *'In some families, tobacco (SLT) is purchased like other household grocery items from shops in cheap village level weekly market.'* (Authors)[23]

B. Reasons for commencement of SLT use

Peer pressure

- *'Everyone else normally chewed (that is, family and friends)'.* (User)[27]
- *'Friends coax the people into getting habituated to chewing areca nut. Initially friends provide areca nut products free and gradually they get habituated.'* (Authors)[14]

Misconceptions

- *'It (SLT) is a useful and cheap remedy for common health problems.'* (User)[14]
- *'Young boys who are employed were under the impression provided by their counterparts that chewing areca nut products would give them relaxation and thus would help them forget their problems.'* (Authors)[14]
- *'Tobacco is chewed after meals for better digestion, given for toothache, pain in abdomen and to induce vomiting in suicidal insecticide poisoning… it is also believed that tobacco consumers are protected from poison of snake and scorpion.'* (Authors)[25]

C. Reasons for current use

Addiction

- *'… it is a habit and is addictive, and once they start using they can't stop.'* (Teacher)[15]
- *'Most of the teachers who are addicted to it have no control over where they use it, in classroom or elsewhere.'* (Non-user)[15]
- *'We sometimes get up at night to chew gutka. We get that urge.'* (User)[15]

Low cost

- *'Chewing is cheap, and there is no reason to quit.'* (User)[15]

D. Perceived harmful effects

- *'It ruins a person.'* (Non-user)[15]
- *'We don't have the knowledge about the different types of cancer but we know that it is incurable.'* (Teacher)[15]
- *'When you go to convince people to quit using tobacco, the users say that they see some people who have used tobacco who remain healthy after a long time, and yet other non-users are getting ill; so they see that it is not 100% certain that they will get cancer if they use tobacco.'* (Teacher)[15]
- *'I don't have any problem because of the habit, so there is nothing wrong.'* (User)[14]

E. Barriers to quitting

Lack of information

- *'If people were fully informed, if they had more information on the health effects, it would help them to quit. Most know it is not good for their health, but it is hard to quit… There is a need for the inner motivation to quit.'* (Non-user)[15]
- *'They are attracted to cessation, but have no way of knowing how.'* (Teacher)[15]
- *'I tried using bubble gum to quit chewing habit, but elders in the community said that if you swallow it, it will get stuck in the gut and will have problems, so I am scared to use it.'* (User)[14]

Peer pressure

- *'Tobacco users who are addicts are the real promoters – they want that more and more people should use tobacco, and this is one of the biggest barriers to quitting, and also a major reason for starting – they want their company (of tobacco users) to increase.'* (Teacher)[15]
- *'Friends may influence the decision too and may make it difficult to stay quit. They may be afraid of mockery by others, and influenced by others to take it up again.'* (Teacher)[15]
- *'In a group, it's because of peer pressure – only when they walk out of the group they can quit.'* (User)[15]

Role models

- *'Role models (doctors); if they are using tobacco and they think it is ok for themselves, then I can also use it.'* (User)[15]

Qualitative

There was a general lack of awareness about the ill effects of SLT use as presented in Box 1D. Sorensen *et al.* explained that although there was some awareness about harmful effects, individuals could not delineate specific ill effects other than cancer.[15] SLT users in India believed that tobacco was a carcinogen while areca nut (used with SLT products) was harmless. There was also uncertainty over ill effects, as not all users were affected equally by ill health.[14]

Source of information

Quantitative

The main sources of information, as shown in Table 2D, were parents (57.4%), educational institutions (30.4%) and the media (37.1%).[19,21,25] Other sources were other family members and friends (i.e. aunts and uncles, 22.2%; neighbours, 10.5%), doctors and dentists.[21]

Qualitative

Gunaseelan *et al.* observed a distinction between urban and rural users in India; the urban users relied on media, family and friends for health information, whereas their rural

counterparts sought information from physicians and community leaders.[14]

Facilitators and barriers to SLT use

Quantitative

Table 2E displays SLT cessation attempts from five studies; however, none reported the duration of abstinence. Although most users were unsuccessful in giving up the habit, a range of 33.3–62.5% thought of quitting.[19,22–24,27] The key requirements for cessation were social, physical and emotional support; these essential factors were primarily provided by parents, close family and friends (63.8%). In addition, media (53%) and advice from doctors/dentists (39%) also played a significant role in decision making.

In India, the main reasons for non-use were fear of cancer (20.1% and 59.1%), poor oral hygiene (39.7%), addiction (14.5%), parental disapproval (8.9%) and loss of social status (percentage not reported).[16,25]

Qualitative

Addiction was the main cause for the struggle to achieve cessation. This struggle was further elevated by the lack of information, resources, motivation and misconceptions associated with SLT use, as displayed in Box 1E.[14,15] Sorensen *et al.* observed that users in India were positively influenced by physicians' advice; however, this advice was devalued when doctors were users themselves. Studies also reported that peer pressure and isolation were the main reasons for resuming the habit, as abstinance restricted their social life with friends who were users.

Discussion

SLT use in the South Asian population is widely acceptable, irrespective of age, sex and location. Its association with socializing, family tradition and cultural heritage perpetuates its use between generations.[16] It is inexpensive and easily accessible[15]; this is further compounded by the lack of legislation to limit accessibility and dissuade use (e.g. age prohibition and advertising restrictions).[23]

Ignorance of the associated health risks and the perceived medicinal benefits encouraged use for a wide range of health reasons (e.g. dental problems, stress). Studies that focused on awareness of associated health risks suggest some knowledge of oral cancer as an adverse effect[19,21,24,25,28,29]; however, there was little understanding about other health effects (i.e. cardiovascular disease).[14]

Most addicts had thought of giving up the habit; however, success rates were poor and there was a dearth of cessation support.[27,30] Some reasons for non-use were fear of cancer, fear of addiction, poor oral hygiene and loss of social status.[17,20,21]

The findings of this review are significant for successful intervention and development of effective culturally sensitive programmes for cessation. This is the first review on this topic, and complements other reviews on the prevalence of SLT in the UK as well as the effectiveness of interventions on cessation of SLT use.[13] These results are consistent with, and further validated by, the recent 'Smokeless tobacco: South Asians Draft' conducted by the National Institute for Clinical Excellence and the Department of Health, which reiterates the social acceptability, cultural tradition, perceived health benefits and lack of knowledge of ill effects related to SLT use among the South Asian population.[31]

Studies in the UK[19,29] reported low levels of knowledge about the harmful health effects in Bangladeshis compared with Indian and Pakistani populations. This review echoes the higher prevalence rates of SLT use in UK Bangladeshis as reported by the Health Survey of England 2004.[31]

The findings that SLT products are easily accessible and only a small fraction of pre-packaged products comply with the legal health warning requirements are in agreement with previous research by Longman *et al.* in England.[32] This review noted a correlation with these findings for SLT products available in Southern Asia. Furthermore, products in the UK that contain tobacco are covered by legislation; however, research shows that this is poorly enforced with regard to SLT products.[33] The governmental focus given to smoking tobacco overshadows that around SLT use, giving rise to a popular disregard for current legislation on behind the counter sales, use of signage for underage sales and health warning requirements.[32]

An important strength of this review was that both qualitative and quantitative findings echo and complement one another. However, the limitations of this review were mainly due to the limited studies ($n = 17$), spanning 15 years. The attitude towards SLT use may have changed over time. Nonetheless, this points to a paucity of reports and the need for further, more comprehensive research. The South Asian population is broad and the results from some studies may not be generalizable; the UK South Asian population probably differs from that of the Indian subcontinent, and care should be taken while extrapolating results from one population to another (e.g. acculturation should be considered). Comparisons between studies were difficult given different methods and populations, and hence variations between studies are open to interpretation as no synthesis of results was possible due to the heterogeneity. Little focus has been placed on such comparisons, bearing in mind the limitations of the data and the variations in methods and samples, rather illustrating the overall picture.

This review illustrates that SLT use is an integral part of South Asian culture; hence, little stigma is associated with its use. This cultural acceptance of the habit has led to widespread use between generations, irrespective of sex or age. In contrast to the disapproval around women smoking, SLT use by women is readily accepted in the South Asian culture.[34] This popular acceptance explains the higher prevalence of this habit among women. Where familial disapproval existed around SLT use, young individuals were reported to start the habit while living away from home.

The results highlight vital factors, such as family, friends and media that act both as facilitators to continued use and barriers to cessation. Users with the desire to quit SLT require a supportive and encouraging environment. Consideration of these factors is imperative in planning cessation programmes.

Success rates of current cessation programmes are poor.[35] This has been attributed to the lack of pharmacological interventions, misconceptions associated with the habit, low costs and cultural connotation associated with SLT use,

particularly for the UK immigrant population. A casual attitude towards the health concerns of SLT use contributes to the continued use and promotion of SLT within social units. Additional factors such as general ignorance around health concerns, misconceived medicinal properties, widespread social acceptance and religious observance provide further social and psychological barriers to cessation.

The essential aspect in consideration of these diverse and often pervasive causes for commencement and continuation of the habit is the social context of SLT use. The development of future cessation programmes will benefit from more comprehensive, robust and successful programmes when the views of SLT users are considered.

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Competing interests

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Appendix A. Example of search terms and search strategies used from MEDLINE.

#	Searches	Results	Search type
1	Attitude/or attitude*.mp.	235,261	Advanced
2	approach.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	462,693	Advanced
3	belief.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	15,024	Advanced
4	character.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	37,220	Advanced
5	disposition.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	21,358	Advanced
6	mindset.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	246	Advanced
7	opinion.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	40,565	Advanced
8	perspective.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	73,432	Advanced
9	behaviour.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	94,246	Advanced
10	philosophy.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	29,014	Advanced
11	point of view.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	22,488	Advanced
12	standpoint.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	6642	Advanced
13	view.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	152,843	Advanced
14	prejudice.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	19,513	Advanced
15	sentiment.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	327	Advanced
16	manner.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	214,366	Advanced
17	conduct.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	25,701	Advanced
18	etiquette.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	228	Advanced

(*continued on next page*)

Appendix. (*continued*)

#	Searches	Results	Search type
19	ethics.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	84,305	Advanced
20	morals.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	9250	Advanced
21	habit.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	8744	Advanced
22	performance.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	370,574	Advanced
23	practice.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	466,002	Advanced
24	ritual.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	1378	Advanced
25	demeanor.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	143	Advanced
26	tradition.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	5405	Advanced
27	inner nature.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	1	Advanced
28	mentality.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	509	Advanced
29	awareness.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	55,886	Advanced
30	knowledge.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	275,479	Advanced
31	cognizance.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	222	Advanced
32	reasoning.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	8247	Advanced
33	understanding.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	267,611	Advanced
34	traditional customs.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	42	Advanced
35	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34	2,397,969	Advanced
36	Smokeless tobacco.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	1275	Advanced
37	spit tobacco.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	36	Advanced
38	chewing tobacco.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	331	Advanced
39	snuff.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	858	Advanced
40	oral tobacco.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	40	Advanced
41	quid.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	780	Advanced
42	chew.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	888	Advanced
43	plug.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	5429	Advanced
44	paan.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	85	Advanced
45	betal nut.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	4	Advanced
46	areca nut.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	278	Advanced
47	beeda.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	0	Advanced
48	gutka.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	21	Advanced
49	dipping.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	1812	Advanced

Appendix. (*continued*)

#	Searches	Results	Search type
50	39 or 40 or 36 or 41 or 48 or 47 or 38 or 42 or 49 or 46 or 45 or 37 or 43 or 44	11,018	Advanced
51	south Asia*.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	2301	Advanced
52	Pakistan*.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	9174	Advanced
53	India*.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	103,070	Advanced
54	Bangladeshi*.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	1089	Advanced
55	Sri Lanka*.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	4157	Advanced
56	Bhutan*.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	191	Advanced
57	Nepal*.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	4145	Advanced
58	Maldive*.mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]	111	Advanced
59	52 or 53 or 57 or 56 or 51 or 58 or 55 or 54	120,030	Advanced
60	59 and 35 and 50	198	Advanced
61	Research Design/ or Research/ or Qualitative research*.mp. or Qualitative Research/	221,438	Advanced
62	Qualitative Research/ or Research Design/ or quantitative research*.mp. or Research/	219,801	Advanced
63	interview*.mp.	182,793	Advanced
64	focus group.mp. or Focus Groups/	11,818	Advanced
65	survey*.mp. or Dental Health Surveys/ or Health Surveys/	296,701	Advanced
66	Cross-Sectional Studies/or cross-sectional study*.mp.	110,960	Advanced
67	Cohort Studies/ or cohort*.mp.	189,447	Advanced
68	Case-Control Studies/ or case-control.mp.	129,810	Advanced
69	questionnaire*.mp. or Questionnaires/	301,076	Advanced
70	mixed method*.mp.	945	Advanced
71	67 or 63 or 70 or 64 or 61 or 68 or 69 or 66 or 62 or 65	1,051,369	Advanced
72	60 and 71	107	Advanced

Appendix B. Reasons for exclusion of studies.

Study	Reasons for exclusion
Prevalence and predictors of smokeless tobacco use among high school males in Karachi, Pakistan (2007)[35]	Study focused on prevalence and anti-tobacco advertisements. No information was reported on attitudes/perception towards SLT
Substance use among intercollege students in district Dehradun, India (2006)[36]	Although the study focused on the biosocial determinants of substance abuse (tobacco – smoking and smokeless, alcohol, cannabis, areca nut, paan masala, opium, sedatives and hard drugs), it is unclear how much of the study population were SLT users (exclusion criteria – results not clearly defined)
Tobacco use among school personnel in Mahendranagar and Dhangadhi of the Far Western Development Region of Nepal. (2007)[37]	Study focused on types of tobacco prevalence and awareness of tobacco policies in the schools of Nepal; excluded as no information was available on attitude and/or beliefs and/or perceptions
Health beliefs in oral cancer: Malaysian estate Indian scenario (2001)[38]	Study focused solely on oral cancer caused by smoking tobacco (not SLT)
Prevalence and correlates of tobacco use and nicotine dependence among psychiatric patients in India (2003)[39]	Study focused on individuals with psychiatric illness; as this was an exclusion criterion, this study was excluded
Use of tobacco and alcoholic beverages by children and teenagers in a low-income coastal community in South India (1994)[40]	Study focused on socio-economic status and education levels of SLT users, not on attitudes, beliefs and perceptions relevant to this study
Prevalence and correlates of tobacco use among Class 8–10 students in Islamabad and Lahore (2008)[41]	This article was a commentary on the prevalence of SLT use in Pakistan; the full text of the original article could not be retrieved