CLINICAL & BASIC RESEARCH

A Study on the Prevalence of Alcohol Consumption, Tobacco Use and Sexual Behaviour among Adolescents in Urban Areas of the Udupi District, Karnataka, India

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معدل انتشار استهلاك الكحول، عادة التبغ والسلوك الجنسي لدى المراهقين في المناطق الحضرية بمقاطعة أدوبي، كرنتكا، الهند

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abstract: *Objectives:* The aim of this study was to assess the prevalence of alcohol consumption, tobacco use and risky sexual behaviour among adolescents, and to evaluate the socioeconomic factors potentially influencing these behaviours. *Methods:* This cross-sectional study was conducted from January to April 2011 among 376 adolescents (15–19 years old) studying in different schools and colleges in Udupi, India. The Youth Risk Behavior Survey questionnaire and guidelines were followed for data collection. Participants' alcohol consumption, smoking habits and sexual behaviour patterns were explored. Univariate analysis followed by multivariate logistic regression was done. *Results:* The prevalence of alcohol consumption, tobacco use and sexual activity was found to occur in 5.7%, 7.2% and 5.5% of participants, respectively. The mean age of the participants' first sexual activity, consumption of alcohol and tobacco use was reported to be approximately 16.8 years. Multivariate analysis showed that males were more likely to have used alcohol and tobacco. Other factors, such as religion and tobacco use among family members, were found to be influential. *Conclusion:* The potential coexistence of multiple risk behaviours in a student demands an integrated approach. Emphasis should be placed on health education in schools and an increased awareness among parents in order to prevent adolescents' behaviours from becoming a risk to their health.

Keywords: Adolescents; Risk Behaviors; Tobacco; Alcoholic Beverages; Sexual Behavior; India.

الملخص: الهدف: تهدف هذه الدراسة إلى تقييم معدل انتشار استهلاك الكحول، استخدام التبغ والسلوك الجنسي لدى المراهقين، وكذلك تقييم العوامل الاجتماعية–الاقتصادية المؤثرة في هذه السلوكيات. الطريقة: أجريت هذه الدراسة المستعرضة على عينة من 376 مراهقا (19– 15 سنة) يدرسون في عدة مدارس وكليات مختلفة في أدوبي بالهند. تم استخدام استبيان وإرشادات مسح سلوكيات الاختطار عند الشباب لجمع البيانات. تم عمل تحليل أحادي المتغيرات وبعد ذلك الانحدار اللوجستي متعدد المتغيرات. النتائج: معدل انتشار استهلاك الكحول، استخدام التبغ والممارسة الجنسية لدى المشاركين كانت 5.7%، 7.2%، 5.5% على التوالي. متوسط عمر المشاركين عند أول ممارسة جنسية، استهلاك للكحول واستخدام التبغ كان تقريبا 16.8 سنة. تحليل متعدد المتغيرات بين أن الذكور كانوا أكثر عرضة لاستخدام الكحول والتبغ. العوامل الأخرى، مثل الديانة واستخدام التبغ من قبل أفراد العائلة وجد أن لها تأثير. الخلاصة: احتمال تواجد عدة عوامل اختطار للسلوكيات عند الطلبة يحتم استخدام أسلوب متكامل. يجب التركيز على التعليم الصحي في المدارس وزيادة إدراك الأهل من أجل الحد من تحول سلوكيات المراهقين إلى عوامل اختطار على صحتهم.

مفتاح الكلمات: المراهقون؛ سلوكيات الاختطار؛ التبغ؛ مشروبات كحولية؛ السلوك الجنسي؛ الهند.

Advances in Knowledge

- This study, the first of its kind, investigated the clustering of at-risk behaviours which might appear at an early stage among Indian adolescents.

- Even though this study did not target a particular risk group, it can still give a proxy image of the existence of behavioural patterns.

Applications to Patient Care

- Determining the current prevalence of at-risk behaviours among Indian adolescents and their correlates could help in strengthening adolescent health programmes and health promotion activities targeting this age group.

- The results of this study can be used to help tailor a targeted information programme.

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- *Identifying at-risk behaviours and potential risk groups at an early stage of life may help in estimating the future burden of diseases expected among adolescents. Therefore, there is a need for preventive care and health education activities to be tailored according to the target population which, in the long term, could help limit adverse health consequences in later life.*

THE DEVELOPMENT OF HEALTHY behaviours, attitudes and lifestyles during adolescence can contribute significantly to a person's current and future physical well-being. Youth risk behaviours (YRB) are described as adverse health behaviours adopted in childhood or adolescence and are one of several indicators of the health of young people. YRB serve as a basis for measuring adolescent health over time as well as for the improved targeting of health policies and programmes.[1] The importance of this measure is based on its association with several mortality and morbidity outcomes, chronic disease resulting from substance use and misuse, sexually transmitted diseases and undesirable social outcomes such as unintended teenage pregnancies.[2] According to the World Health Organization (WHO), 67% of premature deaths and 33% of the disease burden among adults is due to behavioural patterns that emerge during adolescence. This also includes unintended pregnancies due to unprotected sex, 11% of which occur in 15–19 year olds, with a prevalence of approximately 16 million girls.[3]

The aim of this study was to assess the prevalence of alcohol consumption, tobacco use and risky sexual behaviour among Indian adolescents, and to evaluate the socioeconomic factors potentially influencing these behaviours. Like other cities in the developing world, cities in India are reporting a higher prevalence of risky behaviours among their young people.[4,5] Due to globalisation, the country's improved economic status and possibly the effect of the media, the frequency of risky behaviours among India's urban adolescents is approaching that of developed countries.[6] A recent study revealed that the high prevalence of tobacco use among Indians may contribute to 13.3% of total deaths by 2020.[7]

A number of studies from different parts of India have also independently highlighted the frequencies of tobacco use, alcohol consumption and sexual behaviour.[8–10] Studies from Udupi have shown that nearly 17.8% of literate individuals above 15 years of age are tobacco users.[11] Another study from Southern Karnataka documented that nearly 38.1% of men between 16–49

years of age had an alcohol habit and 9.5% had human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS)-related risk behaviours.[9] In both of these studies, the prevalence of risky behaviours was found to be high among individuals over 15 years of age. However, there is limited information available on the prevalence of tobacco use, alcohol consumption and sexual risk behaviours among the adolescent population in this area.

Behaviours which put the adolescent at risk usually coexist with other risk behaviours; however, very few studies have attempted to investigate all of the identified risk factors together on a large scale. Despite the link between health and behaviour, there is a lack of studies on the basic prevalence of risky behaviours in the Indian youth population, particularly in Karnataka. To this end, the present study investigated risky behaviours among adolescents of the Udupi district as well as to understand the underlying factors determining these behaviours.

Methods

This cross-sectional study was carried out from January to April 2011 among 376 adolescents aged 15–19 years old studying in various schools and colleges in Udupi, Karnataka. Udupi is one of the most developed cities of southern Karnataka, with a literacy rate of 93.89%.[12] It has a population of only 125,350 and a gender ratio of 1,019 females to 1,000 males.[12] The city is divided into three administrative areas; however, sampling was only considered in the urban area of Udupi. All schools and colleges, except professional colleges, were included in the sampling frame. The large number of professional colleges and their students were not included in the sampling process because of time and resource constraints. Two-stage cluster sampling was used to assemble a representative sample of students studying in high school grades 9–12 and the first year of college.

A total of 14 high schools, six pre-university colleges (PUCs) and four degree-granting colleges

in Udupi City's main urban area were included in the study, including both public and private schools. In total, four high schools, two PUCs and one degree-granting college were selected randomly in the first stage of sampling.

In the second stage, students from each grade division were enrolled using a systematic sampling method. Students younger than 15 years or older than 19 years were excluded from the study. An extensive literature review was done to explore studies documenting risk behaviours among adolescents in South Karnataka, Karnataka, South India and India.[4,11,13] All of the prevalent behaviours in these studies were noted, and those with the highest frequency were considered for the sample size calculation. With an expected prevalence of 49.1% (for an 80% power and a 5% margin of error) the sample size was estimated to be 384.

A pre-tested, validated Youth Risk Behavior Survey (YRBS) questionnaire from the Centers for Disease Control and Prevention (CDC) was used to collect the information. A pilot survey was carried out among 30 students in the study, establishing consistent reliability (Cronbach's α = 0.70) for the final sample size (N = 384). The YRBS is widely used and accepted in countries across the world, including India.[2]

Among the nine identified risk areas (safety; violence-related activities; tobacco use; alcohol consumption; sexual behaviour; physical activity; weight; drug use, and suicide and health-related topics), only six areas (safety; violence-related activities; tobacco use; alcohol consumption; sexual behaviour, and suicide and health-related topics) were chosen as the focus of this study. Data on these six identified risk behaviours as well as basic sociodemographic information were collected.

The self-administered YRBS consisted of semi-structured open-ended questions with dichotomous and ordinal responses to determine the health behaviours of the adolescents. Only three of these six domains were analysed and discussed in this article.

Questions about sociodemographic characteristics included information about each student's age; gender; place of residence; type of family (either nuclear or joint, which was defined as a family staying with the families of either parent); number of family members, and father's occupation. The latter was classified according to the type of employment

during analysis. Questions on alcohol consumption sought to ascertain the drinking habits of the student during the previous six-month period; the age of initiation of drinking; the reason for drinking; the location for obtaining alcohol, and the drinking habits of the student's family members.

The section on tobacco use in the questionnaire sought to identify: the students' tobacco use during the previous six-month period, for both smoking and smokeless tobacco; the age of initiation of smoking; the reason for tobacco use; the location for obtaining tobacco; the method of acquiring the money required to buy tobacco, and the tobacco use habits in the student's family.

Similarly, in the domain of sexual behaviour, questions were asked about the students' sexual relationships in the previous six months or earlier; the reason for the relationship, and the use of contraceptive measures such as condoms during the last sexual encounter.

The YRBS 2010 guidelines were strictly followed during the data collection stage. Selected students were made to sit separately and separate locations used for male and female participants. Before beginning the questionnaires, the students were given a verbal explanation of the questions. Each student received individual attention and was free to discuss any questions during the survey, with both female and male representatives assisting.

The information obtained was analysed using the Statistical Package for the Social Sciences (SPSS), Version 15 (IBM Corp., Chicago, Illinois, USA). An analysis was performed to describe the adolescents' sociodemographic characteristics and the prevalence of the risk factors. A Chi-squared test and univariate analysis was done to estimate the unadjusted odds ratio (OR) with a 95% confidence interval (CI). Multivariate analysis was done for significant variables to identify the associated factors and reported with the adjusted OR and a 95% CI. During the univariate analysis only, in order to select variables for multiple regression, the P value was kept at <0.25, considering the increased chance of biased responses from the students. In multivariate regression, a P value of <0.05 was considered significant.

Permission for the study was obtained from the Deputy Director of Public Instruction and written consent was obtained from all of the concerned school/college authorities as well as the students.

For students below 18 years of age, consent was obtained from their guardians/parents before their inclusion in the study. Students participated in the study voluntarily and anonymously. The utmost care was taken to make the study participants feel free and comfortable, with personal communications arranged separately for each gender. The study was reviewed and approved by the Institutional Ethical Committee of Manipal University.

Results

Out of the 384 students selected by the sampling process, a total of 376 agreed to participate in the study. Of these 376 students, the ratio of male participants (n = 201) to female participants (n = 175) was 1:1.1. The mean age of the female and male participants was 17.09 years and 16.09 years, respectively. The majority of the students were Hindu (82.18%; n = 309). Most students (87%; n = 330) lived with their parents and 75% lived within nuclear families. Nearly equal numbers of the respondents' fathers were professional compared to unskilled, with 31% in a professional occupation and 43.6% unskilled [Table 1].

Out of the 201 male participants, 9.5% revealed their drinking status compared to 1.7% of female participants. The median age of the student at first consumption of alcohol was 16.82 years (95% CI; 16.44–17.2 years). A total of 12 (54.5%) out of 22 respondents revealed that at least one of their family members had an alcohol habit [Table 2]. In total, about 27 students (7.1%) had smoked in the previous six months. The mean age of the student at first tobacco use was found to be 16.8 years. When asked about their reasons for smoking, 14 (51.84%) students claimed a desire to look stylish and a relief from stress as their motivators. Nearly 41% of students smoked daily whereas 16 students (59.26%) smoked once to thrice a week. Out of 27 students, 55% obtained their cigarettes from a shop and 20 of those students (74.1%) spent their pocket money to get them. Only eight students (30%) smoked an average of one cigarette per day. It was interesting to note that 55.6% of students with a smoking habit had tried to quit smoking at least once before. Only two students (7.4%) mentioned the use of chewing tobacco [Table 3].

Questions were also asked about whether the

Table 1: Sociodemographic characteristics of the participants (n = 376)

Variables		Frequency (95% CI)
Gender	Male	53.45 (48.42–58.40)
	Female	46.55 (41.50–51.65)
Age	<16 years	35.37 (30.66–40.31)
	≥16 years	64.63 (59.69–69.34)
Religion	Hindu	82.18 (78.00–85.80)
	Muslim	11.42 (08.50–14.09)
	Christian	8.50 (6.00–11.60)
Father's occupation	Professional	31.38 (26.80–36.20)
	Skilled	16.75 (13.30–20.80)
	Semi-skilled	7.10 (4.90–10.14)
	Unskilled	43.60 (38.60–48.60)
Currently staying with	Parents	86.90 (83.20–90.09)
	Relatives	5.85 (3.80–5.70)
	Friend	3.90 (2.30–6.30)
	Others	3.19 (1.74–5.36)
Type of family	Nuclear	75.00 (70.40–79.10)
	Joint	25.00 (20.80–29.56)
Alcohol/tobacco habits among any current family members	Yes	25.80 (21.30–31.70)
Tobacco use among students	Yes	7.10 (4.80–10.10)
Alcohol use among students	Yes	5.85 (3.80–8.50)
Sexual relationship within last 6 months [n = 368]	Yes	5.70 (3.60–8.40)

CI = confidence interval.

students had had sexual intercourse within the six-month period prior to the study; their age upon first initiation of sexual intercourse; reasons for the behaviour, and usage of any contraceptive measures. Out of 376 students, 368 answered questions regarding sexual behaviour. Of them, 21 (5.5%) students responded that they had had at least one incidence of sexual intercourse within the previous six months. The median age at initiation was 16.71 years old (range 16.28–17.15). Nearly half of these 21 respondents had had sexual intercourse after 17 years of age; 18 of them lived with their parents compared to three who were staying with friends. The majority of students (52.38%) mentioned that

Table 2: Adolescents having an alcohol habit across sociodemographic variables (n = 22)

Variables		Frequency n (%)	Univariate analysis† (P value)	Adjusted OR (95% CI)
Gender	Male	19 (86.36)	<0.001*	4.82 (1.3–17.5)*
	Female	03 (13.64)		1
Age	<16 years	08 (36.36)	0.920	-
	≥16 years	14 (63.64)		
Religion	Hindu	15 (68.18)	0.014*	1
	Muslim	01 (4.54)		0.01
	Christians	06 (27.28)		2.45 (1.1–8.7)*
Father's occupation	Professional	06 (27.28)	0.295	-
	Skilled	05 (22.72)		
	Semi-skilled	02 (9.10)		
	Unskilled	09 (40.9)		
Currently staying with	Parents	17 (77.26)	0.490	-
	Relatives	01 (4.54)		
	Friends	02 (9.10)		
	Others	02 (9.10)		
Type of family	Nuclear	17 (77.26)	0.490	-
	Joint	05 (22.74)		
Alcohol habit among any current family members	Yes	12 (54.54)	<0.001*	6.23 (3.45–8.95)*
	No	10 (45.46)		1
Age at sexual initiation	<14 years	05 (22.74)	-	-
	15–16 years	05 (22.74)		
	>16 years	12 (54.54)		
Reason for sexual initiation	Stylish	02 [9.10]	-	-
	Curiosity and peer pressure	07 [31.81]		
	Media (TV)	10 [45.45]		
	Stress relief	03 [13.64]		
Frequency	Daily	01 [4.54]	-	-
	1–2 times per week	07 [31.81]		
	3–4 times per week	14 [63.65]		
Place of acquisition	Shop	05 [22.74]	-	-
	Friends	02 [9.10]		
	Family members	08 [36.35]		
	Party/ function	07 [31.81]		
Tobacco use	Yes	16 [72.72]	-	-
	No	06 [27.38]		

*† = Chi-squared test; OR = odds ratio; CI = confidence interval; N/A = not applicable; *P value <0.05.*

having fun was the main motivating factor for having sexual intercourse with 76.2% answering that they had had a sexual relationship with their boyfriend or girlfriend. Out of 21 students, 13 (62%) had not used any kind of contraception during their last sexual encounter.

Univariate analysis showed that gender (P = 0.001), religion (P = 0.014) and having current family members with alcohol habits (P = 0.001) were strongly associated with alcohol consumption among the students. Considering a P value of 0.25 as a margin for selecting variables for multivariate analysis, gender, religion, father's occupations, a family habit of alcohol and smoking habits were considered for binary logistic regression analysis. Binary logistic regression showed that there was a strong association with gender (OR 4.8; 95% CI: 1.3–17.5). Christians were more at risk for having or developing an alcohol habit (OR = 2.45; CI: 1.1–8.7), and the alcohol habits of family members strongly influenced the drinking habits of the cohabitating adolescents living at home (OR = 6.23; 95% CI: 3.45–8.95) [Table 2].

After the univariate analysis, gender, religion, type of family and smoking habits of family memebers and the alcohol habits of students were included in a multivariate analysis. Binary logistic regression showed that gender (OR = 4.29; 95% CI: 1.42–13.43), age over 16 years (OR = 5.3: 95% CI: 3.6–9.71) the smoking habits of family members (OR = 5.1; 95% CI: 2.1–12.21) and having an alcohol habit (OR = 6.4; 95% CI: 1.72–22.6) were identified risk factors for the development of smoking habits in students [Table 3].

Binary logistic regression showed that students of both genders who had alcohol and smoking habits were more likely to be involved in sexual activities. Males were more likely (OR 2.6; 95% CI: 1.37–17.8) than females to form or have a sexual relationship. Students with alcohol habits (OR = 11.3; 95% CI: 3.17–40.25) were also more likely to participate in sexual activities than students who did not consume alcohol [Table 4].

Table 3: Adolescents reporting a tobacco habit across sociodemographic variables (n = 27)

Variables	Categories	Frequency n (%)	Univariate analysis (*P* value)	Adjusted OR (95% CI)
Gender	Male	23 (85.18)	<0.001*	4.29 (1.42–13.4)*
	Female	04 (14.82)		1
Age	<16 years	09 (33.33)	0.057	1
	≥16 years	18 (66.67)		5.3 (3.6–9.71)*
Religion	Hindu	21 (77.78)		1
	Muslim	06 (22.22)	0.084	0.545 (0.193–1.54)
	Christian	-		-
Father's occupation	Professional	06 (22.22)		-
	Skilled	05 (18.52)	2.97	-
	Semi-skilled	11 (40.74)		-
	Unskilled	05 (18.52)		-
Currently staying with	Parents	24 (88.90)	0.490	-
	Others	03 (11.10)		-
Type of family	Nuclear	18 (66.67)	0.080	3.2 (0.72–12.56)
	Joint	09 (33.33)		1
Tobacco habit among any current family members	Yes	17 (62.96)	<0.001*	5.07 (2.1–12.21)*
	No	10 (37.04)		1
Age at initiation	<14 years	04 (14.81)	-	-
	15–16 years	10 (37.04)	-	-
	>16 years	13 (48.15)	-	-
Reason for initiation	Style	07 (25.925)	-	-
	Curiosity and peer pressure	07 (25.925)	-	-
	Media (TV)	06 (22.221)	-	-
	Stress relief	07 (25.925)	-	-
Frequency	Daily	11 (40.74)	-	-
	1–2 times per week	06 (22.22)	-	-
	3–4 times per week	10 (37.04)	-	-
Place of acquisition	Shop	15 (55.55)	-	-
	Friends	10 (37.04)	-	-
	Family members	2 (7.41)	-	-
Alcohol habit	Yes	20 (74.07)	<0.001	6.4 (1.72–22.6)
	No	07 (25.93)		

*OR = odds ratio; CI = confidence interval; *P value <0.05.*

Discussion

In the present study, the mean age of the respondents was 16.09 and 17.09 years old for males and females, respectively. This study found that 5.1% of the respondents had consumed alcohol in the previous six months. Among female participants, the prevalence of alcohol consumption was 1.4% and among male participants it was 4.9%. Similar results were also documented in the Indian National Family Health Survey-3 (NFHS-3), where the prevalence among 15–19 year old girls was 1%.[14] A higher prevalence was reported in the NFHS-3 among boys, which could be due to intercultural variation between the different states of India. The mean age of the participants upon first consuming alcohol was 16.82 ± 0.38 years which was lower than a study done in Kolkata which reported the mean age upon initiation as 20.8 ± 5.9 years.[13] A study in Mexico noted the mean age upon initial consumption of alcohol as 15.6 years.[15]

In this study, it was found that risky behaviours such as alcohol use were 4.8 times higher among males in comparison to females. Univariate analysis showed there was a positive association (OR = 2.25) between the alcohol consumption habits of parents and those of their offspring. One study done in Kerala showed similar results (OR = 2.9) among fathers' and children's alcohol consumption habits.[16] It was also noted that religion might be a factor contributing to alcohol use among students. Christian students were 2.4 times more likely to have consumed alcohol than non-Christians. This could be because of cultural habits seen in some Christian families, where drinking is a custom during social functions or gatherings; in fact, 78% of students mentioned 'home' or 'parties' as a source of obtaining or consuming alcohol.

A large numbers of studies have been carried out to investigate tobacco use among adolescents in India. This study showed that the prevalence of smoking among students within the previous six months was 7.1%. Among male students, the prevalence was found to be 11.8% and among female students it was found to be 2.2%. This number was comparable to the NFHS-3 study, which showed that 12.8% of males and 3.5% of those in the 15–19 year old age group smoked cigarettes or *bidi* (a thin, Indian cigarette filled with tobacco flake and wrapped in a *tendu* leaf).[14] This included males

Table 4: Adolescents demonstrating sexual behaviours across sociodemographic variables (n = 21)

Variables		Frequency n (%)	Univariate analysis (*P* value)	Adjusted OR (95% CI)
Gender	Male	20 (95.23)	<0.001	2.6 (1.37–17.8)*
	Female	1 (4.77)		1
Age	<16 years	10 (47.62)	0.890	-
	≥16 years	11 (52.38)		-
Religion	Hindu	14 (66.67)		1
	Muslim	05 (23.81)		0.599 (0.105–2.32)
	Christian	1 (04.76)	0.072	0.18 (0.13–10.28)
	Not mentioned	1 (04.76)		-
Father's occupation	Professional	06 (28.57)		-
	Skilled	03 (14.29)	0.392	-
	Unskilled	12 (57.14)		-
Currently staying with	Parents	18 (85.71)	0.898	-
	Friends	03 (14.29)		-
Type of family	Nuclear	18 (85.71)	0.20	3.2 (0.72–12.56)*
	Joint	03 (14.29)		1
Alcohol habit	Yes	08 (38.09)	<0.001	11.3 (3.2–40.2)*
	No	13 (61.91)		1
Tobacco use	Yes	11 (52.38)	<0.001	3.23 (0.81–12.82)
	No	10 (47.62)		-
Age of sexual initiation	<14 years	05 (23.81)	-	-
	15–16 years	06 (28.57)	-	-
	>16 years	10 (47.62)	-	-
Reason for sexual initiation	Curiosity and peer pressure	9 (42.86)	-	-
	Earning purposes	1 (4.76)	-	-
	Fun	11 (52.38)	-	-

*OR = odds ratio; CI = confidence interval; *P value <0.05.*

from both urban and rural areas of India.

Another study done in Noida by Narain *et al.* reported a prevalence of 11.2% of tobacco use in any form.[17] In a South Indian study done in Tamil Nadu, the prevalence of tobacco use among 13–15 year olds was 10%.[10] The mean age of the user at first tobacco use was 16.8 years compared to 12.4 years in the Narain *et al.* study. One study done in Nepal showed the age of the user at initiation of tobacco use was 15.7 years.[18]

Reasons for smoking, influenced by the media, were identified as a desire to look stylish and curiosity. A study of schoolchildren in New Delhi also described the influence of the media and celebrities as factors which contributed to smoking.[4] The majority of students reported acquiring cigarettes from shops near their homes. A study done in Dhakishna Kannda by Shenoy *et al.* also identified easy access to tobacco as a factor for smoking.[19] Furthermore, the use of pocket money to buy tobacco products was extremely common among all respondents in this study.[19] Of all smokers in this study, 40.7% had tried to quit smoking; similar results were found in a study in Nepal.[18] This indicates that the students knew that they should quit but their attempts to do so were unsuccessful. The presence of other family members using tobacco increases by five-fold the student's likelihood of using tobacco. This study showed a higher risk of using tobacco than a study done by Chopra *et al.* (OR = 1.5).[16] There is a verified genetic association between parental habits of tobacco use and alcohol consumption and the habits of tobacco use and alcohol consumption among their offspring.[20]

In the current study, 5.5% of students responded that they had had sexual intercourse at least once in the previous six months. Studies on premarital sex and risky sexual behaviours among adolescents are still unexplored in India. Results showed that fewer students in this study were engaging in sexual intercourse compared to a study done over 15 years ago in Mumbai (participants between 15–24 years old).[21] Nearly 10% of the male students in the current study reported having had a sexual relationship, which was comparable to the Alexander *et al.* study in Maharashtra.[22]

The median age of the adolescents at their first sexual encounter was 16.71 years and the majority of the students identified fun and curiosity as the reason for having sex. A large college-based study in Gujarat noted similar experiences and attitudes among students.[23] However, social taboos in Indian society associated with issues regarding sexuality, as well as gender-biased reporting, does not give a clear picture of the actual incidence of premarital sexual activity among adolescents and youth. In addition, 76.2% of the students in this study reported that they had had sex with a girlfriend or boyfriend,

which is similar to results seen in other Gujarat studies.[23] Nearly 62% of the respondents who had had a sexual relationship did not use any kind of contraceptive during their last sexual encounter. This prevalence of unprotected sex leads to a great risk of spreading sexually transmitted diseases (STD) and HIV/AIDS in addition to pregnancy. A report in Delhi found that unprotected sex puts this age group at a high risk of contracting STDs.[23,24]

This study had a number of limitations, including the fact that self-reporting by the students could have biased the results. Underreporting to sensitive questions could also not be ruled out. Furthermore, as this was a cross-sectional study, causal relationships could not be established. Additionally, no further questions were asked in this study about alcohol, tobacco and sexual habits among students, as the aim was to determine the prevalence of these behaviours; however, further enquiries might have uncovered details regarding other risk factors. For example, mutual masturbation was not included as an option in the sexual behaviour section of the questionnaire, which could have given more insight into sexual activity amongst adolescents. The sample size was also not large enough to deduce any other risk factors. Finally, the trends of at-risk behaviours among the population could not be determined, so a longitudinal follow-up study might provide useful insights.

Conclusion

Risk behaviours among adolescents in Udupi are comparable to the findings of studies from other urban areas in India. Behavioural patterns of family members were found to influence the behaviours of adolescents, which highlights the importance of the role of family on adolescent risk-taking. The coexistence and development of multiple risky behaviours such as alcohol consumption, tobacco use and sexual activities indicates the dangerous interconnection between such behaviours among adolescents. Thus there is an urgent need to initiate programmes at various levels to generate awareness regarding the potential health hazards of tobacco, alcohol and premature sexual relationships. The incorporation of educational material regarding the ill effects of risky behaviours in the syllabi of schools and colleges might be helpful. A focus on an increased awareness among school students

through health and peer education and counselling might influence the target population in adopting and supporting health promotion activities.

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