LES INDICES LIES AU FAIT DE FUMER PARMI LES ADOLESCENTS DANS UNE VILLE DU SUD, COTE D'IVOIRE

FACTORS ASSOCIATED WITH CURRENT CIGARETTE SMOKING AMONG ADOLESCENTS IN VILLE DU SUD, COTE D'IVOIRE.

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Résumé

Introduction: Le tabac est une des causes importantes de morbidité and mortalité. Les indices associés au fait de fumer parmi les adolescents dans les pays en voie de développent n'ont pas été bien suffisamment décrits.
Objectives: Evaluer les indices liés au fait de fumer parmi les adolescents scolarisés de la Ville du Sud, Côte d'Ivoire.
Conception: étude conduite dans le cadre de l'enquête épidémiologique globale sur l'usage du tabac parmi les adolescents (GYTS).
Méthode: Les questionnaires ont été développés suivant le modèle de GYTS. Les analyses ont déterminé les proportions, odds ratios et 95% de l'intervalle de confidence.
Résultats: Au total 2694 sujets, 1452 (53.9%) garçons et 1242 (46.1%) filles ont rempli les questionnaires. En général, la prévalence de fumer était 15.3%. Beaucoup plus de garçons (23.0%) que de filles (6,2%) étaient fumeurs ($p<0.001$). Le statut de fumeur de cigarette était associé avec le fait d'avoir des amis fumeurs, être exposé à la publicité pro-tabac, être en possession d'un objet ayant un logo d'une marque de tabac, avoir de l'argent de poche et être âgé de 13 ans. Avoir des parents fumeurs était associé au statut de fumer chez les garçons. La perception que fumer est nuisible à la santé était associée avec moins de probabilité de fumer.
Conclusion: Fumer la cigarette est un problème important de santé publique en Côte d'Ivoire. Les efforts de santé publique pour la prévention de l'usage du tabac parmi les adolescents devrait tenir en compte les indices associés avec fumer.

SUMMARY : Background: Tobacco use is a leading cause of global morbidity and mortality. Predictors of cigarette smoking among adolescents have not been well described in developing countries.
Objectives: To assess predictors of current cigarette smoking among school-going adolescents in Ville du Sud, Cote d'Ivoire.

Design: Cross sectional study within the Global Youth Tobacco Survey.
Method: Questionnaires were completed using the GYTS format. Analysis was carried out to derive frequencies, odds ratios and 95% confidence intervals.
Outcome measures: Prevalence of current cigarette smoking and associated factors.
Results: A total of 2694, 1452 (53.9%) males and 1242 (46.1%) females completed the questionnaires. Overall prevalence of current cigarette smoking was 15.3%. Significantly more males (23.0%) than females (6.2%) were current smokers (p<0.001). Cigarette smoking was associated with having smoking friends, pro-tobacco advertisement, owning an item with a tobacco brand logo, pocket money and younger age. Parental smoking was associated with smoking among males but not among females. Perception that smoking was harmful to health was associated with less likelihood of being a smoker.
Conclusion: Cigarette smoking is a significant public health problem in Cote D'Ivoire. Public health efforts aimed to prevent adolescents should incorporate knowledge on the associated factors related to smoking.
Keywords: adolescent, cigarette smoking, Cote D'Ivoire, tobacco, Global Youth Tobacco Survey

Introduction : Tobacco use is a leading cause of global morbidity and mortality [1,2]. In the developing world however where the bulk of morbidity and mortality is due to infectious diseases tobacco use has not received adequate research attention. There is also limited data on cigarette smoking among adolescents. However, there has been growing interest in adolescent tobacco smoking mostly arising from the Global Youth Tobacco Survey Project spearheaded by the Centres for Diseases and Control (CDC) and participating countries [3-5].

Cigarette smoking among adolescents is of public health interest for several reasons. Some adult cigarette smokers may have initiated smoking as adolescents. Cigarette smoking is also risk factor for asthma, eczema, suicidal behaviour and illicit drug use [6-8].

Adolescent cigarette smoking has not been well characterised in Cote d'Ivoire. We report on the prevalence of cigarette smoking and associated factors among 13 to 15 years olds in Cote D'Ivoire. This information will enable informed design, implementation and evaluation of public health interventions aimed to reduce cigarette smoking in Cote D'Ivoire. This information may also provide data that may be used in cross country comparisons of cigarette smoking among adolescent regionally and globally.

METHODS : Data for our current study was obtained from the Cote D'Ivoire Global Youth Tobacco Survey conducted in 2003. This was a cross sectional designed study which recruited school-going 13 to 15 years olds using a two-stage probability sampling technique. In the first stage of sampling, primary sampling units were schools which were selected with a probability proportional to their enrolment size. In the second step, a systematic sample of classes in the selected schools was obtained. All students in the selected classes were eligible to participate. A self-completed questionnaire was used and included core GYTS questions as has been described elsewhere [3-5]. Current cigarette smoking was defined as having smoked, even a single puff within the past 30 days preceding the survey. For the purposes of our study we aimed to estimate the prevalence of current cigarette smoking and stratified by gender, assess whether a selected list of variables (based on the literature on adolescents tobacco use) were associated with current cigarette smoking. Weighted data analysis was performed using SPSS 11.5 (Chicago, Illinois, United States). A weighting factor was used to reflect the likelihood of sampling each student and to reduce bias by compensating for differing patterns of non response. The weight used for estimation is given by the following formula: W = W1 * W2 * f1 * f2 *f3 *f4, where

W1 = the inverse of the probability of selecting the school

W2 = the inverse of the probability of selecting the classroom within the school

fl = a school-level non response adjustment factor calculated by school size category (small, medium, large)

f2= a class-level non response adjustment factor calculated for each school

f3 = a student-level non response adjustment factor calculated by class

f4 = a post stratification adjustment factor calculated by grade

We obtained frequencies and their 95% confidence intervals as estimation of prevalence. We also conducted logistic regression analysis to estimate the association between current cigarette smoking and relevant predictor variables. We report unadjusted bivariate analysis between current cigarette smoking and a predictor variable. We also report adjusted odds ratios for the factors in model 1 as well as for age and education level. All significant factors at the 5% level were considered in a Backward logistic regression analysis for each gender. The level of statistical significance was set at the 5% level.

RESULTS : A total of 2694, of whom 1452 (53.9%) were males and 1242 (46.1%) females completed the questionnaires. Overall prevalence of current cigarette smoking was 15.3%. Significantly more males (23.0%) than females (6.2%) were current smokers (p<0.001). The proceeding analyses were stratified by sex.

Demographic, social and economic factors

Associations between demographic, social and economic factors on one hand and current smoking status on the other are shown in Table 1.

Among male respondents, compared with those of age less than 13 years, respondents of age 13 years, 14 years, 15 years and more than 15 years were 24% less likely, 17% less likely, 51% more likely and 56% more likely to have been current smokers, respectively (Table 1). In terms of the school grade, compared with respondents in Grade 4, those in Grades 6 and 5 were 19% less likely and 9% more likely to have been current smokers, respectively. Compared with respondents who did not get pocket money in a usual month, those who received less than 1500 CFA Francs, and 5000 or more CFA Francs were 46% more likely and 16% less likely to have been current smokers, respectively.

Among female respondents, compared with those of age less than 13 years, those of age 13 years, and 14 years were 35% more likely and 26% less likely to have been current smokers, respectively. Although the school grade was significantly associated with current smoking status in bivariate analysis, it was not the case when other factors were considered in the analysis. Compared with respondents who did not get pocket money in a usual month, those who received 5000 or more CFA were 59% more likely to have been current smokers.

Table 1. Associations between demographic, social and economic factors on one hand and current smoking status on the other.

Factor	n (%)[a]	Crude OR (95%CI)	Adjusted OR (95%CI)	n (%)[a]	Crude OR (95%CI)	Adjusted OR (95%CI)
Age						
<13	187 (13.5)	1	1	190 (2.7)	1	1
13	217 (14.4)	0.67 (0.58, 0.76)	0.76 (0.65, 0.89)	218 (6.9)	1.24 (1.01, 1.52)	1.35 (1.07, 1.71)
14	269 (18.7)	0.91 (0.81, 1.03)	0.83 (0.73, 0.96)	290 (5.0)	0.88 (0.72, 1.08)	0.74 (0.58, 0.95)
15	304 (27.8)	1.53 (1.38, 1.69)	1.51 (1.00, 1.20)	252 (8.3)	1.50 (1.25, 1.80)	1.01 (0.80, 1.27)
>15	467 (30.5)	1.74 (1.59, 1.90)	1.56 (1.39, 1.76)	286 (7.4)	1.32 (1.10, 1.58)	1.21 (0.98, 1.49)
Grade						
4	476 (20.1)	1	1	430 (3.8)	1	-
5	411 (22.6)	0.99 (0.92, 1.07)	1.09 (1.00, 1.20)	387 (6.6)	1.14 (0.99, 1.31)	
6	565 (25.8)	1.18 (1.10, 1.27)	0.81 (0.74, 0.89)	425 (8.0)	1.39 (1.22, 1.58)	
Pocket money received in a usual month						
None	896 (18.6)	1	1	761 (4.1)	1	1
<1500	154 (34.1)	0.71 (0.63, 0.79)	1.46 (1.26, 1.68)	97 (7.3)	1.02 (0.79, 1.32)	0.88 (0.63, 1.23)
1500-4999	217 (24.5)	1.12 (1.01, 1.25)	0.95 (0.84, 1.08)	197 (8.2)	0.91 (0.75, 1.10)	1.04 (0.83, 1.31)
5000+	175 (31.6)	0.79 (0.71, 0.88)	0.84 (0.73, 0.97)	182 (12.5)	0.56 (0.48, 0.67)	1.59 (1.28, 1.98)

[a] weighted percentage, n un-weighted number of respondents

Parents and best friends smoking status

Table 2 shows the associations between parents and best friends smoking status and current smoking status of respondents. Male respondents who had parents who smoked cigarettes were 18% more likely to have been current smokers than respondents who never had parents who smoked cigarettes. In relation to the number of best friends who smoked cigarettes, male respondents who had 1 , 2 or more best friends who smoked cigarettes were 2.24 and 1.23 times more likely to have been current smokers, respectively, compared with respondents to never had best friends who smoked cigarettes.

No significant association was observed between the smoking status of parents and current smoking status of the female respondents. Females who had 1, 2 or more best friends who smoked cigarettes were 1.78 and 2.08 times more likely, respectively, to have been current smokers compared to respondents did not have best friends who were smokers.

Table 2. Associations between parents and best friends smoking stauts on one hand and current smoking status on the other.

Factor	n (%)[a]	Crude OR (95% CI)	Adjusted OR (95%CI)	n (%)[a]	Crude OR (95%CI)	Adjusted OR (95%CI)
Parents smoking status						
Yes	278 (31.8)	1.36 (1.28, 1.44)	1.18 (1.10, 1.27)	206 (7.8)	1.21 (1.07, 1.36)	-
No	1123 (20.2)	1	1	995 (5.5)	1	
Number of best friends who smoked cigarettes						
None	923 (10.8)	1	1	973 (2.9)	1	1
1	155 (35.0)	1.37 (1.24, 1.52)	1.23 (1.09, 1.37)	90 (16.9)	1.81 (1.52, 2.14)	2.08 (1.71, 2.53)
2+	366 (48.3)	2.38 (2.20, 2.57)	2.24 (2.04, 2.45)	173 (19.0)	2.08 (1.81, 2.39)	1.78 (1.51, 2.11)

[a] weighted percentage, n un-weighted number of respondents

Pro-tobacco advertisements and campaigns against smoking

Associations between advertisements for and campaigns against smoking on one hand and current smoking status of the respondents on the other are shown in Tables 3a-c. Among male respondents, those who had seen 2-3 anti-smoking messages during the previous 30 days to the survey were 21% more likely to have been current smokers compared to those who had not seen any anti-smoking message in either electronic or print media. Male respondents who had sometimes seen anti-smoking messages at social gatherings were 14% less likely to have been current smokers compared with those that had not seen these messages at social gatherings. Compared to male respondents who had not seen actors smoking when watching television, video or movies, those that had sometimes or a lot of times seen actors smoking were 20% more likely and 11% less likely, respectively, to have been current smokers.

Male respondents who had an item like a t-shirt, pen or backpack with a cigarette brand logo on it were 14% more likely to have been current smokers compared with those that did not have something with a cigarette brand on it. When compared with male respondents who did not see advertisements for cigarettes on billboards during the previous 30 days to the survey, those who saw a few of the advertisements on cigarettes were 16% more likely to have been current smokers. Furthermore, male respondents who had seen a few of the advertisements or promotions for cigarettes in newspapers or magazines were 14% more likely to have been current smokers compared with those that had not seen these advertisements in these print media. Lastly, compared with male respondents who had not seen advertisements for cigarettes at social events, those that had sometimes and a lot of times seen these advertisements were 16% and 25%, respectively, more likely to have been current smokers.

Table 3a. Associations between advertisements for and campaigns against smoking on one hand and current smoking status.

Factor	n (%)[a]	Crude OR (95%CI)	Adjusted OR (95%CI)	n (%)[a]	Crude OR (95%CI)	Adjusted OR (95%CI)
Number of anti-smoking media messages seen during the past 30 days						
None	578 (16.3)	1	1	634 (4.1)	1	1
1 per month	301 (27.2)	1.17 (1.06, 1.28)	1.11 (0.99, 1.24)	234 (9.9)	1.59 (1.35, 1.89)	1.56 (1.25, 1.94)
2-3 per month	213 (29.1)	1.28 (1.15, 1.41)	1.21 (1.07, 1.37)	145 (4.3)	0.65 (0.50, 0.84)	0.37 (0.25, 0.54)
At least 1 per week	349 (26.2)	1.11 (1.01, 1.21)	1.06 (0.95, 1.18)	224 (9.6)	1.55 (1.31, 1.85)	1.51 (1.21, 1.89)
Frequency of anti-smoking messages seen at social gatherings						-
None	648 (18.8)	1	1	761 (5.2)	1	
Sometimes	226 (23.8)	1.03 (0.94, 1.13)	0.86 (0.76, 0.97)	120 (9.5)	1.39 (1.16, 1.68)	
A lot	570 (27.6)	1.26 (1.17, 1.36)	1.01 (0.92, 1.11)	355 (6.8)	0.98 (0.85, 1.14)	
Frequency of actors seen smoking on TV, videos or movies						
None	159 (18.2)	1	1	171 (3.6)	1	1
Sometimes	342 (27.0)	1.29 (1.18, 1.42)	1.20 (1.08, 1.34)	263 (3.9)	0.80 (0.65, 0.99)	0.62 (0.49, 0.80)
A lot	945 (22.2)	1.00 (0.92, 1.08)	0.89 (0.81, 0.97)	806 (7.6)	1.64 (1.40, 1.93)	1.72 (1.42, 2.08)

[a] weighted percentage, n un-weighted number of respondents

Table 3b. Associations between advertisements for and campaigns against smoking on one hand and current smoking status.

Factor	n (%)[a]	Crude OR (95% CI)	Adjusted OR (95%CI)	n (%)[a]	Crude OR (95%CI)	Adjusted OR (95%CI)
Had something such as a t-shirt or pen with a cigarette brand logo on it						
Yes	267 (31.8)	1.33 (1.25, 1.41)	1.14 (1.06, 1.24)	192 (12.4)	1.62 (1.45, 1.80)	1.25 (1.09, 1.42)
No	1162 (20.9)	1	1	1042 (5.1)	1	
Frequency of seeing cigarette brand names on TV during the past 30 days						
None	227 (16.6)	1	-	200 (3.0)	1	-
Sometimes	534 (25.0)	1.23 (1.13, 1.32)		455 (7.7)	1.52 (1.30, 1.78)	
A lot	685 (23.3)	1.12 (1.04, 1.20)		581 (6.0)	1.17 (1.00, 1.36)	
Frequency of advertisements for cigarettes seen on billboards during the past 30 Days						
None	437 (15.2)	1	1	445 (4.4)	1	1
A few (1-10)	666 (26.4)	1.25 (1.17, 1.34) 1.28 (1.18, 1.39)	1.16 (1.06, 1.27) 1.08 (0.96, 1.20)	547 (7.2)	1.22 (1.07, 1.38) 1.15 (0.98, 1.35)	1.05 (0.89, 1.24) 1.47 (1.19, 1.82)
A lot (>10)	341 (26.8)			242 (6.9)		

[a] weighted percentage, n un-weighted number of respondents

Table 3c. Associations between advertisements for and campaigns against smoking on one hand and current smoking status.

Factor	n (%)[a]	Crude OR (95% CI)	Adjusted OR (95%CI)	n (%)[a]	Crude OR (95% CI)	Adjusted OR (95%CI)
Frequency of advertisements for cigarettes seen in newspapers or magazines during the past 30 days						
None	687 (19.2)	1	1	617 (4.6)	1	1
A few (1-10)	539 (27.3)	1.24 (1.15, 1.34) 1.02 (0.93, 1.13)	1.14 (1.04, 1.25) 0.90 (0.79, 1.02)	457 (9.5)	1.94 (1.64, 2.29) 0.58 (0.45, 0.77)	1.67 (1.37, 2.04) 0.45 (0.33, 0.63)
A lot (>10)	195 (23.6)			145 (3.1)		
Frequency of advertisements for cigarettes seen at social gatherings						
None	570 (15.5)	1	1	695 (4.4)	1	1
Sometimes	330 (27.8)	1.27 (1.18, 1.38) 1.29 (1.20, 1.38)	1.16 (1.05, 1.28) 1.25 (1.14, 1.36)	204 (10.1)	1.54 (1.33, 1.78) 1.02 (0.88, 1.17)	1.29 (1.07, 1.55) 0.85 (0.72, 1.01)
A lot	543 (28.0)			335 (6.9)		

[a] weighted percentage, n un-weighted number of respondents

Compared with female respondents who had not seen anti-smoking messages in either electronic or print media during the previous 30 days to the survey, those that had seen the anti-smoking messages at least 1 per week, 2-3 per month and 1 per month were 51% more likely, 56% more likely and 63% less likely, respectively, to have been current smokers. When compared with female respondents who did not see actors smoking on television, video or movies, those that had sometimes and a lot of times seen actors smoking on screens were 72% more likely and 38% less likely, respectively, to have been current smokers. In the meantime female respondents, who had something like a t-shirt, pen or backpack with a cigarette brand logo on it were 25% more likely to have been current smokers compared with those that had no cigarette brand on such materials. Compared with female respondents who had not seen advertisements for cigarettes on billboards, those who had seen a lot of the advertisements were 47% more likely to have been current smokers. In relation to number of

cigarettes seen in newspapers or magazines, female respondents who seen a lot and a few advertisements for cigarettes were 55% less likely and 67% more likely, respectively, to have been current smokers compared with those who had not seen the advertisement. Lastly, female respondents who had sometimes seen advertisements for cigarettes at social events were 29% more like to have been smokers compared with those that had not seen the advertisements at social events.

Perception of effects of smoking on health : Table 4 shows associations between knowledge of cigarette smoking being harmful to health and the respondents' current smoking status. No significant association was observed between knowledge of cigarette smoking being harmful to their health and current cigarette smoking among males. Female respondents who thought that cigarette smoking is harmful to their health were 32% less likely to have been current smokers compared with respondents who did not think that cigarette smoking is harmful to their health.

Table 4. Association between knowledge of cigarette smoking being harmful to health and current smoking status.

Factor	n (%)[a]	Crude OR (95% CI)	Adjusted OR (95%CI)	n (%)[a]	Crude OR (95% CI)	Adjusted OR (95%CI)
Cigarette smoking is harmful to health			-			
Yes	1356 (22.2)	0.78 (0.70, 0.85) 1		1178 (6.0)	0.70 (0.59, 0.83) 1	0.68 (0.55, 0.85) 1
No	92 (32.2)			63 (11.4)		

[a] weighted percentage, n un-weighted number of respondents

DISCUSSION : Overall prevalence of cigarette smoking in this group of school going adolescents in Cote D'Ivoire was 15.3% with prevalence among males higher than in females (23.0% versus 6.2%). This prevalence is lower than that estimated in Arua, Uganda by Mpabulungi and Muula (2002) were current cigarette smoking was 21.9% overall, 17.9% in females and 38.7% in males [9]. Our current cigarette smoking prevalence estimates for Cote D'Ivoire however are much higher than the 5.8% estimated for Kampala, Uganda in 2002 [10].

We also found that older adolescents and those in higher school grades were less likely to be smokers compared to young study participants. It is unclear to us why younger adolescents were more likely to be smokers than older study participants. It may be possible that initiation of cigarette smoking occurs at younger ages but many adolescents eventually quit as they grow. This could explain a higher prevalence of current smoking among young adolescents and lower among older.

Adolescents who reported having more pocket money cash were more likely to be smokers. Having some pocket money and having more pocket money have been reported to be associated with adolescent cigarette smoking in many studies [11-13]. It is likely that having disposable cash could facilitate adoption of smoking habit.

We also found that having friends who were also smokers was associated with being a smoker. Interestingly, parental smoking was associated with being a current smoker among males but not in females. Having friends who are smokers or having parents who smoke have been reported before as important predictors of adolescent smoking [14, 15]. Smoking friends could influence initiation of smoking habit or adolescents who are smokers preferentially choose other smokers as friends.

Owning an item with a tobacco brand logo and exposure to pro-tobacco advertisement was associated with being a smoker. Among male respondents, those who had seen 2-3 anti-smoking messages during the previous 30 days to the survey were 21% more likely to have been current smokers compared to those who had not seen any anti-smoking message in either electronic or print media. Perception that smoking was harmful to health was associated with less likelihood of being a smoker. Positive attitudes toward smoking as promoted by mass media has been reported to influence adolescent smoking [16,17].

Our study had several limitations. Due to the cross sectional nature of the study design, we can not describe causation among any of the factors that have been identified as associated with current cigarette smoking. As the study participants were only recruited from schools, it is difficult to generalise these findings to all

adolescents in the study area, including those not currently in school at the time of the survey. As the data collection mechanism relied on self reports without verification of current smoking by biomarkers such as cotinine levels and exhaled carbon monoxide, misreporting, both deliberate and inadvertent could not be verified [18-21]. However, the study followed standard GYTS methodology as has been executed elsewhere.

CONCLUSIONS : Cigarette smoking in a major public health problem in Cote D'Ivoire. There is need for public health interventions to curb adolescent smoking. School-based intervention should be designed with due consideration to the socio-demographic and societal factors that are associated with adolescent smoking [22].

Conflict of interest : *The authors have no conflict of interest to declare*

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