

to complete the questionnaire.⁽¹³⁻¹⁵⁾ All questions were presented as multiple choice options and were completed at a single sitting. The GYTS core questionnaire aimed to collect the following information: experience of cigarette smoking; knowledge and attitudes of young people towards cigarette smoking; gender; age at initiation of smoking; amount of pocket money received each day and amount of money spent on cigarettes; and parental smoking and having friends who were smokers. For the purpose of this study, however, only data related to estimation of the prevalence of smoking, associated factors and amount of pocket money received per day are reported.

Data were analysed using SUDAAN version 9.0 (Research Triangle Institute, Research Triangle Park, Durham, NC, USA). A weighting factor was used to account for non-response and probability of being selected into the study. Proportions and 95% confidence intervals were obtained as estimates of prevalence. Bivariate logistic regression analysis was done to determine associations between current smoking status and other relevant variables according to the literature. Multivariable logistic regression analysis was also done to assess the association of each of the individual variables while adjusting for the other variables.

Permission to conduct the study was obtained from the Ministry of Education. All eligible students were also informed that participation was voluntary. Data collection was facilitated in schools by trained assistants without the presence of a teacher. In order to estimate how much disposable cash a study participant had, there was a question on how much pocket money a study participant received each day. Study participants were required to select the most appropriate option of the given reasonable ranges of money in Mongolian currency (1,200 tögrög [T] is equivalent to USD 1). Current smoking was defined as having smoked even one puff in the past 30 days. Having ever smoked was defined as having smoked even a single puff in one's lifetime.

RESULTS

Selected characteristics of the study population of 4,105 adolescent Mongolians (mean age 14.1 years, standard deviation [SD] 0.8 year) are presented in Table I. Most of the sample were females (54.9%), 15 years old (30.4%), had never smoked (63.5%), had been taught about the dangers of smoking (54.5%), perceived smoking as definitely harmful (86.9%), had parents and friends who were smokers (58.2% and 52.3%, respectively), and were exposed to environmental tobacco smoke (74.5.8%) (Table I). Those who were 15 years or older had increased odds

of smoking, compared to those aged 11–12 years (OR = 2.66; 95% CI 1.51–4.68) and even more so for those aged 16–17 years (OR = 4.03; 95% CI 2.20–7.37) (Table II). The perception of cigarette smoking as harmful was associated with smoking among females. Those who perceived cigarette smoking as definitely not harmful or probably not harmful were six times more likely to smoke than females who perceived cigarette-smoking as definitely harmful (OR = 6.82; 95% CI 3.90–11.92).

There was a dose-response relationship between the amount of pocket money and smoking ($p < 0.001$). Those who had USD 10 or more had a greater than six-time increase in the odds of smoking compared to those who had no pocket money (OR = 6.78; 95% CI 4.60–10.01). Further associations are presented in Table II. The results from multivariate analysis are presented in Table III. The association between smoking and pocket money remained significant after adjusting for age, gender, parents' and friends' smoking status, and perception of cigarette smoking being harmful. Those who reported having less than USD 10 had a greater than four times likelihood in the odds of smoking, compared to those who had no pocket money (OR = 4.33; 95% CI 2.73–6.88), while those who had USD 5–9 had more than double the odds of smoking (OR = 2.50; 95% CI 1.66–3.77). Other variables associated with smoking in multivariate analysis included age, gender, friends who are smokers, and perception of cigarette smoking as harmful (Table III).

DISCUSSION

The prevalence of current cigarette smoking among school-going adolescents in Mongolia was 9.2%. Males had a higher prevalence than females (15.4% vs. 4.4%). The overall prevalence of cigarette smoking is slightly lower than the 10.4% found in the GYTS in Greece in 2005, but the difference between males and females in Greece was small, with percentages of 11.3% versus 9.0%.⁽¹⁶⁾ In Iraq's Kurdistan region, however, cigarette smoking prevalence among the males in 2005 was 21%, while the female prevalence was 11.9%.⁽¹⁷⁾ In 2003 in the Philippines, the overall prevalence was 15.0%, with 21.8% for males and 8.8% for females.⁽¹⁸⁾ In Jakarta (Indonesia), Guangdong (China) and Nepal, male predominance in cigarette smoking has been reported, while in Delhi and Goa (India), and in the Czech Republic, no gender differences have been observed.⁽¹⁹⁾ In Colombia and Chile, more female than male adolescents have been reported to be cigarette smokers.⁽¹⁹⁾ In these settings, the same GYTS core questions were used. It is therefore clear that the gender difference in cigarette smoking has determinants that differ from

Table I. Selected variables on smoking and demographics.

Variables	Total (%) (95% CI)	Males (%) (95% CI)	Females (%) (95% CI)
No. of participants	4,105	1,850	2,255
Age (years)			
All	100.0	45.1 (43.6–46.6)	54.9 (53.4–56.5)
11–12	6.1 (5.5–6.9)	6.7 (5.6–7.9)	5.7 (4.8–6.7)
13	25.1 (23.8–26.4)	23.8 (22.0–25.8)	26.1 (24.3–27.9)
14	29.3 (27.9–30.7)	28.4 (26.4–30.5)	30.0 (28.1–31.9)
15	30.4 (29.1–31.9)	31.9 (29.8–34.0)	29.3 (27.4–31.1)
16–17	9.1 (8.3–10.0)	9.2 (8.0–10.6)	9.0 (7.9–10.3)
Smoker (current or previous)			
Yes	59.9 (58.3–61.3)	45.4 (43.1–47.7)	71.6 (69.7–73.5)
Age started smoking (years)			
Never smoked	63.5 (62.0–65.0)	49.4 (47.1–51.8)	74.9 (73.1–76.9)
11	7.2 (6.4–8.0)	11.4 (10.0–12.9)	3.6 (2.9–4.4)
12–13	5.6 (4.8–6.2)	8.9 (7.6–10.3)	2.7 (2.1–3.5)
14	2.3 (2.2–25.3)	30.4 (28.8–32.6)	18.8 (17.3–20.5)
Current smoker			
Yes	9.2 (8.4–10.2)	15.2 (13.6–16.9)	4.4 (3.6–5.4)
Parental smoking			
None	41.8 (40.3–43.3)	42.4 (40.1–44.7)	41.2 (39.2–43.3)
Both parents	7.0 (6.3–7.9)	6.8 (5.7–8.1)	7.4 (6.4–8.6)
Father only	47.9 (46.3–49.4)	47.9 (45.6–50.2)	47.9 (45.8–50.0)
Mother only	3.3 (2.8–3.9)	2.9 (2.3–3.8)	3.5 (2.8–4.3)
Friends smoking			
None	47.7 (46.2–49.2)	37.0 (34.8–39.2)	56.5 (54.4–58.5)
Some	43.1 (41.6–44.6)	50.8 (48.5–53.1)	36.8 (34.8–38.7)
Most	6.8 (6.1–7.6)	8.2 (7.0–9.6)	5.7 (4.8–6.8)
All	2.4 (2.00–2.9)	4.1 (3.2–5.1)	1.1 (0.7–1.6)
Exposed to ETS	74.5 (73.2–75.5)	76.0 (74.0–77.9)	73.3 (71.4–75.1)
Smoking is harmful			
Taught about dangers of smoking	54.5 (53.0–56.1)	55.56 (53.2–58.0)	53.6 (51.5–55.7)
Definitely/probably not	7.5 (6.8–8.4)	9.5 (8.2, 10.9)	5.9 (5.0–7.0)
Probably yes	5.6 (4.9–6.3)	6.1 (5.1–7.3)	5.9 (5.0–7.0)
Definitely yes	86.9 (85.8–87.9)	84.4 (82.6–86.0)	89.0 (87.6–90.2)

ETS: environmental tobacco smoke; CI: confidential interval

setting to setting. Parna et al reported the prevalence of smoking among girls in Russian schools in Tallinn (34.6%), in Helsinki (39.5%), and in Moscow (32.1%).⁽²⁰⁾ These reports have a higher prevalence than our results. In China, Johnston et al have reported on current cigarette smoking at 9.3% among the eighth graders and 23% among 12th graders.⁽²¹⁾ All these studies have reported prevalence among adolescents of similar age range to those in our study, i.e., 13–15 years.

Although the magnitude of association between bivariate and multivariable analyses changed to varying degrees, overall, the direction of association was maintained. Parental smoking and peer smoking were both positively associated with cigarette smoking. A study of 2,763 high school students by Zhang et al in the Henan Province, China, reported that peer and mother's smoking were positively associated with smoking in the study participants. If smoking was discouraged at school, this was associated

with low smoking propensity by study participants.⁽²²⁾ It is not possible however, from our study, to determine the direction of association between having a friend who smokes and one's smoking, i.e., whether friends influence one to initiate smoking or smokers are likely to choose other smokers as friends, as this was a cross-sectional study. However, as the literature has reported the importance of peer influence in initiating behaviour, it is reasonable to suggest that peer influence could be important also in the initiation of smoking among our study participants.^(23,24) A smoker who has a friend who also smokes may reinforce each other in the maintenance of the habit.

Previous studies elsewhere have reported the association between age, sex, peer influence and cigarette smoking.⁽²³⁾ It is also interesting that we identified a dose-response association between the amount of pocket money received and smoking. This finding may suggest that having a disposable income may influence smoking practice and

Table II. Variables associated with current smoking.

Variables	Odds ratio (95% CI)		
	Total	Males	Females
Age (years)			
11–12	1.00	1.00	1.00
13	0.87 (0.47–1.61)	1.54 (0.67–3.55)	0.46 (0.14–1.52)
14	1.34 (0.75–2.40)	2.29 (1.02–5.15)	0.76 (0.25–2.32)
15	2.66 (1.51–4.68)	3.83 (1.73–8.48)	2.23 (0.78–6.33)
16–17	4.03 (2.20–7.37)	6.17 (2.66–14.30)	3.05 (1.00–9.29)
Gender			
Females	1.00	-	-
Males	3.84 (3.01–4.91)	-	-
Parental smoking			
None	1.00	1.00	1.00
Father only	1.15 (0.90–1.46)	1.12 (0.84–1.49)	1.17 (0.72–1.90)
Mother only	1.80 (1.04–3.09)	1.78 (0.88–3.61)	2.62 (1.05–6.52)
Both parents	1.81 (1.22–2.68)	1.41 (0.84–2.38)	3.10 (1.62–5.92)
Friends smoking			
None	1.00	1.00	1.00
Some	6.91 (4.73–10.09)	4.78 (3.06–7.49)	8.12 (3.93–16.77)
Most	38.10 (24.88–58.34)	28.67 (16.88–48.70)	50.72 (23.41–109.88)
All	43.07 (25.23–73.54)	25.07 (13.16–47.73)	78.09 (27.37–223.08)
Perception that smoking is harmful			
Definitely yes	1.00	1.00	1.00
Probably yes	1.80 (1.27–2.56)	1.25 (0.82–1.91)	2.51 (1.25–5.04)
Definitely or probably no	2.70 (1.87–3.90)	1.47 (0.89–2.42)	6.82 (3.90–11.92)
Pocket money			
No pocket money	1.00	1.00	1.00
< 1 USD	2.55 (1.77–3.68)	2.46 (1.64–3.69)	2.30 (1.11–4.73)
1–4 USD	2.77 (1.98–3.88)	2.71 (1.75–4.20)	3.33 (1.76–6.31)
5–9 USD	3.65 (2.48–5.38)	3.13 (1.96–4.99)	4.35 (2.08–9.08)
≥ 10 USD	6.78 (4.60–10.01)	7.68 (4.76–12.40)	5.38 (2.51–11.55)

conversely, those adolescents with very little or no pocket money may be only be able to afford bare essentials. Mohan et al have also reported that in India, adolescents who received pocket money have four times the risk of being a smoker versus those who do not.⁽²⁵⁾ The public health significance of this finding is that parents and other guardians who provide adolescents with cash should take an interest in how the money is used. We found that adolescents who believed that smoking was harmful to health were less likely to be current smokers, compared to those who disbelieved. Rodriguez et al have also reported that adolescents who had positive attitudes towards smoking were more likely to be smokers.⁽²⁶⁾

Our study has the following limitations. As the data were collected through self-completion of the questionnaire, it is possible to have deliberate misreporting. There may also be recall bias as study participants may fail to recall whether or not they smoked within the past 30 days prior to the day of completion of questionnaire. As our assessment of current smoking status was not validated by biomarkers,

such as nicotine or cotinine levels or exhaled carbon monoxide, it is difficult to estimate the extent of any reporting biases that may have occurred.^(27–30) However, our study used a standardised questionnaire that enables within country and across country comparisons of smoking status. The prevalence estimates also obtained are likely to closely represent the smoking prevalence among school-going adolescents. It is not known how representative our sample was of the adolescent population in Mongolia. However, as the gross primary and secondary school enrolment ratios for Mongolia range between 84% and 97%, it implies that the majority of adolescents are in school.⁽³¹⁾ The Human Development Report states that 97.8% of persons aged 15 years and older are literate in Mongolia.⁽³²⁾ The limitation of the gross enrolment ratio is that it measures the estimated number of students in a class expressed as a proportion of the total expected number of students at a particular age or ages. In a situation where class repletion is high, gross enrolment ratio could be high, despite having a significant proportion of adolescents out

Table III. Variables associated with current smoking in multivariate analysis.

Variable	Odds ratio (95% CI)
Pocket money	
No pocket money	1.00
< 1 USD	2.31 (1.60–3.34)
1–4 USD	2.47 (1.59–3.84)
5–9 USD	2.50 (1.66–3.77)
≥10 USD	4.33 (2.73–6.88)
Age (years)	
11–12	1.00
13	1.47 (0.65–3.29)
14	1.84 (0.85–4.00)
15	2.90 (1.36–6.20)
16–17	3.91 (1.74–8.81)
Gender	
Female	1.00
Male	3.22 (2.45–4.24)
Parental smoking	
None	1.00
Father only	1.10 (0.84–1.44)
Mother only	1.43 (0.71–2.89)
Both parents	1.52 (0.95–2.43)
Friends smoking	
None	1.00
Some	4.49 (3.06–6.60)
Most	24.25 (15.66–37.54)
All	25.52 (13.72–47.48)
Cigarette smoking harmful	
Definitely yes	1.00
Probably yes	1.65 (1.03–2.64)
Definitely or probably no	2.29 (1.46–3.59)

of school.

In conclusion, among school-going adolescents in Mongolia, we found that cigarette smoking is prevalent and strongly associated with the amount of pocket money, as well as the smoking status of friends and parents. These findings indicate the need to implement public health interventions, with special attention to the determinants of smoking in this group.

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