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Research Article

A Hospital-Based Cross-Sectional Analysis of Socioeconomic Factors Related to Nicotine Dependence in Mongolia

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Abstract

Introduction: Adult smoking rates are among the highest of any public health crisis. It is important to identify and understand the various elements that may make people more susceptible to the negative health effects of smoking. **Objective:** This study is purposed to investigate potential socio-economic risk factors associated with Nicotine Dependence among UB residents. Methods: Risk factors associated with Nicotine Dependence were assessed through cross-sectional study design. For quantitative data collection method employed. **Results:** Higher nicotine dependence in this study was associated with being male, older, divorced, living in a ger's neighborhood, having a lower education level, not having a regular job, drinking more alcohol, and starting to smoke before the age of 18. **Conclusion:** According to the results of our research, countries with low and moderate levels of income, such as Mongolia, have a significant problem with high levels of nicotine dependence. In addition to this, it underscores the importance of developing smoking cessation programs that consider the extent of nicotine dependence while placing a greater emphasis on early interventions of the linked factors.

Keywords: Mongolia; Nicotine dependence; Fagerstrom test; Socioeconomic factors

Introduction

Smoking causes 7.69 million deaths and 200 million DALYs worldwide (years of life lost due to disability). Tobacco usage has dropped across all regions and development levels, although tobacco control implementation is still lacking [1]. Mongolian males smoked 46.3% and women 6.8% in 2010. Males, city dwellers, 45-54-year-olds, and young Mongolians (15.5%) were more likely to do this. Smoking prevalence was unaffected by education [2].

Sluggish nicotine metabolism and depression put adolescents at risk of nicotine dependency, whereas smoking in the past appears to play a modest influence [3]. In 2019, 400 Delhi University college students were investigated cross-sectionally using the Fagestrom test. The median (IQR) number of cigarettes smoked per day was 3 (2-6), the majority (80.7%) smoked within 30 minutes of waking up, and the 40% had nicotine dependence [4]. Toombak (form of smokeless tobacco) users took the six-question Fagerstrom Nicotine Dependence-Smokeless Tobacco Test (FTND-ST) <4 indicated low-to-moderate dependence, whereas >5 indicated severe dependence. Toombak users had 9.7 pg/ml hair cortisol, while non-users had 19.4 (p=0.023). Psycho-dependent (score>5) and nicotine-tolerant, 85% of Toombak consumers (FTND-ST scores 4-9) [5] and large-scale cortical processes in young smokers and offer a novel perspective on adolescent smoker brain networks [6].

624 Brazilian BR-050 truck drivers were surveyed between 2015 and 2016. Smoking truck drivers took the Fagerstrom Nicotine Dependency Test (FTND). Tobacco use was associated with lack of religion (AOR: 2.60; 95%CI: 1.35-5.01), contract employment (AOR=1.98; 95%CI: 1.26-3.13), >12 hours daily working time, and alcohol intake in the prior 30 days. Irregular exercise enhanced nicotine dependency (beta = 1.87; 95%CI: 0.55-3.19) [7]. A large Norwegian population-based intervention study examined six-month smoking cessation factors. 4333 smokers (72.1% women) engaged in an internet-based smoking cessation program in 2010-2012. Female sex and longer education predicted smoking cessation success, but a medium or high FTND score, student status, and snus use predicted failure [8]. Like these studies, numerous global studies have investigated the risk factors associated with nicotine dependence in diverse populations. However, most of the Mongolian research focuses on smoking, whereas few investigate risk factors for nicotine dependence using the Fagerstrom standard questionnaire. Consequently, this study investigates socioeconomic risk factors for nicotine dependence among UB residents.

Methodology

Risk factors associated with Nicotine Dependence were assessed through cross-sectional study design. For quantative data collection method employed.

Study participants: The sample size was calculated to be 875 persons with a 95% Confidence Interval (CI), an error margin of 0.04% (ER), and a non-sampling error of 30% (NSE) based on the size of the population between the ages of 18 and 65 in six central Ulaanbaatar districts (n=855,899) (Table 1).

Districts	Number of population (18-65)	Sample population
Bayanzurkh	230.125	197
Songinokhairkhan	202.652	173
Bayangol	130.160	140
Khan-uul	121.296	144
Chingeltei	85.313	116
Sukhbaatar	86.353	105
Total	**855.899**	**875**

Table 1: Survey sample population by district.

Criteria for study inclusion: It is a Mongolian citizen aged 18-65 who smokes and lives in one of the city's six districts.

Study measurements

Independent variables: Audit for alcohol consumption, socioeconomic and tobacco use variables

Dependent variable: Nicotine Dependence Test-Short version (6 questions)

To assess nicotine dependence, a short version of the Fagerström Questionnaire [9,10], developed in 1978, was used in the study. It consists of six questions designed to assess nicotine dependence based on self-report. Each question will be graded on a scale of 1 to 3. 0-2 points indicate very low correlation, 3-4 points indicate low correlation, 5 points indicate medium correlation, 6-7 points indicate high correlation, and 8 or more points indicate very high correlation. Low level (5), High level (>=6) (Table 2).

Item	Response option	Numerical value
How soon after you wake up do you smoke your first cigarette?	Within 5 min	3
	6-30 min	2
	31-60 min	1
	After 60 min	0
Do you find it difficult to refrain from smoking in places where it is forbidden?	No	0
	Yes	1
Which cigarette would you hate most to give up?	The first one in the morning	1
	Any other	0
How many cigarettes do you smoke per day?	10 or more	0
	11-20	1
	21-30	2
	31 or more	3
Do you smoke more frequently during the first hours after waking, than during the rest of the day?	No	0
	Yes	1
Do you smoke even if you are so ill that you are in bed most of the day?	No	0
	Yes	1

Table 2: The Fagerstrom Test for Nicotine Dependence items, response options and scoring.

Research ethics

Before taking part in the research, everyone who was enrolled in the study voluntarily supplied written informed consent. The Ulaanbaatar, Mongolia branch of the Mongolian National University of Medical Sciences (MNUMS)' Ethics Committee gave its stamp of approval to the study's protocol (No 2019-3-13). Additionally, we have received approval from our institutional ethics committee of the MNUMS (No. 2023/01).

Statistical analysis

The data were double-checked for accuracy before being coded and processed with IBM SPSS Statistics (25.0 version). Statistics such as means, standard deviations, frequencies, and percentages were used to provide a snapshot of the study population. As a first step in the analysis method, we employed the chi-square test to investigate the correlation between nicotine addiction and the explanatory variables. After determining which factors were statistically significant using the Chi-square test, we used multivariate logistic regression to go deeper into the data.

Results

According to Table 3, there were a total of 875 participants ages 18 to 65 who came from six different neighborhoods in the city center of Ulaanbaatar.

Of those participants, 650 (74.3%) were male and 225 (25.7%) were female. 106 (12.1%) are between the ages of 18 and 29, 216 (24.7%) are between the ages of 30-39, 244 (27.9%) are between the ages of 40 and 49, 197 (22.5%) are between the ages of 40 and 49, and 111 (12.8%) are between the ages of 60 and 65. There are 626 married people in this group, which accounts for 71.5% of the total, 113 single people (12.9%), and 75 people (8.6%) who live together.

527 people, or 60.2% of the population, called apartments their home, whereas 258 people, or 29.5%, called homes their home and 81 people, or 9.3%, called houses their home. There are 417 people who have completed some form of higher education, 79 people who have completed a technical vocational education, 262 people who have completed some form of secondary education, 102 people who have not completed secondary education, and 15 people who have not completed any form of education. occupying 345 (39.4%) are private organizations, 121 (13.8%) are retirees, 47 (5.4%) are non-governmental organizations, 17 (1.9%) are in non-regular paid job, 61 (7%) were unemployed (able to work), 19 (2.2%) were unemployed (unable to work), and 10 (1.1%) were students. occupying 345 (39.4%) are private organizations, 121 (13.8%) are retirees, 47 (5.4%) are non-governmental organizations.

After evaluating the participants' drinking habits, it was determined that 621 (71%) of them had low-risk drinking, 186 (21.3%) had dangerous drinking, 37 (4.2%) had damaging drinking, and 31 (3.5%) were alcohol-dependent. When it came to the age at which they started smoking, 373 (42.6%) of them were

younger than 18 years old, while 502 (57.4%) of them were 19 or older (Table 3).

Sociodemographic characteristic	N	(%)
Gender		
Male	650	74.3
Female	225	25.7
Age (years)		
Until 29	106	12.1
30 - 39	216	24.7
40 - 49	244	27.9
50 - 59	197	22.5
60 - 65	112	12.8
Marital status		
Single	113	12.9
Married	626	71.5
Relationship	75	8.6
Living separately	17	1.9
Divorced	31	3.5
Widowed	13	1.5
Living condition		
Ger[§]	81	9.3
Ger brick house	258	29.5
House	527	60.2
Apartment	7	0.8
Other	2	0.2
Education level		
Low and lower	15	1.7
High school education	102	11.7
Secondary education	262	29.9
Technical and professional	79	9
Upper	417	47.7
Occupation		
State organization	236	27
Non-state organization	47	5.4
Private organization	345	39.4
Regular unpaid work	17	1.9
Retired	121	13.8
University or school student	10	1.1
Unemployed (no disability)	61	7
Unemployed (with disability)	19	2.2

Other	19	2.2
Monthly household income (MNT)		
Until 500‘000₮	221	25.3
500‘001-1‘000‘000₮	237	27.1
1‘00‘001-1‘500‘000₮	133	15.2
1‘500‘001-2‘000‘000₮	166	19
2‘000‘000₮ over	116	13.3
Alcohol consumption		
Low risk	621	71
Increasing risk	186	21.3
Higher risk	37	4.2
Possible dependence	31	3.5
Started smoking age		
≤18	373	42.6
≥19	502	57.4
[§]Ger-Traditional Mongolian house where raw or improved coal is burned. MNT Mongolian National Tugrug		

Table 3: Characteristics of the survey participants’ socioeconomic backgrounds (N=875).

Table 4 illustrates that the average age at which participants began smoking was 19.1±6.8 years, the average length of time they smoked was 23.7±11.8 years, the average age at which they began smoking daily was 20.9±7.3 years, and the average number of cigarettes smoked by participants today is 15.4±7. Low-dependence smokers started smoking later in life, smoked fewer cigarettes per day, and had a lower average age at which they began smoking (p=.001). Heavy-dependence smokers started smoking earlier in life and had higher average ages at which they began smoking and were heavier smokers overall.

638 (72.9%) of the people who participated in the study had tried to quit smoking before (p=0.023), with an average of 2.4±1.5 failed attempts. There was a mean abstinence time of 7.1±18.5 months and a mean time since last attempt of 3.4±5.9 years. The average time since quitting smoking for the low nicotine dependence group was 2.9 years, while the average time for the high nicotine dependence group was 4 years (Table 4).

	Total		**Low**		**High**		**P value**
	Mean (SD)	95% CI	Mean (SD)	95% CI	Mean (SD)	95% CI	
Age started smoking	19.1±6.8	18.6 -19.6	20±7.3	19.4-20.6	17.9±5.9	17.3-18.5	**.001**
Years of tobacco use	23.7±11.8	22.9-24.5	22.2±11.8	21.2-23.3	25.7±11.5	24.5-26.9	**.001**
The age when daily smoking began	20.9±7.3	20.4-21.4	21.9±7.9	21.2-22.6	19.4±6.0	18.8-20.1	**.001**
Cigarette consumption per day	15.4±7.0	14.9-15.9	13.1±6.1	12.5-13.6	18.6±6.9	17.9-19.3	**.001**
Attempts to give up smoking							
Yes	638 (72.9)						
No	237 (27.1)						
Number of tries of quit smoking(average)	2.4±1.5	2.2-2.5	2.4±1.5	2.3-2.6	2.3±1.5	2.1-2.5	.29
The last time tried quitting (by year)	3.4±5.9	2.9-3.8	2.9±5.5	2.4-3.5	4.0±6.4	3.2-4.8	**.03**
Time for endurance (by month)	7.1±18.5	5.6-8.5	7.3±20.5	5.2-9.5	6.6±15.3	4.8-8.6	.65

Table 4: Tobacco use and attempts to quit are examined.

According to Table 5, men have a nicotine dependence that is 1.21 times more common than women do (p value.298, CI 0.85-1.73). According to age group, those between the ages of 40 and 49 have a prevalence of nicotine dependency that is 2.93 times higher (p value =.001, confidence interval = 1.6-5.36), while those between the ages of 50 and 59 have a prevalence of 2.24 times higher (p value =.011, CI 1.2-4.19). Divorcees showed a nicotine dependence that was 1.09 times higher than those who had never been married or who were single (P value is .847, CI 0.45-2.65). Living in a ger's brick house is associated with an increased risk of nicotine dependence that is 1.6 times higher (p value.005, Confidence Interval [CI] 1.15-2.23), and living in public housing is associated with an increased risk of nicotine dependence that is 1.34 times higher (p value.722, CI 0.27-6.71) than living in an apartment.

When education level is considered, nicotine dependence is found to be 1.28 times higher (p value.358, CI 0.76-2.16) among citizens who have completed a technical and professional education, and 1.79 times higher (p value.023, CI 0.08-2.98) among people who have not completed their education compared with people who have completed their education.

When it comes to employment, the rate of non-regular workers is 1.79 times higher (p value.276, CI 0.63-5.11) than that of citizens working in government organizations, and the rate of unemployed citizens with disabilities is 1.27 times higher (p value.639, CI 0.46-3.50) was addicted to nicotine. Both statistics can be found in the Confidence Interval (CI).

When adjusted for income, the likelihood of nicotine addiction was 1.21 times higher among residents' incomes of less than 500,000 MNT with compared to citizens incomes of more than 2,000,000 MNT (p value.459, CI 0.73-2.02). When compared to the group with a low risk, the risk of poor outcomes was 1.63 times greater (p value.175, CI 0.81-3.29), and the risk of alcohol dependency was 1.19 times higher. Both ratios are statistically significant (p value.663, CI 0.55-2.56). Nicotine dependency was shown to be 1.8 times higher in the group of smokers under the age of 18 (those who started smoking before the age of 17), in comparison to the group of smokers over the age of 19 (those who started smoking after the age of 18). (p value.001, CI 1.33-2.43) (Table 5).

Covariate	Total† n (%)	aOR	95% CI	P value
Age (years)				
Until 29	106 (12.1)	*Ref*		
30 - 39	216 (24.7)	2.33	1.30 to 4.20	**.005**
40 - 49	244 (27.9)	2.93	1.60 to 5.36	**.001**
50 - 59	197 (22.5)	2.24	1.20 to 4.19	**.011**
60 - 65	112 (12.8)	1.55	0.7 to 3.41	.281
Sex				
Male	650 (74.3)	*Ref*		
Female	225 (25.7)	1.21	0.85 to 1.73	.298
Marital status				
Single	113 (12.9)	*Ref*		
Married	626 (71.5)	0.92	0.56 to 1.51	.741
Relationship	75 (8.6)	0.68	0.35 to 1.32	.249
Living separately	17 (1.9)	0.99	0.32 to 3.05	.981
Divorced	31 (3.5)	1.09	0.45 to 2.65	.847
Widowed	13 (1.5)	0.38	0.09 to 1.64	.192
Living condition				
Apartment	527 (60.2)	*Ref*		
Ger	81 (9.3)	1.15	0.67 to 1.99	.615
Ger brick house	258 (29.5)	1.60	1.15 to 2.23	**.005**

Public House	7 (0.8)	1.34	0.27 to 6.71	.722
Other	2 (0.2)	0.82	0.05 to 14.21	.891
Education level				
Low and lower	15 (1.7)	1.31	0.43 to 4.00	.632
High school education	102 (11.7)	1.79	1.08 to 2.98	**.023**
Secondary education	262 (29.9)	1.07	0.75 to 1.54	.712
Technical and professional	79 (9)	1.28	0.76 to 2.16	.358
Upper	417 (47.7)	*Ref*		
Occupation				
State organization	236 (27)	*Ref*		
Non-state organization	47 (5.4)	1.40	0.72 to 2.71	.322
Private organization	345 (39.4)	1.03	0.71 to 1.48	.882
Regular unpaid work	17 (1.9)	1.79	0.63 to 5.11	.276
Retired	121 (13.8)	1.28	0.69 to 2.39	.431
University or school student	10 (1.1)	0	0 to 0	.999
Unemployed (no disability)	61 (7)	1.14	0.63 to 2.07	.675
Unemployed (with disability)	19 (2.2)	1.27	0.46 to 3.50	.639
Other	19 (2.2)	1.87	0.69 to 5.04	.216
Monthly household income (tugrug)				
Until 500‘000₮	221 (25.3)	1.21	0.73 to 2.02	.459
500‘001-1‘000‘000₮	237 (27.1)	1.06	0.65 to 1.73	.827
1‘00‘001-1‘500‘000₮	133 (15.2)	0.96	0.55 to 1.65	.873
1‘500‘001-2‘000‘000₮	166 (19)	1.13	0.67 to 1.89	.648
2‘000‘000₮ over	116 (13.3)	*Ref*		
Alcohol consumption				
Low risk	621 (71)	*Ref*		
Increasing risk	186 (21.3)	1.26	0.88 to 1.80	.201
Higher risk	37 (4.2)	1.63	0.81 to 3.29	.175
Possible dependence	31 (3.5)	1.19	0.55 to 2.56	.663
Started smoking				
≤18	373 (42.6)	1.80	1.33 to 2.43	**.001**
≥19	502 (57.4)	*Ref*		
Grand total	**875 (100)**			

†Percentages were added up column by column to get the grand total; P-value for Pearson’s Chi-Square Test; Adjusted Odds Ratio (aOR) Reference Category *(Ref)*

Table 5: Factors linked to nicotine dependence.

Discussion

The average score on the Fagerstrom Test for Nicotine Dependence among the subjects in this study was 3.4±1.5. It was consistent with the 2020 Global Adult Tobacco Survey in Zhejiang found 17.4% of daily smokers were extremely nicotine dependent, with a mean Fagerstrom Test for Nicotine Dependence score of 3.1+/-2.4 [11].

Higher nicotine dependence in this study was associated with being male, older, divorced, living in a ger's neighborhood, having a lower education level, not having a regular job, drinking more alcohol, and starting to smoke before the age of 18. These risk factors were consistent with 1026 parents questioned smoking Malaysians over 18 in 2021 using the FTND. FTND nicotine dependency was associated with gender, education, occupation, marital status, residence, and monthly income (all $p<0.05$) [12]. The 2020 Global Adult Tobacco Survey in Zhejiang found that age, education, occupation, and daily smoking age affected high nicotine dependency, although domicile, sex, and yearly household income did not. Daily smokers with higher education exhibited lower nicotine dependence than primary or less educated smokers (OR=3.07 and OR=2.62). Government, jobless, and industrial workers were more nicotine addicted than other workers (OR=4.02, 3.08, 2.46). Smoking daily before 18 increased nicotine dependency (OR=2.25) [11].

This study is constrained by the nature of the study design, and the hospital-based population may not be representative of the entire Mongolian community. Smoking-related mortality reduction efforts should incorporate barriers to quitting. High-risk nicotine-dependent populations should be prioritized in Mongolia. A more robust counseling service is required because most respondents had doubts about whether they could give up smoking. At addition, those who report being nicotine dependent and who are in the stage of preparing for or contemplating quitting tobacco need to participate in an individualized tobacco cessation program and employ specific tactics for doing so. For policymakers and the government to be able to conduct effective tobacco control programs in Mongolia, it is highly important that they have access to baseline information relating to nicotine dependence and the stage of transformation that cigarette users are in.

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References

1. Tobacco Collaborators GBD (2021) Spatial, temporal, and demographic patterns in prevalence of smoking tobacco use and attributable disease burden in 204 countries and territories, 1990-2019: a systematic analysis from the Global Burden of Disease Study 2019. Lancet 397: 2337-2360.
2. Demaio AR, Nehme J, Otgontuya D, Meyrowitsch DW, Enkhtuya P (2014) Tobacco smoking in Mongolia: findings of a national knowledge, attitudes and practices study. BMC Public Health 14: 213.
3. Karp I, O'Loughlin J, Hanley J, Tyndale RF, Paradis G (2006) Risk factors for tobacco dependence in adolescent smokers. Tob Control 15: 199-204.
4. Kamble BD, Acharya BP, Jethani S, Chellaiyan VG, Singh SK, et al. (2022) Tobacco smoking habits and nicotine dependence among the college students of University of Delhi, India. J Family Med Prim Care 11: 2965-2970.
5. Sami A, Elimairi I, Ryan CA, Ross RP, Stanton C (2023) Sudanese smokeless tobacco (Toombak) users harbour significantly altered long-term cortisol body production. Steroids 193: 109189.
6. Li X, Dong F, Zhang Y, Wang J, Wang Z, et al. (2022) Altered resting-state electroencephalography microstate characteristics in young male smokers', Front Psychiatry 13: 1008007.
7. Fernandes IL, Guimaraes RA, Lucchese R, Vera I, Brito RP, et al. (2023) Epidemiology of tobacco use and nicotine dependence in truck drivers. Rev Saude Publica 56: 108.
8. Gram IT, Antypas K, Wangberg SC, Lochen ML, Larbi D (2022) Factors associated with predictors of smoking cessation from a Norwegian internet-based smoking cessation intervention study. Tob Prev Cessat 8: 38.
9. Timilsina JK, Bhatta B, Devkota A (2022) Nicotine dependence and quitting stages of smokers in Nepal: A community based cross-sectional study. PLoS One 17: e0266661.
10. Subedi K, Shrestha A, Bhagat T (2021) Assessment of nicotine dependence among tobacco users visiting outreach programs in Dharan, Nepal: a cross-sectional study. BMC Public Health 21: 1515.
11. Xu Y, Xu S, Wu Q, Chen H, Yao D, et al. (2022) Analysis of nicotine dependence among daily smokers in China: evidence from a cross-sectional study in Zhejiang Province. BMJ Open 12: e062799.
12. Marzo RR, El-Fass KA, Osman NA, Kyaw TM, Arivanandan PKA, et al. (2022) Identifying the barriers of smoking cessation and predictors of nicotine dependence among adult Malaysian smokers: A cross-sectional study. Tob Induc Dis 20: 109.