**SOCIO-DEMOGRAPHIC DETERMINANTS OF MALE CIGARETTE SMOKING IN PAKISTAN**

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**Background:** To identify the socio demographic factors that have statistically significant association with cigarette smoking will enhance the capability of strategy planer that contributes to improve the prevention measures and mechanisms of anti-tobacco may decline the smoking related ill health and mortality. **Design:** Pakistan demographic and health survey data set 2012-13 has been used for the present study. **Methods:** Bivariate and binary logistic regression analysis has been carried out to evaluate the determinants of cigarette smoking. **Results:** More than two third (71.68%) respondents never smoke cigarette. Chewing tobacco is a commonly (18.6%) used by the respondents. High proportion (34.1%) of respondents consumed eighteen and over cigarettes in 24 hours, whereas the 18% of the respondents consumed twelve to seventeen cigarettes. Age, education, place of residence by province, media access and wealth index are found to be significant with respect to cigarette smoking. Inverse association exist education and smoking .i.e. respondents with no education have 1.604 times more smoke cigarettes as compared to respondents with higher level of education. The respondents reading newspaper and access to radio have less likely to smoke cigarettes [OR=0.931 and OR=0.80] respectively compared to their counterpart having no access to media. Ever married men belong to Baluchistan province smoke cigarettes 1.576 times more than their counterparts that lived in GB. **Conclusion:** Age, education, place of residence by province, media access particularly newspaper and radio and wealth index are associated with smoking. These statistical outcomes will serve as guide in smoking control and management.

**Keywords:** binary logistic regression; smoking; socio demographic factors

**Introduction:** Tobacco is one of the major public health threat particularly in developing countries, Approximately one person dies every six seconds due to tobacco, accounting for one in 10 adult deaths.More than one billion (80%) smokers globally live in low- and middle-income countries, where the mortality and morbidity burden due to tobacco is much higher[1](#_ENREF_1). The prevalence of smoking in most high income countries continues to decline in the past[2](#_ENREF_2). From medical prospective, smoking has direct health harms, disease of nearly all organs of the body connected to cigarette smoking[3](#_ENREF_3). avoiding smoking prolongs life as well as a significant role in decreasing the threat of heart related problems and death[4](#_ENREF_4). There are several other direct harm to health from cigarette smoking like lung cancer, heart related problem and respiratory complications[3](#_ENREF_3), cigarettes smoking are also responsible in the reduction of fertility as well as erectile dysfunction in males[5](#_ENREF_5). It may also cause of diabetes and rises both the risk and the severity of rheumatoid arthritis[3](#_ENREF_3). It causes the age-related macular degeneration[3](#_ENREF_3) and a major cause of chronic coughing, increased phlegm, emphysema and bronchitis. Smoking intensifies asthma in adults and also damages the immune system[3](#_ENREF_3). Smokers are more prone to influenza and likely to experience severe symptoms when they get the flu[6](#_ENREF_6). It is common understanding among smokers that cigarettes smoking relieves stress, Epidemiologic[7](#_ENREF_7" \o "Glassman, 1990 #646) and clinical[8](#_ENREF_8" \o "Kandel, 1986 #647)studies have reported a strong association between smoking and depression. Smoking only appears to decrease tension because it declines the irritability and stress caused by the underlying nicotine addiction[9](#_ENREF_9).

Several studies revealed that socio demographic factors are consistently associated with cigarette smoking namely male sex, younger age, lower socio economic status, and lower educational background are directly linked with smoking prevalence[10](#_ENREF_10); [11](#_ENREF_11); [12](#_ENREF_12); [13](#_ENREF_13); [14](#_ENREF_14). It is well established that rise in awareness level prevent the initiation of tobacco use and reduce its prevalence among youth[15](#_ENREF_15). This study with a definite object to address the socio-demographics factors such as age, education, Location and geographical area of residence, wealth index, media exposure and respondents occupation and evaluating the statistically significant factors associated with cigarette smoking.

**Methods and materials:**

**Data source:** So far three demographic health survey (1990-19, 2006-07 and 202-13) has been conducted as part of the MEASURE DHS international series. The national institute of population studies done these survey with the technical support from ICF International and Pakistan bureau of statistics and the USAID supported the financially. The most recent data set for ever married men with sample size 3134 was used for this study.

Bivariate analysis is performed for respondents with the object to determine the socioeconomic characteristics that have potential influence in cigarette smoking. Pearson’s chi- square test of independence was performed to evaluate the association between dependent and independent variable. To understand the functional relationship of variables binary logistic regression analysis was carried out[16](#_ENREF_16), [17](#_ENREF_17). The dependent variable in our study was smoke cigarette had two categories (0=no and 1=yes). The explanatory variables were age (15-49), place of residence (urban rural), place of residence by province (Punjab, Sindh, KPK, Baluchistan and Gilgit Baltistan), educational level (Illiterate, primary, secondary and higher), media exposure (read newspaper, listen radio and watch TV), wealth index (poorest, poorer, middle, richer and richest) and respondents occupation (working and not working). The variables found to be insignificant in bivariate analysis excluded in binary logistic analysis.

**Results:**

The maximum (20.3%) and the minimum (1%) respondent’s falls in age group 30-34 and 15-19 respectively, while almost same proportion (18%) of respondent lie in 35-39 and upper age groups. The percentage of rural (51.5) respondents are higher compared to urban (48.5). Punjab has a higher proportion of respondents and about quarter (24.2%) of the respondents is from Sindh. Respondents with secondary level of education are in a greater proportion 32% while about more than a quarter (27.1) of the respondents are illiterate. The proportion of poorest and richest respondent’s about 18.6% and 24.9% respectively. Whereas the greater number of respondents has access to television and radio compared to newspaper. 97 Out of 100 ever married men are working; the detail description is illustrated in Table 1.

**Table 1: Socio Demographic characteristics of respondents**

|  |  |  |
| --- | --- | --- |
| Covariate | Response | Ever married Men (%) |
| Age | 15-19 | 0.9 |
| 20-24 | 7.1 |
| 25-29 | 15.9 |
| 30-34 | 20.3 |
| 35-39 | 18.8 |
| 40-44 | 18.3 |
| 45-49 | 18.7 |
| Place of residence | Urban | 48.5 |
| Rural | 51.5 |
| Residence by province | Punjab | 34.5 |
| Sindh | 24.2 |
| KPK | 15.9 |
| Baluchistan | 17.6 |
| GB | 7.8 |
| Education status | No education | 27.1 |
| Primary | 17.1 |
| Secondary | 31.9 |
| Higher | 23.9 |
| Wealth index | Poorest | 18.6 |
| Poorer | 18.5 |
| Middle | 17.5 |
| Richer | 20.5 |
| Richest | 24.9 |
| Access to media | No Access to radio | 45.2 |
| Access to radio | 54.8 |
| No Read newspaper | 64.2 |
| Read newspaper | 35.8 |
| No access to TV | 18.4 |
| Access to television | 81.6 |
| Occupation | Not Working | 3.1 |
| Working | 96.9 |

Various questions were asked to the respondents about the use of tobacco, table 2 showing the responses about tobacco use. High proportion (55.1%) of the respondent’s smokes nothing. Whereas 18.6% of the respondents using chewing tobacco. More than two third (71.68%) of the respondents never smoke cigarette and only 28.32% ever married men smoke cigarette.

**Table 2: use of Tobacco by ever married men age 15-49**

|  |  |  |
| --- | --- | --- |
|  | Response (%) | |
| Covariate | No | Yes |
| Smokes cigarettes | 71.68 | 28.3 |
| Smokes pipe | 99.9 | 0.10 |
| Uses chewing tobacco | 81.4 | 18.6 |
| Uses snuff | 99.8 | 0.20 |
| Smokes hukaa/shisha | 97.3 | 2.70 |
| Smokes other | 99.6 | 0.40 |
| Smokes nothing | 44.9 | 55.1 |

Percentage distribution of the total number of cigarettes that respondents used to smoke in last twenty fours demonstrated in Table 3. High proportion (34.1%) of ever married men smoked eighteen and over cigarettes in last twenty fours. Whereas the 18% of the respondents smoked twelve to seventeen cigarettes in last twenty fours.

**Table 3: Number of cigarettes consume by the respondents in last 24 hours**

|  |  |
| --- | --- |
| Frequency | % |
| 0-5 | 18.6 |
| 6-11 | 29.3 |
| 12-17 | 18.0 |
| 18 and over | 34.1 |

**Bivariate analysis:**

Under the bivariate analysis the findings revealed that the early age groups of the respondents did not smoke cigarettes i.e. 89.7% of the ever married men with age group 15-19 years old did not smoke. As age increases, the proportions of smoker also increase. The place of residence by urban rural found to be insignificant while the place of residence by province found to be significant. Higher number of respondents smoke cigarettes lived in Baluchistan (37.6%) followed by Punjab, GB, Sindh and KPK. Educational status found to be positively associated with smoking. Newspaper and radio are found to be significant as well as wealth index. Whereas the smoking and occupation of ever married men are independent. The detail explanations of bivariate analysis are illustrated in Table 4.

**Table 4: Cross tabulation of outcome variable versus explanatory variables**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Smokes cigarettes | |  | | |
|  | | Ever married men | | |
| Covariate | Response | No | Yes | P-value |
| Age | 15-19 | 89.7% | 10.3% | 0.000 |
| 20-24 | 82.1% | 17.9% |
| 25-29 | 77.7% | 22.3% |
| 30-34 | 70.7% | 29.3% |
| 35-39 | 73.0% | 27.0% |
| 40-44 | 66.0% | 34.0% |
| 45-49 | 67.1% | 32.9% |
| Place of residence by region | Punjab | 68.9% | 31.1% | 0.000 |
| Sindh | 76.8% | 23.2% |
| KPK | 78.9% | 21.1% |
| Baluchistan | 62.4% | 37.6% |
| GB | 73.2% | 26.8% |
| Residence | Urban | 71.7% | 28.3% | 0.980 |
| Rural | 71.7% | 28.3% |
| Educational level | Illiterate | 65.8% | 34.2% | 0.000 |
| Primary | 71.3% | 28.7% |
| Secondary | 71.9% | 28.1% |
| Higher | 78.3% | 21.7% |
| Read newspaper | No | 68.6% | 31.4% | 0.000 |
| Yes | 74.2% | 25.8% |
| Listen radio | No | 73.1% | 26.9% | 0.018 |
| Yes | 69.1% | 30.9% |
| Listen TV | No | 74.4% | 25.6% | 0.063 |
| Yes | 71.1% | 28.9% |
| Wealth quintile | Poorest | 71.9% | 28.1% | 0.000 |
| Poorer | 69.0% | 31.0% |
| Middle | 69.5% | 30.5% |
| Richer | 68.3% | 31.7% |
|  | Richest | 77.8% | 22.2% |
| Respondent occupation | No working | 77.5% | 22.5% | 0.214 |
| Working | 71.5% | 28.5% |

**Binary logistic regression:**

Factors along with odds ratio are showed in table 6, model revealed that the early age groups (20-24 and 25-29) lees likely to smoke [OR=0.451 ,0.584] as compared to upper age groups. The places of residence by region are found to be significant model revealed that the ever married men resident of Baluchistan smoke cigarettes 1.576 times more than their counterparts who lived in GB. Education and smoking have inverse relationship. Ever married men with no education have 1.604 times more smoke cigarettes as compared to with higher level of education. The respondents reading newspaper and access to radio have less likely to smoke cigarettes [OR=0.931 and OR=0.80] respectively compared to their counterpart having no access to media. Poorer, middle and richer have smoke cigarettes 1.403, 1.396 and 1.525 times more than their counterpart richest respectively.

**Table 6: Binary Logistic Regression analysis about smoking**

|  |  |  |  |
| --- | --- | --- | --- |
| Smoke cigarettes | | | |
| Variables | | Category | Ever married men |
|  | 15-19 | | 0.229 |
|  | 20-24 | | 0.451\*\*\* |
| Age (ref 45-49) | 25-29 | | 0.584\*\*\* |
|  | 30-34 | | 0.882 |
|  | 35-39 | | 0.78 |
|  | 40-44 | | 1.035 |
| Education level (ref Higher) | illiterate | | 1.604\*\* |
| primary | | 1.36\* |
| secondary | | 1.362\*\* |
| Read Newspaper( ref no) | Yes | | 0.931\* |
| Has Radio(ref no) | Yes | | 0.80\* |
| Place of residence by region (ref GB) | Punjab | | 1.27 |
| Sindh | | 0.928 |
| KPK | | 0.749\* |
| Baluchistan | | 1.576\*\* |
| Wealth index (ref Richest) | Poorest | | 1.138 |
| Poorer | | 1.403\* |
| Middle | | 1.396\* |
| Richer | | 1.525\*\*\* |

Key: values represent odds ratio; ref implies reference category; \*\*\*p<0.001, \*\*p<0.01, \*p<0.05 and GB= Gilgit Baltistan

**Discussions and conclusion:**

This study found out that more than two third (71.68%) of the respondents never smoke cigarette. Chewing tobacco was commonly (18.6%) used. Number of cigarettes consumed by the respondents in last 24 hours varies; high proportion (34.1%) of the respondents consumed eighteen and over cigarettes, whereas the 18% of the respondents consumed twelve to seventeen cigarettes. The association of smoking is well documented in this study, the findings was consistent with the previously study conducted by the National Health Survey of Pakistan[18](#_ENREF_18). The proportion of cigarette smoker’s increase as age increased in our findings. Historical study showed that the use of tobacco smoking increases with an increase in age, particularly in rural areas of Pakistan [19](#_ENREF_19),[18](#_ENREF_18). The identical results yielded in Sindhi males from rural areas[20](#_ENREF_20). It is well established that cigarette smoking varies by location and geographical area of residence[21](#_ENREF_21). Smoking trend between both gender increases at the rate of 1.26 per decade in Northern areas of Pakistan [22](#_ENREF_22). Among low and middle income countries, Ethiopia had lowest prevalence rate of 7.4% and Latvia had the highest (65%) [23](#_ENREF_23). The prevalence of smoking among adolescence decreased between 2002 to 2010 in some European countries, namely Germany, Netherland, Belgium and France and increases in Croatia, but remained constant for Italy and Hungary [24](#_ENREF_24). The smoking trend is increasing in some Asian countries[25](#_ENREF_25), [26](#_ENREF_26), [27](#_ENREF_27), [28](#_ENREF_28). However, in Kuwait, the prevalence is highest at early adult ages. More than half of them quit smoking habit till reaching at 29 years of age [29](#_ENREF_29). The prevalence of smoking is highest for young adults than older ones in Australia, U.S and Korea [30](#_ENREF_30). Among provinces, the respondents from Baluchistan are more likely to smoke in our findings, the reason might be the province has low status in term of health, education gender equality indicators, economic development and physical status comparing with provinces and Pakistan taken as whole. Previous study [18](#_ENREF_18) showed much variation among different ethnic groups in Pakistan. The prevalence rates of smoking were highest in Sandhi’s. However Pashtuns were fond of chewing/snuff tobacco rather than cigarette smoke. The importance of education is acknowledged globally, better educated individuals indeed to have a better health and a lower risk of mortality [31](#_ENREF_31).Our findings revealed that inverse association exist between educational attachment and smoking. Higher educational attainment increases the probability of smoking cessation [32](#_ENREF_32).Pakistan has poor literacy rate [20](#_ENREF_20); nearly half of the males were illiterate [33](#_ENREF_33). A study showed in Rawalpindi a major city of Pakistan, education reduce the smoking habit [34](#_ENREF_34).Identical results yielded by National Health Survey of Pakistan [18](#_ENREF_18). In Dhaka, people with low education more likely to smoke [35](#_ENREF_35). Along with education, the mass media coverage become an important tools for stopping the smoking behaviour particularly television [2](#_ENREF_2), [36](#_ENREF_36). The newspaper coverage sometimes promote the smoke free bars and restaurants [37](#_ENREF_37). Higher educated groups were more effected through mass media campaign than lower educated groups [38](#_ENREF_38). The U.S based tobacco industry target on young people because they can influence them smoothly[39](#_ENREF_39). Almost one fourth of urban Nepali people saw cigarette advertisement frequently [40](#_ENREF_40) The chance of adopting the smoking habit was much higher among these people. The Indian men was found more addictive who watched television daily [41](#_ENREF_41). The increase in the price of cigarette with media campaign significantly reduced the smoking intensity in Mauritius and Australia [42](#_ENREF_42), [43](#_ENREF_43). The campaign may have short term influence due to parallel marketing by tobacco industry [44](#_ENREF_44), which neutralize the effort of quitting. Tobacco companies spend tens of billions of dollars each year on tobacco advertising, promotion and sponsorship[45](#_ENREF_45). Our finding revealed that positive association between wealth index and cigarette smoking. A study in Serbia demonstrating that richest men were more likely to quit smoking than poorest men[46](#_ENREF_46). A cross national gender study revealed that smoking is inversely associated with wealth and education among three countries namely Australia, U.S and Korea[30](#_ENREF_30). In India, the richest people were less likely to consume tobacco than poorer [47](#_ENREF_47).

Finally it is concluded that those with lower educational attachment, people belong to less develop areas with low socio economic status, increase in age and sufficient lack of media access are more prone to cigarette smoking. Potential struggles are mandatory where the low literacy rate and insufficient media coverage particularly in remote areas, so that various direct health harm caused by cigarette smoking can be reduced. Government should completely ban the smoking encouraging advertisement. The availability of these outcomes can be emerging in anti-tobacco management and control.

**Study limitations:**

This study based from secondary data set taken from PDHS, in which a few limited question asked about smoking and other form of tobacco use to a small proportion of ever married men. The data lacked other important variables like smoking related several kind of dieses, treatment and prevention which does not allow establishing temporal relationship on the basis of these findings. This study goal was to only pinpoint the socio demographic factors that might be helpful in anti-tobacco seeking measures and mechanism.

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