Tobacco use is considered as a global issue and a major risk factor that is related to diseases, particularly noncontagious ones. The epidemiologic literature worldwide points to the positive correlation between tobacco use and the incidence rate of noncontagious diseases (1). Every year, tobacco use accounts for more than 8 million mortalities (2). Approximately 80% of these mortalities occur in low- to moderate-income countries (3). Moreover, tobacco products are addictive and a prelude to drug abuse and other illegal substances.

Tobacco use behaviors are also on the rise in Iran, especially smoking cigarettes and hookahs among adults (4). Despite preventive measures, the rate of smoking cigarettes by adults has shown no decrease in the past two decades (5). According to the CASPIAN study (2011-2012), 5.9% of Iranian adults (6-18 years) used tobacco products in their life, which is higher than that in western and other middle-eastern countries (6).

Tobacco use is currently a major concern for the healthcare system in Iran. The controlling of tobacco use needs an effective plan (7, 8) and serious attempts to lower the rate of associated diseases (9) since many diseases are induced by tobacco use (4). It seems that an effective strategy, before any intervention, would be to prevent and manage tobacco use by finding the depth and range of the problem and its correlates. This is how the correlates of tobacco use are better known.

Correlates of Tobacco Use: A Population-Based Study in Southern Iran

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Abstract

**Background:** Around the globe, tobacco use is a major risk factor that is associated with diseases, especially noncontagious diseases. Iran has not been an exception and has witnessed an exponential growth in tobacco use. This rising trend motivated the present study to explore the correlates of tobacco use in the south of Iran in Hormozgan Province.

**Materials and Methods:** This cross-sectional study was carried out in 2017 on 4,872 residents of Hormozgan who were selected through multi-stratified cluster sampling. The data were collected by researcher-made questionnaires which were analyzed in SPSS 19. A logistic regression analysis was run to find the foremost correlates of tobacco use.

**Results:** The findings indicated that 1,085 (22.3%) of the sample used tobacco. Based on the obtained data, 25.1% and 20.3% of participants were males and females, respectively. The major correlates of tobacco use were found to be masculinity, higher age (P < 0.001), citizenship (P < 0.001), and low education level (P < 0.001). The unemployed or those with simple jobs showed a higher tendency to use tobacco compared to the more professional (P < 0.001). Finally, single participants demonstrated a higher rate of using tobacco in comparison with married ones (P < 0.001).

**Conclusion:** Significant differences were found between rural and urban residents, those with low and high education levels, men and women, the unemployed and employed participants, as well as the single and married ones. Accordingly, considering effective factors accounting for these divergences and designing effective interventions can help moderate the effect of these factors in controlling tobacco use in the future in Hormozgan.

**Keywords:** Predictors, Smoking, Hormozgan
Accordingly, more epidemiologic research can be developed and implemented to recognize the correlates of tobacco use before any effective intervention (10). Additionally, there are significant differences within and between geographical areas in terms of the prevalence of tobacco use (11). Various geographical areas have different risk factors due to a variety of cultures and locations. Thus, a need is felt for unique investigations in different geographies. It is essential to take into account geographical diversities in planning preventive and political plans to fight back tobacco use in Iran (12).

In this regard, the present study sought to explore the predictors of tobacco use in Hormozgan Province in the south of Iran. The main privilege of this study is that it provides data to enrich policies to fight tobacco use and plan to prevent and reduce its use for local health staff and policy-makers. Among the other long-term functional goals of this study are a reduced cost of chronic diseases caused by tobacco use and a higher level of health and quality of life in the community.

Materials and Methods

Design and Setting

This cross-sectional, descriptive, and analytical study was conducted in 2015 aiming at exploring the socio-demographic predictors of tobacco use in Hormozgan Province. The sample size was decided via Cochran’s formula and the existing literature (21%) to be 1592 (95% CI, precision =0.02). Then, to increase the quality of the collected data, this number was multiplied by 3 and then approximated as 5000. Eventually, 4872 participants were practically recruited after considering the inclusion and exclusion criteria.

A multi-stage sampling method was employed to select a representative sample of the whole province. First, the whole province was divided into two urban and rural strata since 47% of the whole province population were urban residents while 53% of them were rural residents. Then, a proper size was selected from each stratum according to the probability proportional to size. Therefore, from a sample of 5000, 2350 and 2650 cases belonged to urban and rural strata, respectively. Next, the urban and rural strata were divided into 12 urban and 12 rural regions in accordance with the number of constituent counties, respectively. Finally, an eligible number of clusters and samples was set for each region.

Data Collection

Initially, it is required that the urban healthcare centers in the target place or those in rural areas be fully representative of the whole province for selecting the sample to be included in each cluster. Thus, a list of all households within the clusters was prepared by those implementing the project and then provided to the researchers, along with the name of the place for initiation. The researchers visited the region and the selected clusters and households. Next, a list of all households usually living together was made from whom one participant was finally selected for an interview. After the completion of the interview, the next household was visited and the process was continued until obtaining the required data. If the selected participant was absent, the researcher visited some other time, otherwise, the interview was conducted with another household until reaching the required sample size.

Inclusion and Exclusion Criteria

The inclusion criterion was to be a local resident of Hormozgan or to have lived in the city for at least a year for immigrants. On the other hand, those who were unwilling to participate (despite being told about the significance of research and its purpose) and those who found it hard to communicate their ideas were excluded from the study.

Instrumentation

The data collection instrument was a researcher-made questionnaire based on a review of the related literature on the topic of interest. The questionnaire contained socio-demographic and behavioral information about tobacco use. The demographic information enquired about participants’ age, gender, marital status, education, and occupation. The second part asked about their use of tobacco products including cigarettes, hookahs, traditional pipes, pipes, or chewing tobacco, which were considered as dependent variables.

To substantiate the content validity of the questionnaire, a panel of experts were consulted, and their comments were used to revise the questionnaire, add something to it, or remove certain contents. Moreover, the test-retest method was applied to substantiate reliability.

Having gained the required permission from the Deputy of Research at Hormozgan University of Medical Sciences and met those in charge, the researcher visited the participants and asked for a written letter of informed consent. The participants were ensured of their anonymity and the confidentiality of the information. For the literate, the questionnaire was filled out as self-reports. For the illiterate individuals, interviews were held, and the questions were read out loud and upon hearing the answers, the interviewer jotted them down.

Statistical Analysis

SPSS19 was employed to analyze the data. Frequency and percentage were used for descriptive statistics, as well as the odds ratio, chi-square test, binary regression analysis for inferential statistics. The significance level was set at $P<0.05$. 

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Results
Among a total number of 4872 participants completing the questionnaires, 1085 (22.3%) cases were tobacco users at the time of the study. Tobacco use was detected to prevail among 25.1% of male and 20.3% of female participants. The other demographic information is summarized in Table 1.

Statistically significant differences were found across genders in terms of tobacco use ($P=0.0001$) and across the place of residence because tobacco use prevailed among 559 (23.06%) of urban and 518 (21.0%) of rural residents ($P=0.032$). In addition, 30.0% of the illiterate demonstrated to be tobacco users while 26.4% of the less educated individuals used tobacco compared to the highly educated ones. Thus, the difference between the education levels was statistically significant ($P=0.0001$). As regards occupation, a higher prevalence of tobacco use was observed among taxi drivers (34.0%), simple workers (31.9%), and businessmen (29.0%), respectively ($P=0.0001$). Regarding age, 23.4% of the participants older than 30 were tobacco users at the time of the study (Table 2).

Several socio-demographic variables were correlated with tobacco use. When the risk factors of tobacco use were controlled in logistic regression models, Variables that $P<0.25$ in bivariate logistics and to select the candidate variables for multiple linear regression analysis, the major correlates of tobacco use were the type of occupation including unemployed (OR = 2.36, 1.87-2.96), taxi driver (OR = 2.25, 1.46-3.46), simple worker (OR = 2.14, 1.6-2.70), business (OR = 1.954, 1.45-2.63), and the age above 30 (OR = 1.80, 1.31-2.46), urban life (OR = 1.56, 1.34-1.81), a low level of education (OR = 1.45, 1.15-1.82), and being illiterate (OR = 1.41, 1.17-1.70). No significant correlation was found for other demographic information including the administrative officer (OR = 1.11, 0.82-1.49), a moderate level of education (OR = 1.25, 0.89-1.41), and masculinity (OR = .93, .83-1.17). The marital state showed to be an effective protective factor involved in tobacco use.

Discussion
The present findings revealed that urban lifestyle, low education, unemployment, higher age, and marital status were the main predictors of tobacco use in Hormozgan province.

It was found that tobacco use was more prevalent among men compared to women. The present findings are in line with those of other studies in Iran and abroad (13, 14). Contrary to the present findings, tobacco use showed to be more common among women in several other studies (15, 16). In some other research, no statistically significant difference was observed between men and women in terms of tobacco use (17). These divergent findings can be explained by cultural and geographic differences and gender distribution, features of the target population, type

### Table 1. Distribution of Tobacco Use Based on Demographic Information

| Socio-demographic Factors | Characteristics | Tobacco Use: Yes, N (%) | Tobacco Use: No, N (%) | Total N |
|---------------------------|-----------------|-------------------------|------------------------|---------|
| General                   |                 | 1077 (22.3)             | 3750 (77.7)            | 4827    |
| Gender                    | Male            | 499 (25.1)              | 1488 (74.9)            | 1987    |
|                           | Female          | 578 (20.4)              | 2262 (79.6)            | 2840    |
| Age                       | <29 year        | 1025 (23.4)             | 3355 (76.6)            | 4380    |
|                           | ≥30 year        | 52 (11.6)               | 395 (88.4)             | 447     |
| Marital status            | Single          | 36 (12.9)               | 243 (87.1)             | 279     |
|                           | Married         | 1041 (22.9)             | 3507 (77.1)            | 4548    |
|                           | Divorced        | 17 (26.6)               | 47 (73.4)              | 64      |
|                           | Widowed         | 88 (24.9)               | 265 (75.1)             | 353     |
| Education                 | Illiterate      | 372 (30.0)              | 868 (70.0)             | 1240    |
|                           | Elementary school | 657 (26.4)         | 1832 (73.6)            | 2489    |
|                           | Junior high school | 816 (25.6)     | 2369 (74.4)            | 3185    |
|                           | Higher          | 261 (15.9)              | 1381 (84.1)            | 1642    |
| Occupation                | Unemployed      | 157 (34.1)              | 304 (65.9)             | 461     |
|                           | Simple worker   | 169 (31.4)              | 370 (68.6)             | 539     |
|                           | Construction Worker | 8 (22.2)      | 28 (77.8)              | 36      |
|                           | Driver          | 36 (31.9)               | 77 (68.1)              | 113     |
|                           | Clerk           | 77 (17.5)               | 364 (82.5)             | 441     |
|                           | Business        | 84 (29.0)               | 206 (71.0)             | 290     |
|                           | Professional    | 12 (36.4)               | 21 (63.6)              | 33      |
|                           | House worker    | 489 (18.4)              | 2173 (81.6)            | 2662    |
of tobacco product, and the sample size. This finding can be explained by the fact that men are globally more prone to risky habits and further tend to ignore the serious threats of tobacco abuse (18). Especially in conservative communities, where men are more controlled than women, tobacco is less available to women compared to men. Moreover, cigarette smoking is generally rejected for women in Islamic countries (19).

Based on the findings, urban life was a major predictor of tobacco use. In line with the present findings, tobacco use was more prevalent in urban residents compared to rural ones in another research (20). Contrary to these findings, another study showed that more than half of the rural participants maintained that using tobacco was acceptable at home (21). In addition, living in rural areas was reported to increase the chances of cigarette smoking by twice as much (22). The results of one study represented no significant correlation between the place of residence and tobacco use (23). These contradictory findings can be explained by cultural and geographic differences and demographic distribution.

In general, tobacco use was more common among the illiterate or those of a low education compared to the highly educated individuals. The present findings showed that higher education was associated with less tobacco use. With this respect, a body of research demonstrated that low education was the main reason for a higher tendency to tobacco use (24, 25). Conversely, some studies reported no effect of the education level on protection against tobacco use (14, 26). This contradiction can be partly due to the level of questions within the questionnaire, level of education, and sociocultural features across studies. One probable reason can be that lower education is followed by lower health literacy and then poor recognition of the real risks and outcomes of tobacco use (27).

Our findings indicated that tobacco use is more

| Factors            | Tobacco Yes N (%) | Tobacco No N (%) | OR (95%CI)       | P value |
|--------------------|------------------|-----------------|-----------------|---------|
| Gender             |                  |                 |                 |         |
| Male               | 499 (52.1)       | 1488 (47.9)     | 1031 (1.14-1.50) | P<0.001 |
| Female             | 578 (20.4)       | 2262 (79.6)     | 1               |         |
| Age                |                  |                 |                 |         |
| <29 year           | 1025 (23.4)      | 3355 (76.6)     | 2.32 (1.72-3.12) | P<0.001 |
| ≥30 year           | 52 (11.6)        | 395 (88.4)      | 1               |         |
| Marital Status     |                  |                 |                 |         |
| Single             | 36 (12.9)        | 243 (87.1)      | 0.49 (0.34-0.71) | P<0.001 |
| Married            | 1041 (22.9)      | 3507 (77.1)     | 1               |         |
| Education          |                  |                 |                 |         |
| Illiterate         | 372 (30.0)       | 868 (70.0)      | 1.74 (1.51-2.03) | P<0.001 |
| Any level of education | 705 (19.7) | 2882 (80.3)    | 1               |         |
| Elementary school or junior high school | 657 (26.4) | 1832 (73.6)    | 1.63 (1.42-1.88) | P<0.001 |
| High school or higher | 420 (18.0) | 1918 (82.0)    | 1               |         |
| High school        | 816 (25.6)       | 2369 (74.4)     | 1.82 (1.56-2.13) | P<0.001 |
| Higher             | 261 (15.9)       | 1381 (84.1)     | 1               |         |
| Occupation level   |                  |                 |                 |         |
| Unemployed         | 157 (34.1)       | 304 (65.9)      | 1.93 (1.57-2.37) | P<0.001 |
| Employed           | 920 (21.1)       | 3446 (78.9)     | 1               |         |
| Simple worker      | 169 (31.4)       | 370 (68.6)      | 1.70 (1.39-2.07) | P<0.001 |
| Other jobs         | 908 (2102)       | 3380 (78.8)     | 1               |         |
| Construction worker | 8 (22.8)        | 370 (68.6)      | 0.99 (0.45-2.19) | P=0.588 |
| Other jobs         | 1069 (22.3)      | 3722 (77.7)     | 1               |         |
| Driver             | 36 (31.9)        | 77 (68.1)       | 1.65 (1.10-2.46) | P=0.011 |
| Other jobs         | 1041 (22.1)      | 3673 (77.9)     | 1               |         |
| Clerk              | 77 (17.5)        | 364 (82.5)      | 0.71 (0.55-0.92) | P=0.005 |
| Other jobs         | 1000 (22.8)      | 3386 (77.2)     | 1               |         |
| Business           | 84 (29.0)        | 206 (71.0)      | 1.45 (1.12-1.89) | P=0.004 |
| Other jobs         | 993 (21.9)       | 3544 (78.1)     | 1               |         |
| Professional       | 12 (36.4)        | 21 (63.6)       | 2.00 (0.98-4.08) | P=0.047 |
| Other jobs         | 1065 (22.2)      | 3729 (77.8)     | 1               |         |
| House worker       | 489 (18.4)       | 2173 (81.6)     | 0.60 (0.52-0.69) | P<0.001 |
| Other jobs         | 588 (27.2)       | 1577 (72.8)     | 1               |         |

Note: OR: Odds ratio; CI: Confidence interval.
prevalent among the unemployed or those with simple jobs than the more professional or those with higher incomes. It seems that the employed individuals have less leisure time, and thus use tobacco less in their free time. A review study also mentioned unemployment and free time as the reasons for tobacco use (28). This finding can be explained by the fact that people occasionally lack a proper job, leading to economic problems, and thus cannot have healthy leisure. As a result, they tend to use tobacco products. In this regard, another study reported the lack of job opportunities and abundant economic challenges as the underlying reasons for a tendency to consume tobacco products (29).

The prevalence of tobacco use was higher among those above 30 compared to those below 30. Consistent with this finding, other studies reported the increasing rate of tobacco use with higher age (4, 30, 31). Contrarily, some other works indicated a higher tendency to tobacco use among youngsters (13, 32, 33). In their study, Gulian et al found that older age groups have more tendency to use tobacco, and quitting tobacco use at this age is undesirable for them (34). This difference can be partly due to the features of the target group and age groups, as well as different cultural and geographical conditions. The present finding can be explained by the fact that older generations might tend to continue using tobacco in forthcoming years for reasons such as an inability to work, less work pressure and responsibility, loneliness, more free time, and a positive attitude toward tobacco use. Marital status was a protective factor in tobacco use. The findings showed that tobacco use was less prevalent among married individuals. Another research reported that perceived familial norms in married ones can be effective in their intention to cease tobacco use (35). Furthermore, in another research, married women were found to be more encouraged to cease tobacco (36). In general, the divorced and widowed experience more emotional and social pressures due to the loss of their spouse, thus they retreat to tobacco use to relieve their mind.

**Strengths and Limitations of Study**

One limitation of this study was the self-reporting nature of estimations. More accurate findings can be obtained from biochemical tests such as measuring the nicotine serum level of blood which is a more reliable indicator. This study was conducted in Hormozgan Province and the results might be ungeneralizable to other geographical areas. Additionally, the present research was demographic and explored the prevalence and distribution of tobacco use and its correlates in a population of a different cultural background. These findings can provide useful and practical information to evaluate and revise planning and policies to control tobacco use in this region and Iran for authorities.

**Conclusion**

Overall, significant differences were found in the rate of tobacco use between urban and rural residents, educated and uneducated, male and female, employed and unemployed, and single or married participants. Accordingly, taking the effective factors in these differences into account and developing effective interventions can be useful for controlling tobacco use in the future in Hormozgan.

**Authors’ Contributions**

HF designed the study, supervised data collection, analyzed the data, and reviewed the manuscript. MH and AM designed the study, collected data, analyzed the data, drafted the manuscript, and critically reviewed the manuscript. SD designed the study and reviewed the manuscript. AM analyzed the data and reviewed the manuscript. FZ reviewed the manuscript, and all authors read and approved the final manuscript.

**Conflict of Interest Disclosures**

None.

**Ethical Statement**

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