DETERMINATION OF THE RELATIONSHIP BETWEEN CIGARETTE AND SMOKELESS TOBACCO (MARAS POWDER) USE AND DEPRESSION/ANXIETY

HAMIT SIRRI KETEN1, OZGUR ERSOY2, YILMAZ SATAN3, SONER OLMEZ4, HUSEYIN UCER5, MERVE SAHIN6, MUSTAFA CELIK7
1Department of Family Medicine, Onikusubat Community Health Center, Kahramanmaras - 2Department of Public Health, Medical Faculty, Kahramanmaras Sutcu Imam University, Kahramanmaras - 3Department of Psychiatry, Medical Faculty, Necmettin Erbakan University, Konya - 4Department of Family Medicine, Medical Faculty, Kahramanmaras Sutcu Imam University, Kahramanmaras, Turkey

ABSTRACT

Introduction: Tobacco consumption is still a serious cause of mortality and morbidity worldwide. Besides cigarette, use of smokeless tobacco is also high. This study aims to evaluate the symptoms of depression and anxiety among people using cigarette or local smokeless tobacco, Maras powder, and those not consuming tobacco products.

Materials and methods: This study was conducted in 20 coffee houses in Kahramanmaras city on 353 voluntary males aged between 18 and 64 years. One hundred and thirty one people consuming Maras powder, 98 people consuming cigarette and 124 controls with no history of tobacco product usage were enrolled in the study. The sociodemographic characteristics, the attitudes of Maras powder and cigarette usage, and the scores of Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI) were recorded.

Results: The mean BAI scores were 9.64±7.70, 10.45±9.04, and 6.87±6.51 for Maras powder group, cigarette group and the control group respectively. The mean BAI scores were significantly higher in Maras powder and cigarette groups compared to control group (p=0.002). It was determined that the mean scores of BAI were similar between Maras powder and cigarette groups (p=0.712). The mean BDI scores were 7.41±6.96, 7.51±8.16, and 5.30±5.24 for Maras powder group, cigarette group and the control group respectively. The mean BDI scores were significantly higher in Maras powder (p=0.037) and cigarette groups (p=0.045) compared to control group. It was determined that the mean scores of BDI were similar between Maras powder and cigarette groups (p=0.994).

Conclusion: Obtained findings showed that depression and anxiety scores of people consuming Maras powder and cigarette were significantly higher compared to those does not use tobacco products.

Keywords: Smoking, addiction, anxiety/anxiety disorders, depression, Quality of Life.

Introduction

Tobacco consumption remains to be the most important cause of mortality and morbidity worldwide1. While the number of deaths related to tobacco was 3 million in 1993, it is expected to reach 8.4 million by the year 20202. According to data from World Health Organization, 22% of the individuals over 15 years worldwide and 27.1% in Turkey (41.5% of the male and 13.1% of the female) are estimated to be cigarette users3,4.

Among the tobacco products, cigarette is the most commonly consumed, however use of smokeless tobacco is also quite high. The rate of usage of smokeless tobacco products is 3.2% in America and 21% among males and 3.9% among females from Sweden5,6. In Turkey (Kahramanmaras city) 16.8% of total population (25.1% of males and 1.4% of females) and 9.4% of the individuals with chronic diseases (16.0% of male and 1.1% of female) consume Maras powder (MP)7,8. MP is a kind of smokeless tobacco which is prepared by powdering the leaves of the smoke plant, Nicotiana rustica linn and mixing it with ash in different ratios. MP is used by wrapping the powder within a paper and sucking between the gingiva and the lower lip9,10.

In an epidemiological study, it was reported that the people with psychopathological problems smoke two times more frequently than others11. It
was stated that people with depression and anxiety disorder smoke more commonly, had higher levels of nicotine addiction, and lower levels of quitting smoking success compared to normal population\(^{(12)}\). Among smoking people, psychiatric diseases (mood disorders, anxiety disorder) are more prevalent compared to others\(^{(13,14)}\). In America, the frequency of smoking was 43% among individuals with depression, while it was 22% among healthy ones\(^{(15)}\). In a study from Turkey, it was found that among the people with psychiatric problems, 31.5% used cigarette and 10.1% used MP while the usage rates of cigarette and MP was 25% and 5.6% among the individuals from the control group respectively\(^{(16)}\).

In the present study we aimed to evaluate the prevalence of depression and anxiety disorder between people consuming cigarette and MP and the ones not consuming tobacco products.

**Material and methods**

This study was conducted in Kahramanmaraş city, which is a province in the South region of Turkey with an approximate population of one million, between dates 01.02.2014 and 01.04.2014. Five hundred males aged 18-64 years from 20 coffee houses of Kahramanmaraş city center were interviewed prior to study. Of these, 385 accepted to participate in the study and gave written consents. Of these, 25 were excluded due to alcohol and substance abuse and 7 were excluded due to psychiatric diseases. In order to achieve homogeneity for study population females were not included in the study since the use of Maras powder is extremely rare among females because of cultural characteristics in Kahramanmaraş. The individuals included in or excluded from the study stated that they had not ever have diagnosis of depression or anxiety disorders. Three hundred and fifty three males were taken in the scope of the study. In accordance with Helsinki Declaration, ethical approval was obtained from Medical Faculty of Kahramanmaraş Sutcu Imam University.

One hundred and thirty one individuals who have been using MP at least 5 times a day for at least 3 years were assigned to the MP group and 98 individuals who have smoked at least for 5 years and at least 5 cigarettes a day were assigned to the cigarette group. One hundred and twenty four people claiming they have never consumed tobacco products at all constituted the control group.

A survey questioning the sociodemographic characteristics and attitudes of MP and cigarette consumption was performed to all participants. Also they were demanded to answer Fagerström Test for Nicotine Dependence (FTND), Beck Depression and Anxiety Scales.

The Beck Depression Inventory (BDI) is used in order to evaluate the risk of depression and to determine the level and severity of depressive symptoms. It is a self-assessment scale consisting of 3 point Likert scale of 21 questions and it was developed by Beck et al\(^{(17)}\). The Turkish adaptation and validity study of the scale was performed by Hisli et al. with a Cronbach’s alpha coefficient of 0.80\(^{(18)}\).

The Beck Anxiety Inventory (BAI) is used to determine the symptoms of anxiety and the severity of them. It is a self-assessment scale consisting of 3 point Likert scale of 21 questions and it was developed by Beck et al\(^{(19)}\). The Turkish adaptation and validity study of the scale was performed by Ulusoy et al. with a Cronbach’s alpha coefficient of 0.93\(^{(20)}\).

The Fagerström Test for Nicotine Dependence (FTND) was developed by Heatherton at al.\(^{(21)}\) and its adaption to Turkish language and validity was proven by Uysal et al with a Cronbach’s alpha coefficient of 0.56\(^{(22)}\). It is a 6 item self-assessment scale consisting of Likert type questions. The scores vary from 0 to 10 and ≤2 points correspond to very low, 3-4 points to low, 5 point to medium, 6-7 points to high, and ≥8 points to high degree of nicotine dependency.

**Statistical analysis**

The analysis of the data was performed using Statistical Package for the Social Sciences (SPSS) 20.0 statistical (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.) program. The mean, frequency and standard deviation were determined. One way analysis of variance (ANOVA) test was used for evaluation of three or more groups. The homogeneity of variance was assessed by Levene’s test. In the conditions where statistical difference was available between groups, post-hoc comparisons were performed by Tukey’s test. The Pearson and Spearman correlation tests were used for the assessment of relationships between parameters. p<0.05 was considered statistically significant.
Results

All of the participants were male with a mean age of 38.71±11.00 (min=18, max=64) years. The mean ages were 38.89±8.99 years, 38.43±12.71 years, and 38.75±11.55 years in MP, cigarette and control groups, respectively. The mean ages were statistically similar within these groups (p=0.951). The marital status (p=0.056), occupation (p=0.470) and the settlement (p=0.923) of the participants of the 3 groups were similar. The educational status (p<0.001) and monthly income (p<0.001) were significantly lower in MP group compared to cigarette and control groups. The sociodemographic characteristics of the participants are reported in table 1.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>variable</th>
<th>Total</th>
<th>control group</th>
<th>Smoking group</th>
<th>Maras powder users group</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age range</td>
<td>18-30</td>
<td>78(22.1)</td>
<td>36(24.2)</td>
<td>32(32.7)</td>
<td>14(12.2)</td>
<td>0.269</td>
</tr>
<tr>
<td></td>
<td>31-40</td>
<td>127(36.0)</td>
<td>47(37.9)</td>
<td>28(28.6)</td>
<td>52(39.7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>41-50</td>
<td>102(28.9)</td>
<td>29(23.4)</td>
<td>20(20.4)</td>
<td>53(40.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>51-64</td>
<td>46(13.0)</td>
<td>18(14.5)</td>
<td>18(14.8)</td>
<td>10(7.6)</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>Married</td>
<td>276(78.2)</td>
<td>97(78.2)</td>
<td>67(68.4)</td>
<td>112(85.5)</td>
<td>0.056</td>
</tr>
<tr>
<td></td>
<td>Single</td>
<td>57(16.1)</td>
<td>20(16.1)</td>
<td>25(25.5)</td>
<td>12(9.2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Divorced</td>
<td>20(5.7)</td>
<td>7(5.6)</td>
<td>6(6.1)</td>
<td>7(5.3)</td>
<td></td>
</tr>
<tr>
<td>Educational status</td>
<td>≤8</td>
<td>235(66.6)</td>
<td>47(37.9)</td>
<td>67(68.4)</td>
<td>121(92.4)</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>≥9</td>
<td>118(33.4)</td>
<td>77(61.2)</td>
<td>31(31.6)</td>
<td>10(7.6)</td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td>Worker</td>
<td>120(34.0)</td>
<td>20(16.1)</td>
<td>28(28.6)</td>
<td>72(55.0)</td>
<td>0.470</td>
</tr>
<tr>
<td></td>
<td>Officer</td>
<td>100(30.6)</td>
<td>63(50.8)</td>
<td>29(29.6)</td>
<td>16(12.2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Retired</td>
<td>43(12.2)</td>
<td>14(11.3)</td>
<td>13(13.3)</td>
<td>14(12.2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tradesman</td>
<td>36(10.2)</td>
<td>5(4.0)</td>
<td>13(13.3)</td>
<td>18(13.7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Student</td>
<td>22(6.2)</td>
<td>9(7.3)</td>
<td>8(8.2)</td>
<td>5(3.8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unemployed</td>
<td>16(4.5)</td>
<td>11(8.9)</td>
<td>3(3.1)</td>
<td>2(1.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Farmer</td>
<td>8(2.3)</td>
<td>2(1.6)</td>
<td>4(4.1)</td>
<td>2(1.5)</td>
<td></td>
</tr>
<tr>
<td>Level of monthly income</td>
<td>&lt;400 Dollars</td>
<td>127(36.0)</td>
<td>27(21.8)</td>
<td>33(33.7)</td>
<td>67(51.1)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>401-800 Dollars</td>
<td>114(32.3)</td>
<td>25(20.2)</td>
<td>34(34.7)</td>
<td>55(42.0)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>801-1200 Dollar</td>
<td>83(24.1)</td>
<td>54(43.5)</td>
<td>22(22.4)</td>
<td>9(6.9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;1201 Dollars</td>
<td>27(7.6)</td>
<td>18(14.5)</td>
<td>9(9.2)</td>
<td>0(0)</td>
<td></td>
</tr>
<tr>
<td>Settlement</td>
<td>Urban</td>
<td>317(89.8)</td>
<td>112(90.3)</td>
<td>87(88.8)</td>
<td>118(90.1)</td>
<td>0.923</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>36(10.2)</td>
<td>12(9.7)</td>
<td>11(11.2)</td>
<td>13(9.9)</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: The sociodemographic characteristics of the participants.

In the present study it was detected that BDI (p=0.003) and BAI (p=0.008) scores of the participants with educational level of ≥9 years were significantly lower than the ones with educational level of ≤8 years. While the BAI scores were significantly higher (p=0.007) among the unemployed, BDI scores were similar with other occupational groups (p=0.058). The BDI and BAI scores of the participants with monthly incomes of <400 dollars were significantly lower than that of the individuals with higher monthly income (p=0.001). The mean BDI and BAI scores of the participants according to sociodemographic features are reported in table 2.

The mean BAI scores were 9.64±7.70, 10.45±9.04, and 6.87±6.51 for MP group, cigarette group and the control group respectively. The mean BAI scores were significantly higher among MP consumers (p=0.012) and smokers (p=0.002) compared to controls. The mean BAI scores of smokers and MP consumers were similar (p=0.712).

The mean BDI scores were 7.41±6.96, 7.51±8.16, and 5.30±5.24 for MP group, cigarette group and the control group respectively. The mean BDI scores were significantly higher among MP consumers (p=0.007) and smokers (p=0.045) compared to controls. However, the mean BAI scores of smokers and MP consumers were similar (p=0.994). The mean BAI and BDI scores of the participants according to groups were presented in table 3.

In our study while a positive correlation (r=0.154, p=0.004) was detected between participants’ age and BAI scores, no correlation was observed between age and BDI scores (r=0.102, p=0.054). There was not a significant correlation between FTND scores and BAI scores (r=0.173, p=0.088), while there was a positive correlation between FTND scores and BDI scores (r=0.269, p=0.007). The association between BDI and BAI scores of the participants and demographic characteristics, MP and cigarette consumption attitudes is reported in table 4.

Fifty five (56.1%) of the smokers and 49 (37.4%) of the MP users admitted having tried to give up them previously. According to FTND, 37 (37.8%) of the smokers had very low, 23 (23.5%) had low, 11 (11.2%) had moderate, 20 (20.4%) had high, and 7 had (7.1%) very high dependence to cigarette. Among smokers, mean number of daily consumed cigarette was 15.63±10.53 and the mean usage period was 16.71±10.51 years. The mean MP usage was 13.57±8.32 times a day and the mean usage period of MP was 15.96±12.71 years.
In the present study the mean BAI scores were higher in the participants aged between 18-30 years, the unemployed and those with lower income and lower educational status. The mean BDI scores were higher in subjects with lower income and lower educational levels. Mihai et al reported that depression had a peak of prevalence between 31-35 years\(^{23}\). It is stated that stable employment and reliable income are important factors for good mental health and that poverty and financial problems are significant socio-economic risk factors for mental health\(^{24}\).

It is clearly seen that socioeconomic status was significantly related to the development of depression and anxiety disorders. In terms of underlying depression and anxiety disorder, special attention should be paid for the cases with lower socioeconomic level applying to healthcare providers.

In cross sectional studies\(^{25,26}\), it was reported that 30% of the patients with depression and 60% of the patients who have had depression at any time of their lives were smokers or had smoked previously\(^{27}\). In America, the rate of smoking was...
43% among the individuals with depression while it was 22% among healthy individuals\(^{(15)}\). A study by Orhan et al. reported that the individuals with psychiatric disorders consumed cigarette and MP in a significantly higher ratio compared to healthy individuals of the control group\(^{(16)}\). In the literature, it was stated that smokers had depressive episodes more frequently and had the idea and attempts for suicide more commonly than nonsmokers\(^{(26,29)}\). In a study by Saatçioğlu et al., the mean Hamilton Depression Scale scores were found to be higher among smokers compared to normal population\(^{(30)}\).

In our study the mean BDI score was significantly higher in MP users and smokers compared to the controls. The mean BDI scores of MP users and smokers were similar. As reported in the literature, our study also revealed a significant relationship between depression symptoms and consumption of tobacco products. This result indicates that the psychiatric evaluation of the smokers is of great importance when treatment of smoking cessation is initiated.

In the literature some pathways explaining the relationship between depressive disorder and nicotine addiction were defined. Various neurotransmitters such as glutamate, serotonin and dopamine were shown to take role in both nicotine addiction and mood regulation\(^{(31,32)}\). When the tobacco product is consumed, nicotine is fastly distributed to the brain from the lungs, interacts with high-affinity nicotinic acetylcholine receptors (nAChRs) and increases a rapid discharge of various neurotransmitters especially the pulsatile release of dopamine from mesolimbic system\(^{(33,34)}\). In clinical trials antidepressants were found to be effective in treatment of nicotine addiction in mood changes and depression related to cigarette. Bupropion was approved for treatment of nicotine addiction by the FDA. This is attributed to noncompetitive nicotinic receptor antagonism of bupropion and the effect of dopaminergic activity on pleasure and reward center of mesolimbic system\(^{(35,36)}\).

It was shown that anxiety disorders were seen in a higher frequency in smokers than the normal population. In many studies it was reported that anxiety disorder was 1.5-3 times more common among smokers compared to non-smokers\(^{(37,38)}\). In a study, it was found that mean Hamilton Anxiety Scale scores were significantly higher among smokers than nonsmokers\(^{(30)}\). In our study, we found BAI scores to be significantly higher in MP users and smokers compared to controls.

The mean BAI scores of smokers and MP users were similar. Both in our study and the other studies, it was determined that the anxiety symptoms were more prevalent among users of tobacco products than the normal population. To evaluate the anxiety status of the patients who will begin a cigarette cessation program and to develop preventive health policies for this situation is an important step for the campaign against tobacco products.

Different mechanisms explaining the relationship between anxiety and nicotine addiction were proposed. It is reported that the primary psychoactive substance in tobacco, nicotine interacts in many pathways of the brain with nAChRs. The anxiolytic effects of nicotine are attributed to blockade of GABA by the nicotinic receptors of GABAergic neurons\(^{(39,40)}\).

In our study it was revealed that there was no significant association between FTND scores and mean BAI scores and there was a weak correlation between FTND scores and mean BDI scores. In the study by Saatçioğlu et al it was reported that there was no significant correlation between FTND and Hamilton Anxiety Scale scores of smokers. Besides they detected weak but significant correlation between FTND scores and depression\(^{(30)}\). Our study is compatible with the literature.

As for the limitations of the present study; the fact that the study was performed on males only is an important limitation. Also to assess the symptoms of depression and anxiety by scales and that these scales are based on self-assessment are other limitations of the study.

Conclusion

We revealed that the individuals using MP and cigarette have higher scores of depression and anxiety. In treatment of nicotine addiction, the risk of underlying depression or anxiety before or during the treatment should be considered. Furthermore, this issue needs to be taken into account during fight against tobacco products. Development and implementation of preventive health policies based on multidisciplinary approach will be helpful in talking this public health problem.
References


Determination of the relationship between cigarette and smokeless tobacco (Maras Powder)...

Acknowledgement
This manuscript was presented as an oral presentation at the 13th National Congress of Turkish Family Medicine, Antalya, Turkey, on 23–27 April 2013.


37) Johnson EO, Breslau N. Is the association of smoking and depression a recent phenomenon? Nicotine & Tobacco Research 2006; 8: 257-63.


Corresponding author
Dr. HAMIT SHRIR KETEN
Onikisubat Community Health Center, Department of Family Medicine
TR-46050 Kahramanmaras
(Turkey)