ASSOCIATION OF MENTAL HEALTH WITH TOBACCO CONSUMPTION AMONG SMOKERS AND NON-SMOKERS OF GANNAVARAM MANDAL – A CROSS SECTIONAL STUDY

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Abstract

Background: The use of tobacco has been developed as an epidemic with serious consequences that affects the physical, psychological and financial determinants of this vulnerable population. Tobacco consumption is one of the leading causes of mental health disorders across the world. It is evident that, perceived stress has been found to be associated with greater odds of tobacco use because most of the tobacco addicts believe that they were relieved from the stress when they consume tobacco.

Objective: The aim of the current study is the association between mental health and tobacco consumption among smokers and non-smokers in Gannavaram Mandalam.
To assess the mental health of the participants with GHQ-12 questionnaire.To know the nicotine dependence of the study group (smokers) with modified Fagerstrom nicotine dependence questionnaire. (mFTQ).

Methods:
An observational cross-sectional study was conducted on 400 participants who attend the OPD of dental institution located in Chinnoutpalli, Gannavaram Mandalam. The total participants will be divided into 2 groups – Group 1 which is a study group, comprises of 200tobacco consumers and Group 2 is a control group consisting of 200 non tobacco users from the general population. Participants were 18 – 75 years of age. The sample was considered based on convenience sampling technique. The participation of subjects is voluntary and an informed consent is taken from the participants.

Results: A total of 400 subjects participated in the study, more number of participants belong to (20- 30) years among both smokers and non-smokers group. Males (78%) are the predominant study group than that of females (22%). The males are the only gender present in the smokers group.

Conclusion : There is a lack of documentation on female smokers.Even though there is no statistical significance between the mental health status and smokers but it is observed that there is a significant difference in their opinion.There is negligible correlation between nicotine dependence and mental health status of an individual.

Key words : Smokers , Non - Smokers , General health , Mental health , tobacco consumption, Nicotine Dependent , habit of tobacco consumption .

INTRODUCTION :

According to WHO, tobacco kills nearly 7 million people each year in both developed and developing countries.[1] Oral cancers that are caused due to consumption of tobacco are ranked as No. 3 among all the cancers existing in India, which is a large producer of tobacco in the world. Among the non-communicable diseases, deaths occurring with tobacco consumption can be prevented at higher rate as the risk factors associated with the disease are mostly psychological and behavioural than biological.

The use of tobacco has been developed as an epidemic with serious consequences that affects the physical, psychological and financial determinants of this vulnerable population. Tobacco consumption is one of the leading causes of mental health disorders across the world. It is evident that, perceived stress has been found to be associated with greater odds of tobacco use because most of the tobacco addicts believe that they were relieved from the stress when they consume tobacco.[2] The literature shows that smoking ratesare significantly higher in individuals with mental illnesses than in the general population. People with psychiatric disorders such as schizophrenia, anxiety disorders, Bipolar disorder, and depression are smoking at dreadful levels.[3] It is observed from study conducted in early 1990's that people with psychiatric disorders smoke at rates almost twice as high as the general population which was 44 percent and 21 percent respectively. Similarly, people diagnosed with schizophrenia face double the risk of death because of the cardiovascular problems and triple the risk of respiratory disease and lung cancer.[4]

Nicotine dependence and mental illness present a complex network, involving multiple factors. A conjunction of neurobiological and psychosocial factors is at play where individuals with severe mental illness (SMI) often have co-occurring disorders.[5] In fact, psychiatric disorders and Substance abuse often go hand in hand. In addition, there is a strong relationship between a Consumer's history of trauma and abuse, especially adverse experiences in childhood which is a risk factor for mental health issues and concomitant

tobacco and other Substance use later in life. Assessing the physiological, psychological and social factors plays a vital role for the success of cessation counselling.[6] Breslau et al stated that the depression and anxiety rates increased with severity of nicotine addiction and this relationship might be a causal one in either of the direction.[7]

Hence it is imperative to screen the tobacco users for their mental illness which will be also an asset to seek professional help.

Hence with the above-mentioned rationale, this study was proposed with a purpose to evaluate the risk of anxiety, depression and mental health in tobacco users of Gannavaram mandalam in Andhra Pradesh.

AIMS AND OBJECTIVES OF THE STUDY :

The aim of the current study is the association between mental health and tobacco consumption among smokers and non-smokers in Gannavaram Mandalam.

To assess the mental health of the participants with GHQ-12 questionnaire.
To know the nicotine dependence of the study group (smokers) with modified Fagerstromnicotine dependence questionnaire. (mFTQ).

Materials and Methodology :

STUDY DESIGN :

An observational cross-sectional study was conducted on 400 participants who attend the OPD of dental institution located in Chinnoutpalli, Gannavaram Mandalam. The total participants will be divided into 2 groups – Group 1 which is a study group, comprises of 200tobacco consumers and

Group 2 is a control group consisting of 200 non tobacco users from the general population. Participants were 18 – 75 years of age. The sample was considered based on convenience sampling technique. The participation of subjects is voluntary and an informed consent is taken from the participants.

Ethical clearance:

The study obtained an ethical clearance from the institutional ethical committee with a reference ID No: IEC/DRS.S&NRSIDS/2023/UG/003.

Inclusion criteria:

- Participants between 18 to 75 years of age will be considered.
- Participants present at the time of study.
- Individuals having the habit of tobacco consumption were considered under smokers group.
- Individual not having the habit are considered under non-smokers groups.
- Both Male and females were included.

OBSERVATION AND RESULTS:

A total of 400 subjects participated in the study, more number of participants belong to (20-30) years among both smokers and non-smokers group. Males (78%) are the predominant study group than that of females (22%). The males are the only gender present in the smokers group.

Table 1: Representing the distribution of smokers responses using Modified Version of the Fagerstrom Tolerance Questionnaire (mFTQ)

Sl.No	Question	Responses	Percentages
1.	How many cigarettes a day do you smoke?	**Over 26 cigarettes a day**	5%
		About 16-25 cigarettes	17.9%
		About 1-15 cigarettes a day	59.2%
		Less than 1 a day	17.9%
2.	Do you inhale?	**Always**	47.3%
		Quite often	16.9%
		Seldom	13.4%
		Never	22.4%

3.	How soon after you wake up do you smoke your first cigarette?	**Within the first 30 minutes**	54.7%
		More than 30 minutes after waking but before noon	22.4%
		In the afternoon	10%
		In the afternoon	12.9%
4.	Which cigarette would you hate to give up?	**First cigarette in the morning**	46.3%
		Any other cigarette beforenoon	26.9%
		Any other cigarette afternoon	17.9%
		Any other cigarette in theevening	9%
5.	Do you find it difficult to refrain from smoking in places where it is forbidden (church, library, movies, etc.)?	**Yes, very difficult**	36.8%
		Yes, somewhat difficult	16.9%
		No, not usually difficult	29.9%
		No, not at all difficult	16.4%
6.	Do you smoke if you are so ill that you are in bed most of the day?	**Yes, always**	32.8%
		Yes, quite often	17.4%
		No, not usually	30.8%
		No, never	18.9%
7.	Do you smoke more during the first 2 hours than during the rest of the day?	**Yes**	62.2%
		No	37.8%

Table 2: Representing the distribution of smokers and non-smokers responses regarding Social dysfunction using General Health Questionnaire (GHQ-12)

Sl.No	**Question**	**Responses**	**Percentages**	
			Smokers	**Non-smokers**
1.	Been able to concentrate on what you're doing?	**Better than usual**	18.8%	10%
		Same as usual	54.0%	76.6 %
		Less than usual	22.3%	7.5%
		Much less than usual	5%	6%
3.	Felt you were playing a useful part in things?	**More so than usual**	16.8%	10%
		Same as usual	62.4%	79.6 %
		Less useful than usual	17.3%	9%
		Much less useful	3.5%	1.5%
4.		**More so than usual**	15.8%	15.4%

	Felt capable of making decisions about things?	**Same as usual**	62.4%	76.6 %
		Less useful than usual	12.9%	5.5%
		Much less useful	8.9%	2.5%
7.	Been able to enjoy your normal day-to-day activities?	**More so than usual**	19.8%	13.9%
		Same as usual	55.9%	79.6 %
		Less useful than usual	12.9%	5%
		Much less useful	11.4%	1.5%
8.	Been able to face up to your problems?	**More so than usual**	15.3%	10.4%
		Same as usual	58.9%	85.6
		Less useful than usual	15.8%	4%
		Much less useful	9.9%	-
12.	Been feeling reasonably happy, all things considered	**More so than usual**	33.2%	16.9 %
		About Same as usual	48.5%	76.6 %
		Less useful than usual	13.9%	5%
		Much less useful	4.5%	10%

Smokers group are with less social dysfunction when compared with that of non-smokers group. Apart from the above observations all the participants in both the groups have certain social dysfunction irrespective of their smoking behaviour. **(Table 2)**

Table 3: Representing the distribution of smokers and non-smokers responses regarding Anxiety and depression using General Health Questionnaire (GHQ-12)

Sl.No	**Question**	**Responses**	**Percentages**	
			Smokers	**Non-smokers**
2.	Lost much sleep over worry?	**Not at all**	44.6%	54.7%
		No more than usual	25.2%	36.3%
		Rather more than usual	22.8%	6.5%
		Much more than usual	6.9%	2.5%
5.	Felt constantly under strain?	**Not at all**	48%	35.8%
		No more than usual	24.8%	48.3%
		Rather more than usual	25.2%	13.9%
		Much more than usual	2%	2%

6.	Felt you couldn't overcome your difficulties?	**Not at all**	55.5%	74.1%
		No more than usual	28.2%	18.9%
		Rather more than usual	9.4%	5%
		Much more than usual	6.9%	2%
9.	Been feeling unhappy and depressed?	**Not at all**	46.5%	60.7%
		No more than usual	34.2%	33.8%
		Rather more than usual	13.4%	5.5%
		Much more than usual	5.9%	-

Regardless with the presence of the habit, it is observed that all the participants are under certain level of stress, anxiety and depression. **(Table 3)**

Table 4: Representing the distribution of smokers and non-smokers responses regarding Loss of confidence using General Health Questionnaire (GHQ-12)

Sl. No	**Question**	**Responses**	**Percentages**	
			Smokers	**Non-smokers**
10.	Been losing confidence in yourself?	**Not at all**	55.9%	76.1%
		No more than usual	16.8%	20.9%
		Rather more than usual	23.8%	2.0%
		Much more than Usual	3.5%	1%
11.	Been thinking of yourself as a worthless person?	**Not at all**	61.9%	77.6%
		No more than usual	29.2%	16.9%
		Rather more than usual	5%	4%
		Much more than Usual	4%	1.5%

Comparatively, non-smokers are more confident and they feel that they are worthy than the smokers.

Table 5: Representing the distribution of smokers and non-smokers responses regarding Social dysfunction using General Health Questionnaire (GHQ-12)

Sl.No	Question	Responses	Percentages	
			Males	Females
3.	Felt you were playing a useful part in things?	More so than usual	6.7%	11.0%
		Same as usual	77.8%	80.6%
		Less so than usual	15.6%	7.1%
		Much less than Usual	-	1.3%
7.	Been able to enjoy your normal day-to-day activities?	More so than usual	8.9%	15.5%
		Same as usual	84.4%	78.7%
		Less so than usual	6.7%	4.5%
		Much less than Usual	-	1.3%

Compared to males, females felt that they are playing a useful part and are able to do their day to day activities more than males. **(Table 5)**

Table 6: Representing the distribution of smokers and non-smokers responses regarding Anxiety and depression using General Health Questionnaire (GHQ-12)

Sl.No	Question	Responses	Percentages	
			Males	Females
2.	Lost much sleep over worry?	**Not at all**	53.3%	55.5%
		No more than usual	37.8%	36.1%
		Rather more than usual	8.9%	5.8%
		Much more than usual	-	2.6%
6.	Felt you couldn't overcome your difficulties?	**Not at all**	68.9%	76.1%
		No more than usual	20%	18.7%
		Rather more than usual	4.4%	4.5%
		Much more than usual	6.7%	0.6%

Table 7: Representing the nicotine dependence according to different age groups among smokers.

Age group	Very low dependence	Low dependence	Moderate dependence	High dependence	p- value
20-30	28.9%	21.1%	35.5%	14.5%	0.868
31-40	30.0%	30.0%	30.0%	10.0%	
41-50	20.5%	25.6%	43.6%	10.3%	
51-60	13.3%	26.7%	43.3%	16.7%	
61-70	7.7%	23.1%	53.8%	15.4%	
Above 70 years	33.3%	33.3%	33.3%	0.0%	

*Chi-square test, statistical significance level set as p<0.05.

Majority of the participants are of moderate dependence among all age groups with no statistical significance between them.**(Table 7)**

Table 8: Representing the mental health status according to different age groups among smokers.

Age group	Normal	Minor	Major	p- value
20-30	1.3%	68.4%	30.3%	0.648
31-40	0	80%	20%	
41-50	0	64.1%	35.9%	
51-60	0	53.3%	46.7%	
61-70	0	61.5%	38.5%	
Above 70 years	0	66.7%	33.3%	

*Chi-square test, statistical significance level set as p<0.05.

According to the categorization of GHQ-12, majority of the participants in the smokers groups are under minor category with no statistical significance between the age groups. **(Table 8)**

Table 9: Representing the mental health status according to different age groups among non-smokers.

Age group	Normal	Minor	Major	p- value
20-30	7.8%	84.4%	7.8%	0.369
31-40	6.7%	88.3%	5.0%	
41-50	2.2%	97.8%	0%	
51-60	0%	90.9%	9.1%	
61-70	0%	100.0%	0%	

*Chi-square test, statistical significance level set as $p<0.05$.

According to the categorization of GHQ-12, majority of the participants in the non- smokers groups are under minor category and there is a no statistical significance between the age groups. **(Table 9)**

Table 10: Representing the mental health status based on gender among non-smokers.

Gender	Normal	Minor	Major	p value
Male	2.2%	88.9%	8.9%	p<0.264
Female	5.8%	90.3%	3.9%	

*Chi-square test, statistical significance level set as $p<0.05$.

According to the categorization of GHQ-12, majority of the participants in the non- smokers groups are under minor category and there is a no statistical significance between the gender. **(Table 10)**

Spearman rank correlation co-efficient was performed between GHQ-12 of smokers and non-smokers, it is observed that there is a negligible positive correlation between them. **(Graph 1)**

Chart 1: Representing the distribution of responses among females and males on losing confidence.

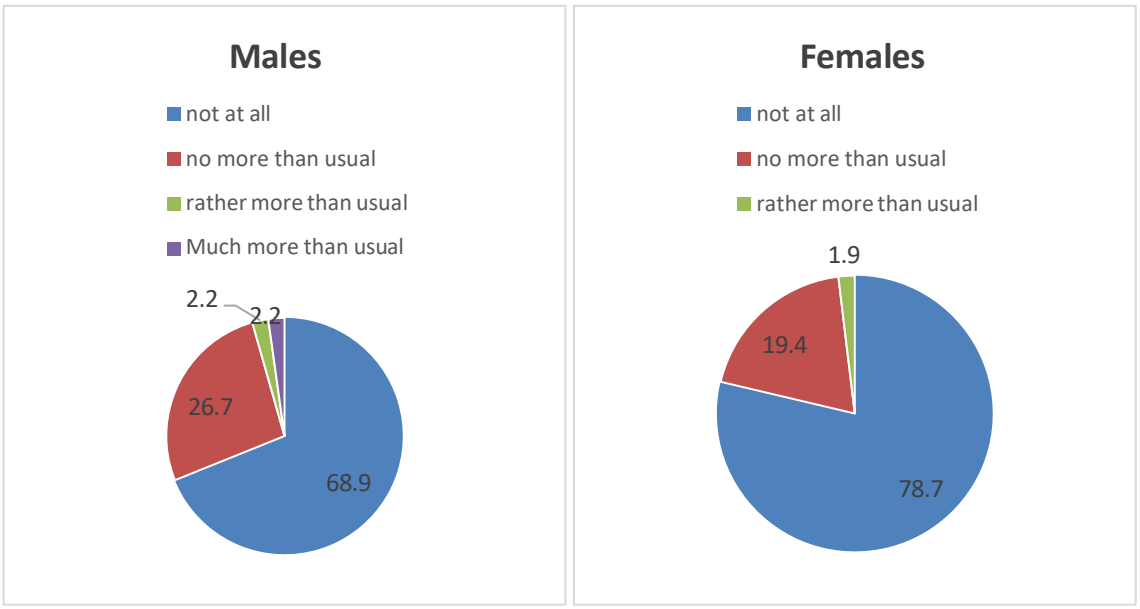


Chart 2: Representing the distribution of responses among males and females on worthiness

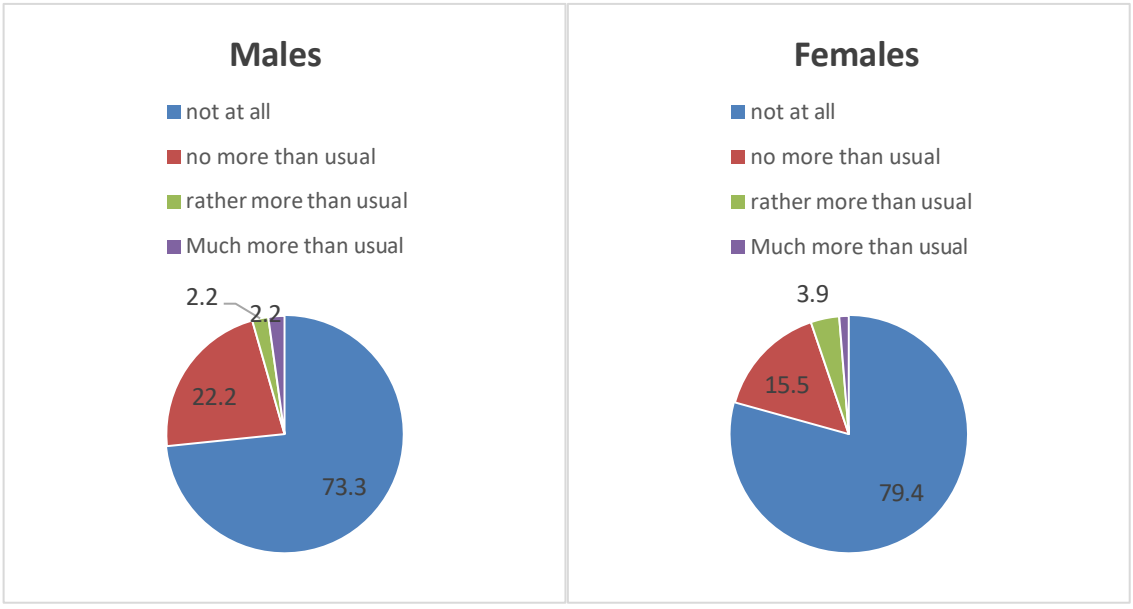


Chart 3: Bar diagram representing the distribution of responses among males and females on feeling of being constantly under strain.

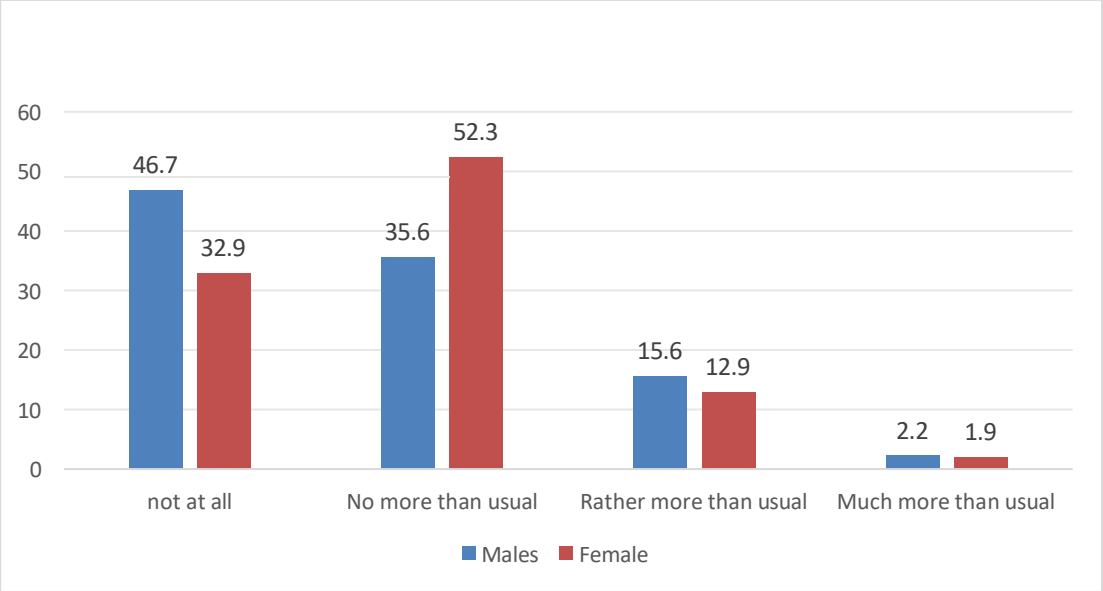


Chart 4: Bar diagram representing the distribution of responses among males and females on reasonably happy

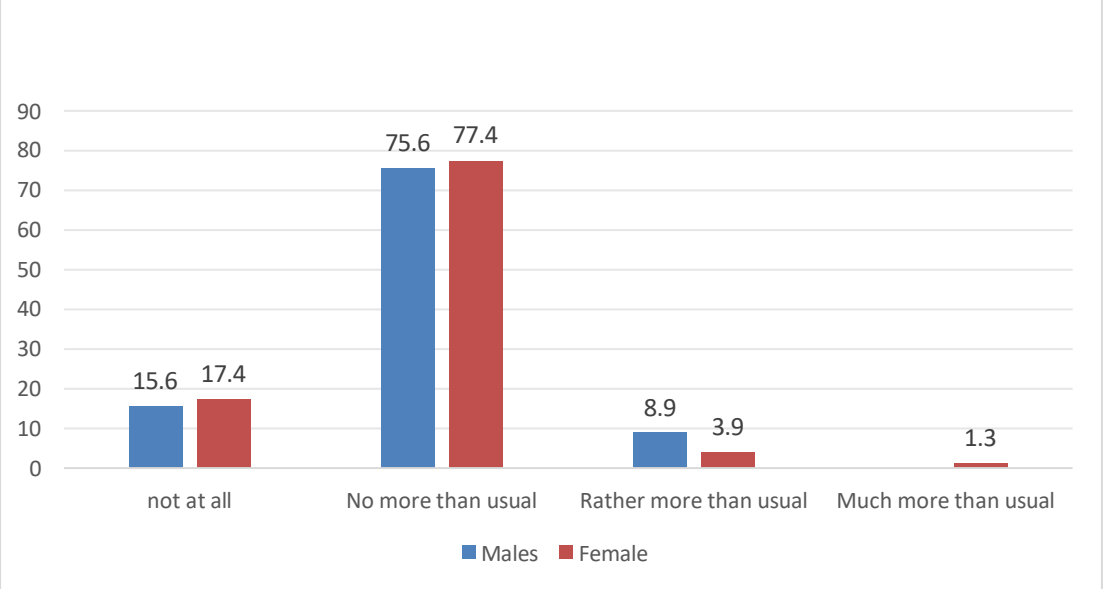


Chart 5: Bar diagram representing the distribution of responses among males and females on feeling being unhappy.

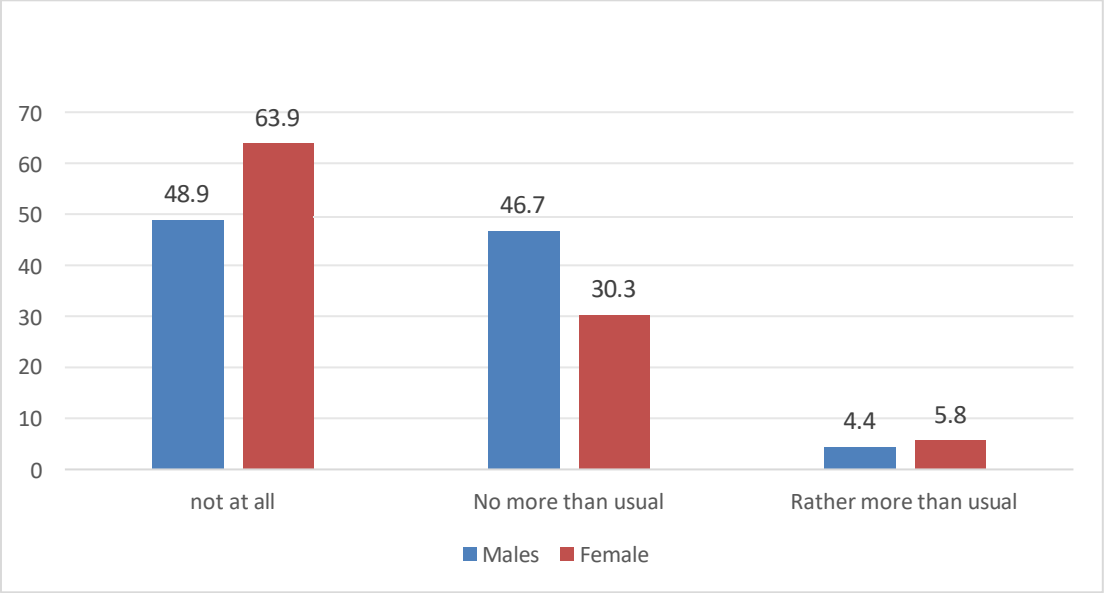


Chart 6: Bar diagram representing the distribution of responses among males and females on being able to concentrate.

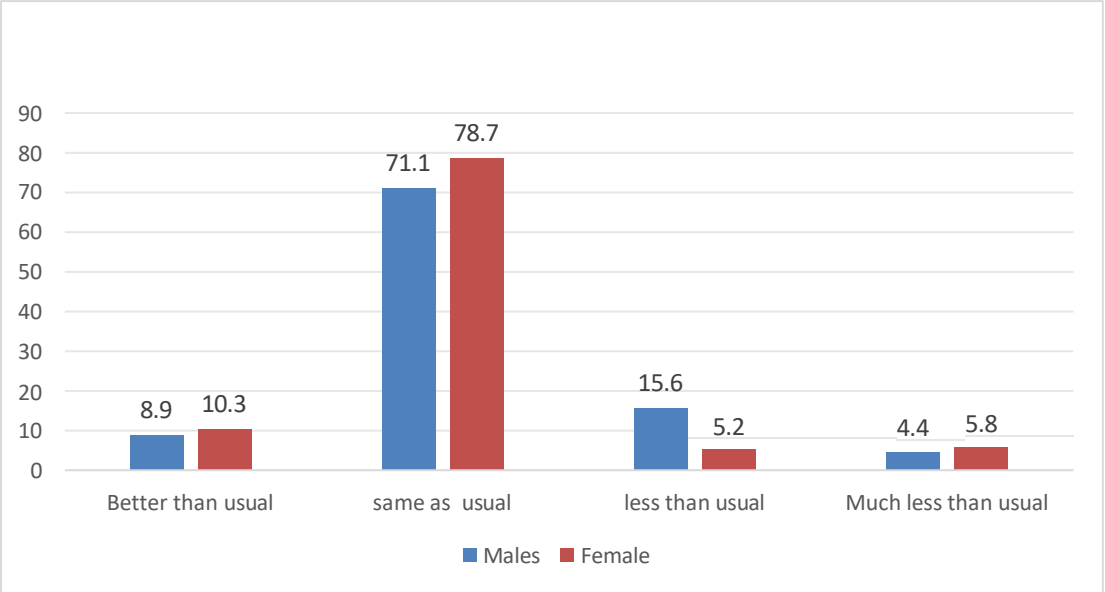
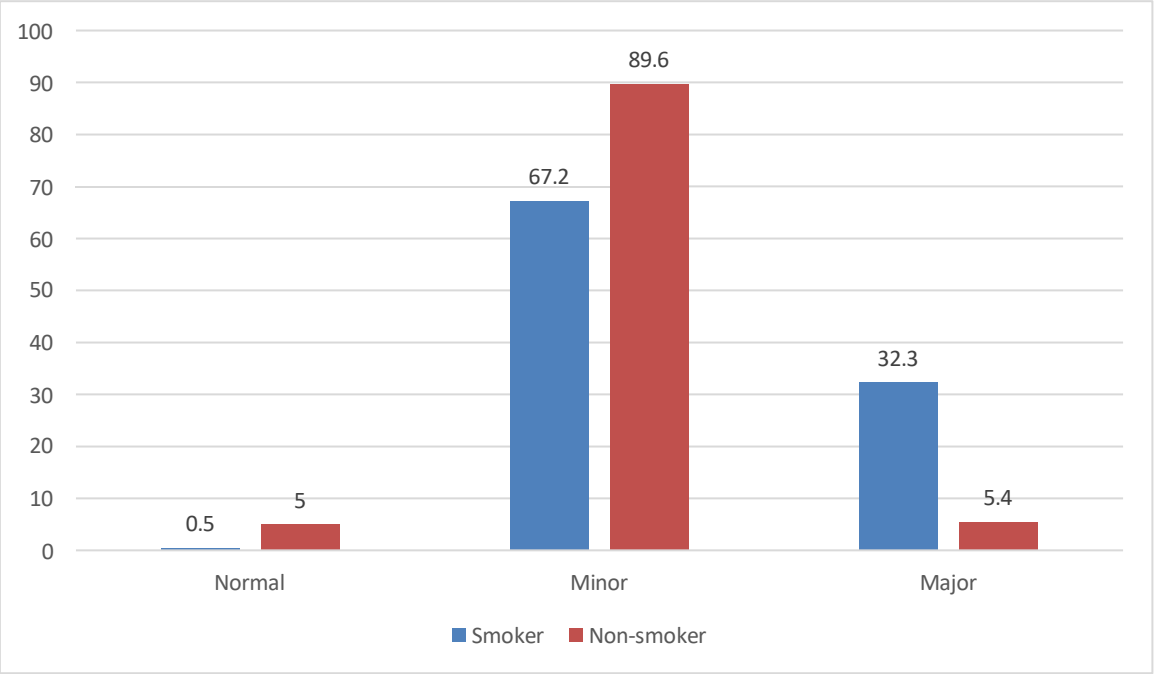
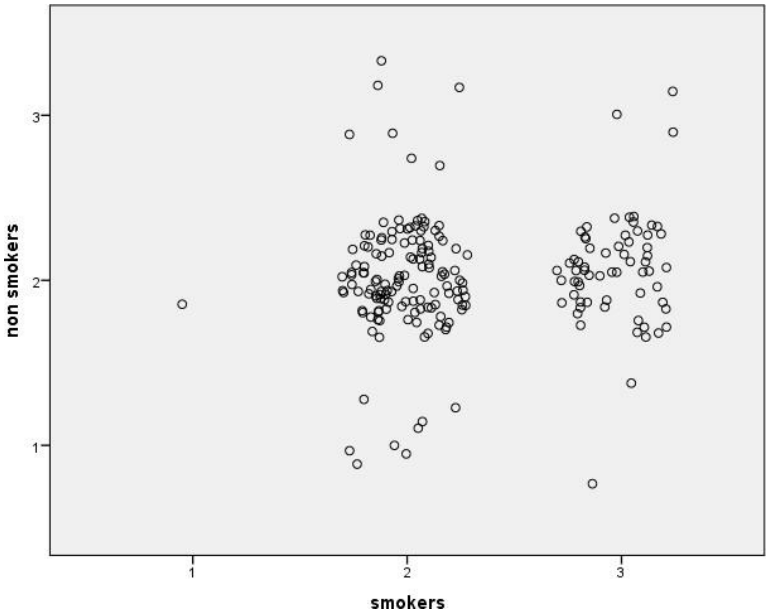


Chart 7: Bar Diagram representing the GHQ-12 categories of smokers and non-smokers.



Graph 1 : Scatter Plot Representing the Correlation of GHQ-12 Responses between Smokers and Non-Smokers



The above plot states that there is negligible correlation pertaining to mental health status betweensmokers and non-smokers.

DISCUSSION:

The present study interviewed the smokers and non-smokers for their mental health status by administrating validated scaled questionnaire to assess whether the habit of smoking influences the mental health status of an individual and also compared the mental health status of smokers with their contour parts, i.e., non-smokers.

According to the survey conducted on tobacco consumption among Indians in 2021 by age groups, it is observed that almost all the age groups consume tobacco in smoke or smokeless forms with slight difference in their prevalence. It is concluded from this survey that theadults (30-44) are more into the habit followed by young adults (20-29), older adults, senior citizens and the teens by **sanyukta kanwal.** [19]

According to the evidence published in British medical journal in 2019, it stated that the India has now became second home to second highest number of women smokers in the world after US. Even though the prevalence is less when compared to the males, but the female smokers increased drastically from 1980 to 2012 and the rise is still on. The reason behind the lower numbers is because of lack of documentation on female smokers. [20]

The present study used mFTQ questionnaire to assess the nicotine dependence in the smoker and GHQ-12 questionnaire to know the mental status of the smokers and non-smokers. The study also assessed the association with the socio-demographic factors such as age for nicotine dependence and comparisons were made between males and females pertaining to mental health status.

NICOTINE DEPENDENCE

From the results obtained, it is observed that the nicotine dependence is higher (16.7%) in 51-60 years age group followed by 67-70 age group (15.4%) and moderate dependence is observed in 61-70 years age group (53.8%), (41-50), (51-60), (31-40) years and this results are similar with the study

conducted by **sanyukta kanwal**[19] in 2021 and published by statista in Oct 2022.

The mFTQ responses of the present survey stated that around 60% of the smokers participated, smoke about 1-15 cigarettes in a day where as 17.9% of them smoke around 16-25 cigarettes per day and when the respondents enquired about the inhalation, 47.3% of them agreed they always inhale the emitted smoke thus enrouting the carcinogenic components into the respiratory system which is dreadful and these findings are in accordance with the study conducted by **Bandiera et al (2016)**,[17] **Farsalinos et al (2013)**[18]. More than half (54.7%) of the smokers in the study responded that they will have their cigarette within first 30 minutes after the wake up and this is in par with the response related to hate to give up cigarette which is about 46.3%. Among the smokers participated in the study, 36.8% of them agreed that it is very difficult for them to refrain from smoking where it is forbidden such as public places. When enquired about the smoking when they were ill, the responses are in two extremities where 32.8% of them said they always smoke irrespective of their illness while 29.9% responded they don't usually. Majority of the participants agreed that they are likely to smoke during the first 2hrs (62.2%) than the rest of the day (37.8%) and these results are similar with the study conducted by **Morris CD et al (2011)**[26] **and Prochaska et al (2013)**[27]

Based on the mFTQ scoring criteria, the participants (smokers) responses were calculated and categorized as very low dependence (score of 1-2), low dependence (3-4), moderate dependence (5-7) and high dependence (score of 8 or more). Majority of smokers (53.8%) were of moderate dependence on nicotine and about 16.7% of the smokers participated were of high nicotine dependence. The study also showed that there is no established association between age and nicotine dependence ($p<0.868$) which are in accordance with the study conducted by **Dickerson F et al (2018)**[33] **and Nieto-González et al (2022).**[32]

MENTAL HEALTH STATUS

People with mental illness smoke two to four times more than the mentally sound individuals. Stress and anxiety can increase the tendency to smoke and can be the cause for relapse among the former smokers because smokers self-medicate themselves[2] with tobacco which comforts them and provide them with the sense of pleasure due to the release of the hormones such as dopamine and serotonin, thus managing their psychological symptoms. The current study assessed the mental status of smokers and non-smokers using GHQ-12 questionnaire. From the results, it is observed that about 67.2% of smokers are in minor category whereas 32.3% are in major category of GHQ-12 and majority of non-smokers are in minor category and negligible percentage of 0.5% are present in major category. The present study showed that there is no established association with mental health status between smokers and non-smokers which is in similarity with the studiesconducted by **Diaz-Martinez et al (2022)[47] and NIDA in 2021.[46]**

SOCIAL DISFUNCTION

From the results, it is observed there exists a great disparity in the responses among smokers and non-smokers. About 54% of smokers and 76.6% of non-smokers said that they can concentrate same as usual on what they are doing where 7.5% of non-smokers agreed that it is less than usual for them regarding the same. 76.6% of the non-smokers felt that they are capable of making decisions same as usual whereas it is only 62.4% in smokers. Almost all the non-smokers are able to enjoy their normal day to day activities while it is not in case of smokers where it is only about 55.9%, and 12.9% of them reported that it is less than usual. Among smokers, 15.8% of them agreed that they are able to face the problems less than the usual. 76.6% of non-smokers felt reasonably happy same as usual while it is less than usual in non-smokers (13.9%) and these findings are in accordance with the studies conducted by **Cosci F et al.**[15]

STRESS, ANXIETY AND DEPRESSION:

The present shows that loss of sleep over much worry is rather more than usual in smokers (22.8%) than non-smokers which are 6.5%. It is also observed that 24.8% and 25.2% among smokers felt that they are under constant strain for no more than usual and rather than usual where only 13.9% of non-smokers are under this category. More of smokers than the non-smokers felt that they can't overcome the difficulties and smokers are unhappier and depressed than the non-smokers p e r t a i n i n g t o much more than usual which are in par with the resultsfrom the study conducted by **Grant JE et al (2022)[31] and Hindocha C et al (2021).[34]**

LOSS OF CONFIDENCE:

When compared with non-smokers, smokers lose confidence and feel themselves as unworthy persons and these findings are similar with the study conducted by **Lawless et al (2015)**[2]. From the study, it is observed that majority of the participants are under minor category regarding the mental health status irrespective of the tobacco consumption, age and the gender. Hence, it is observed that though there is an association between the nicotine dependence and mental health status, the non-smokers were also at stress, anxiety and depression.[26, 30]

CONCLUSION AND SUMMARY:

From the above survey it has been noted that the habit of smoking influences the mental health of the individual.

There is a lack of documentation on female smokers.

Even though there is no statistical significance between the mental health status and smokers but it is observed that there is a significant difference in their opinion.

There is negligible correlation between nicotine dependence and mental health status of an individual.

The sustained efforts of health care providers, policy makers & researches are needed to address the major public health harms of tobacco use to build a tobacco free society.

Even though there is no statistical association between the mental health and the tobacco consumption, this study has proved that the smokers are distributed both in the minor and the major categories much more than the non-smokers. This study has also shown that the mental status of individuals doesn't depend on age and the gender.

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