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Nicotine Dependence and its Variation among Tobacco Users Who Visited the Tobacco Cessation Clinic in an Urban Primary Healthcare Center in Male' Maldives

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Abstract: ***Objective**: This study aimed to identify nicotine dependence and its variation among tobacco users who attended tobacco cessation clinic at one of the Urban Primary Healthcare Center (Dhamanaveshi) in Male', Maldives, spanning from 2017 through 2023. **Methods**: A retrospective, quantitative, descriptive survey was conducted using secondary data collected through tobacco cessation assessment forms at the tobacco cessation clinic run in one of the Urban Primary Healthcare Center (Dhamanaveshi) in Male', Maldives. Census sampling was employed accordingly all the available tobacco cessation forms were considered resulting in a total sample size of 544. Data transfer sheet was developed after reviewing the tobacco cessation assessment forms and the required data were transferred to the data transfer sheet by the primary researcher. Both descriptive & inferential statistical analyses were performed using SPSS version 21.0. **Results**: Out of 544 tobacco users 494 (90.8%) were male and 50 (9.2%) were female. The majority were married and employed, and most did not take any medication or have allergies. The average age of tobacco users was 39.6 years, with the majority falling within the 36 - 64 age range. A significant number of tobacco users started using tobacco before the age of 18, and most had been using it for at least 10 years. Many of them were traditional smokers who exclusively used Camel brand cigarettes. The majority smoked more than 10 cigarettes daily or used tobacco more than 10 times a day. Less than half of the tobacco users had moderate nicotine dependence, majority used tobacco within half an hour of wake up, most of them did not use more tobacco during first hours of the day and majority used tobacco during their illness. Nicotine dependency varies based on most of the demographic characters and with most of the practices of tobacco use. **Conclusion**: Majority of the of the tobacco users had moderate nicotine dependence. Nicotine dependence varies significantly with regards to most of the demographic factors and also varies based on practices of tobacco use by tobacco users.*

Keywords: nicotine dependence, difference in nicotine dependence, nicotine, tobacco use, practice of tobacco use

1. Introduction

Consumption of tobacco is one of the leading causes of death globally (WHO, 2022) [1]. It is verified that tobacco kills nearly half of its consumers (WHO, 2022) [1]. Tobacco consumption is growing epidemically to public health concern in most of the low to middle income countries (NCD Alliance, 2022) [2].

Tobacco cessation is considered of great importance equal to the prevention of tobacco use commencement (Gallert et al., 2012) [3]. Research shows two third of smokers wanted to stop smoking; however, only a few people consequently succeeded in quit attempts (Yong et al., 2014) [4]. Surveys across several countries and various age groups including Maldives show that approximately 70% of smokers had thought of quitting at some point in time, but only 2 - 3% have successfully quitted without any assistance (Smoke free teens, 2017) [5].

Nicotine, the major addictive substance in tobacco, produces temporarily pleasing physical and mood - altering effects in the brain which alter the mesolimbic pathway (Kaur et al., 2011) [6]. Similar to any other drug, long term consumption of tobacco can cause both physical and psychological addiction. This is also true for those who use any form of tobacco products. Nicotine dependence increases the risk of smoking persistence and is the leading preventable cause of morbidity and death (Surgeon General Report, 2020) [7].

Nicotine dependence was assessed in multiple former studies and different level of nicotine dependence demonstrated by various studies done across diverse population and ethnicity. Higher nicotine dependence among tobacco users was revealed in some previous studies such as 55.9% of study subjects reported by Saha et al (2017) [8], 55.7% of participants reported by (Du Plooy, Macharia & Verster, 2016) [9] and 48.7% reported by Sharmila et al (2024) [10]. Similarly, some previous studies reported moderate nicotine dependence among tobacco users such as 47.5% of respondents expressed by Dasgupta et al (2021) [11], 48% of study subjects, stated by Subedi et al (2021) [12], 51% of participants reported by Aryal et al (2015) [13] and 33% reported by Marzo et al (2022) [14]. Furthermore, some previous studies revealed low nicotine dependence among tobacco users like 52% minimal dependence as reported by Subedi et al (2021) [12], 52% mild dependence as reported by Charkazi et al (2016) [15] and 48% low nicotine dependence as reported by Aryal et al (2015) [13].

Higher nicotine dependence was associated with smoking more than 10 cigarettes per day (Subedi et al., 2021) [12]. Nicotine dependence is higher among females than males (Subedi et al., 2021) [12]. Higher nicotine dependency among smokers made them difficult to quit and are less like to do a quit attempt (Vangeli et al., 2011) [16].

Nicotine in tobacco is usually a chemical responsible for chemical addiction and often associated with dependence, which is recognized as a public health menace and the single most significant factor for premature death. Hence, assessment of nicotine dependence among tobacco users is essential to implement tobacco control measures effectively.

Though, the tobacco cessation clinic at UPHC (Dhamanaveshi) is the first clinic opened, no researches have

been conducted to analyze the already collected secondary data through tobacco cessation assessment forms. Thus, this study was aimed at identifying nicotine dependence and its variation among tobacco users who attended the selected tobacco cessation clinic from 2017 to the end of 2023.

2. Aims

To identify nicotine dependence and its variation among tobacco users who attended tobacco cessation clinic at one of the Urban Primary Healthcare Center (Dhamanaveshi) from 2017 to the end of 2023.

The aim of the actual research project was to identify the characteristics of tobacco users such as (1) demographic characteristics, (2) practice of tobacco use, (3) history of previous quit attempts (4) nicotine dependence (5) status of follow ups (6) status of quit and relapse among tobacco users who attended tobacco cessation clinic at one of the Urban Primary Healthcare Center (Dhamanaveshi) in Male' Maldives, from 2017 to the end of 2023. Moreover, the actual project also analyzed (7) variation in nicotine dependence among tobacco users.

However, this paper is mainly focused on the 4th & 7th objectives of actual research project. Previously, an article was produced based on first 3 objectives and published by A. A. Hameed (2024) [39] in peer reviewed journal titled "Characteristics of tobacco users who visited the tobacco cessation clinic in an urban primary healthcare center in Male' Maldives from 2017 - 2023: A retrospective, descriptive cross - sectional study".

3. Objectives

1) To determine nicotine dependence among tobacco users who attended the selected tobacco cessation clinic.
2) To assess all the items included in Fagerstrom's Test for Nicotine Dependence descriptively, which is related to the practices of tobacco users.
3) To analyze variation in nicotine dependence among tobacco users with regards to the demographic characteristics of tobacco users.
4) To analyze variation in nicotine dependence among tobacco users with regards to the practices of tobacco use among tobacco users.

4. Methods

This is a quantitative retrospective cross - sectional study conducted using secondary data stored at tobacco cessation clinic (TCC), in one of the Urban Primacy Healthcare (UPHC) setup "Dhamanaveshi" located in Greater Male' Area (GMA). The study analyzed secondary data of TCC starting from 2017 till the end of 2023. During the given 7 years' time period, a total of 693 clients attended the clinic. Nevertheless, 544 study subjects were sampled with the exclusion of those who came repeatedly and for those cases or forms of clients which were misplaced or unreachable during data analyzing phase. The study utilized census sampling; thus, the total sample size was equal to the total target population which was 544.

A data transfer sheet was developed by the primary researcher as an instrument after reviewing the tobacco cessation assessment form, which comprises of 5 sections starting from (1) demographic characteristics followed by (2) practices of tobacco users, (3) history of tobacco cessation among tobacco users, (4) nicotine dependency and (5) follow up statuses of the tobacco users. The data was then transferred from the tobacco cessation assessment form to the data transfer sheet by the primary researcher. However, this paper is focused on 4th section, which includes nicotine dependence amongst tobacco users.

Prior to the data transfer or collection, no objection letter was obtained from the urban primary health care center (Dhamanaveshi) and ethical approval was attained from National Health Research Council (NHRC) at the Ministry of Health, Maldives. The NHRC approval number is NHRC/2023/18. Data was analyzed by utilizing SPSS software version 21.0. Simple descriptive statistics such as mean, median, mode, frequency and percentages were used. Furthermore, non - parametric inferential statistics such as Kruskal Wallis test and Mann - Whitney U tests were performed to evaluate the variation in nicotine dependence based on the demographic characteristics and practices of tobacco use among tobacco users.

5. Results

Sociodemographic characteristics

According to the present study 39.6 years is mean age for tobacco users who attended tobacco cessation clinic at UPHC (Dhamanaveshi) and 18 to 80 years was the age range of the study subjects. Less than half (49.1%) of the tobacco users who attended the clinic belonged to the age group 36 - 64 years. Greatest number (90.8%) of tobacco users were male and nearly two - third (59.0%) were married. Approximately 34.2% of tobacco users had no children at the time of data collection or assessment completion. Most (83.6%) of the tobacco users were employed either by themselves, government or private.

Practice of tobacco use

The current study revealed that 40.4% of tobacco users started tobacco use between 10 - 15 years of age and when considering median age as 18 years, it showed that the majority (72.7%) of tobacco consumers commenced tobacco use before the age of 18 years. The present study reported that more than one - third (36.9%) of tobacco users used tobacco for a duration between 11 - 20 years. The study also identified that majority (92.3%) have used tobacco for more than 10 years of duration.

According to this study the majority (78.1%) of tobacco users were traditional smokers and consumed cigarettes solely while majority (67.5%) used camel brand either camel hard (39.0%) or camel light (28.5%). Furthermore, the study also discovered that majority (83.3%) of the tobacco users consumed more than 10 cigarettes daily or used tobacco more than 10 times a day. However, more than a quarter (36.4%) of the study subjects used tobacco 11 - 20 times a day or consumed 11 - 20 cigarettes daily.

The current study also noted that almost all (98.7%) of the participants used tobacco on almost every day of the month and more than half (69.5%) of the tobacco users always inhaled tobacco smoke or liquid in. Similarly, it also described that more than half (51.7%) of the tobacco users did not used tobacco in a forbidden area or place, yet almost all of them (99.8%) follow no specific area or place for tobacco use.

Table 1: Fagerstrom Test for Nicotine Dependence (FTND scale

Variable		
Duration between wake up and first tobacco use	**N**	**%**
Within 5 minutes	238	43.8%
6 - 30 minutes	164	30.1%
31 - 60 minutes	113	20.8%
After 60 minutes	21	3.9%
Difficult to refrain tobacco use in forbidden area		
Yes	281	51.7%
No	255	46.9%
Tobacco use or cigarette most hate to give up		
All others	275	50.6%
The first one in the morning	261	48.0%
Number of cigarette daily / how many times used		
< 10 times or < 10 cigarettes	88	16.2%
11 - 20 times or 11 - 20 cigarettes	198	36.4%
21 - 30 times or 21 - 30 cigarettes	125	23.0%
>31 times or > 31 cigarettes	126	23.2%
Tobacco uses more in first hours of the day		
Yes	186	34.2%
No	350	64.3%
Tobacco uses during illness		
Yes	346	63.6%
No	190	34.9%
Nicotine dependence (Fagerstrom's scale)		
1 - 2: mild nicotine dependence	44	8.1%
3 - 4: mild to moderate nicotine dependence	130	23.9%
5 - 7: moderate nicotine dependence	246	45.2%
Above 8: severe nicotine dependence	117	21.5%
Mean Fagerstrom's (FTND) score		**5.6**

Nicotine dependence among tobacco users

Nicotine dependence was assessed by utilizing Fagerstrom Test for Nicotine Dependence (FTND), a standard tool designed to assess intensity of physical addiction to nicotine. The tool contains 6 items that evaluate the quantity of tobacco use, the compulsion to use and dependence.

In scoring of Fagerstrom Test for Nicotine Dependence (FTND), yes/no items were scored from 0 to 1 while multiple choice items were scored from 0 - 3. The items are summed up to yield a total score of 0 - 10. The higher the FTND score, the more intense is the patient's physical dependence on nicotine (Heattherton et al., 1991) [17].

The present study reported that less than half (45.2%) of the study subjects had moderate nicotine dependence, while 21.5% had severe or higher nicotine dependence concluding that majority (66.7%) of the study subjects had moderate to higher nicotine dependence. The mean Fagerstrom's score for nicotine dependency is 5.6 indicating average moderate nicotine dependency among tobacco users who attended the tobacco cessation clinic at UPHC (Dhamanaveshi).

The Fagerstrom's scale consists of 6 items (table 01). Descriptive analysis was conducted on all 6 items. The existing study also described that about 73.9% (43.8% within 5 minutes of wake up and 30.1% for within 6 - 30 minutes of wake up) of tobacco users consumed tobacco within half an hour of wake up and 94.7% (43.8% within 5 minutes of wake up, 30.1% for within 6 - 30 minutes of wake up and 20.8% for within 31 - 60 minutes of wake up) of tobacco users consumed tobacco within one hour of wake up. Nevertheless, only 3.9% of tobacco users consumed tobacco after 60 minutes of wake up.

Table 2: Compare means with Fagerstrom's score and demographic variables using descriptive and non - parametric tests

Variable	Mean	Test	P value
Age		Kruskal Wallis test	.000
18 – 25 years	6.3		
26 - 35 years	6.0		
36 – 64 years	5.3		
Above 65 years	4.4		
Gender		Man - Whitney U test	.035
Male	5.7		
Female	4.9		
Marital status		Kruskal Wallis test	.110
Single	6.0		
Married	5.5		
Divorced	5.4		
Widowed	3.7		
Employment		Man - Whitney U test	.004
Yes	5.8		
No	5.0		
No of children		Kruskal Wallis test	.001
No children yet	6.1		
One child	5.6		
2 - 3 children	5.4		
>4 children	5.1		

According to the results, more than one - third (36.4%, n=198) used tobacco 11 - 20 times a day or used 11 - 20 cigarettes daily, 23% used tobacco 21 - 30 times a day or used 21 - 30 cigarettes daily and 23.2% used tobacco more 31 times a daily or used more than 31 cigarettes daily. This concluded that majority (82.6%, n=449) consumed tobacco for more than 10 times a day or used more than 10 cigarettes daily. Nevertheless, only 16.2% of tobacco users consumed tobacco for less than 10 times in a day or consumed less than 10 cigarettes daily.

The present study showed that more than half (51.7%, n=281) said it is difficult to refrain tobacco use in forbidden areas, about 50.6% (n=275) said all other times other than first tobacco use in the morning were the most hated to give up and 48% (n=261) said they hate to give up the first one tobacco use in the morning.

The study also reported that utmost (64.3%) number of tobacco users had not used more tobacco during the first hours of the day and almost equal amount (63.6%) consumed tobacco during their illness.

Differences in nicotine dependence based on demographic characteristics and practices of tobacco use among tobacco users.

As the data were not normally distributed, non - parametric inferential statistical tests such as Kruskal Wallis test and Mann - Whitney U tests were performed to evaluate the variation in nicotine dependence based on the demographic characteristics and practices of tobacco use among tobacco users. Nicotine dependence varies significantly according to the age, gender, employment status and number of children tobacco users had. However, nicotine dependence does not vary based on their marital status. Nicotine dependence varies significantly based on the age of initiation, duration of tobacco use, brand of cigarettes, daily consumption, inhalation of tobacco smoke or liquid in and duration between wake up and first tobacco use. However, nicotine dependence does not vary based on average days of use in a month and forms of tobacco use.

Descriptive compare means performed for all the variables in demographics and practices. Based on mean Fagerstrom's (FTND) score by compare means, nicotine dependency is highest (mean score 6.3) among tobacco users aged between 18 - 25 years of age and lowest (mean score 4.4) among tobacco users age above 65 years.

Table 3: Compare means with Fagerstrom's score and practice items using descriptive and non - parametric tests

Variable	Mean	Inferential test	P value
Age of initiation		Kruskal Wallis test	.005
Before 10 years	5.5		
11 - 15 years	6.0		
16 - 18 years	5.7		
Above 18 years	5.0		
Duration of tobacco use		Kruskal Wallis test	.007
< 5 years	5.2		
6 - 10 years	6.1		
11 - 20 years	6.0		
21 - 30 years	5.6		
More than 30 years	5.0		
Frequency of daily usage		Kruskal Wallis test	.000
< 5 times or < 5 cigarettes	3.3		
6 - 10 times or 6 - 10 cigarettes	4.1		
11 - 20 times or 11 - 20 cigarettes	5.4		
21 - 40 times or 21 - 40 cigarettes	7.3		
>40 times or > 40 cigarettes	5.9		
Average days of use in a month		Kruskal Wallis test	1.000
6 - 15 days	3.4		
16 - 29 days	5.0		
30 days or almost every day	5.6		
Inhalation of tobacco smoke or liquid in		Kruskal Wallis test	.000
Always	5.9		
Sometime	5.1		
Never	3.9		
Duration between wake up & First tobacco use		Kruskal Wallis test	.000
Within 5 minutes	7.1		
6 - 30 minutes	5.3		
31 - 60 minutes	3.5		
After 60 minutes	2.3		

Nicotine dependency was higher among male (mean score 5.7) than female (mean score 4.9). It was highest (mean score 6.0) among single or unmarried and lowest (mean score 3.7) among widowed. It was also higher (mean score 5.8) among employed tobacco users than unemployed (mean score 5.0) tobacco users. Moreover, it was also highest (mean score 6.1) among those tobacco users who had no children as compared to those who already had children (mean score 5.1).

Nicotine dependency was highest (mean score 6.0) among those who started tobacco use at age 11 - 15 years and lowest (mean score 5.0) among those who started above 18 years. It was highest (mean score 6.1) for those who had been using tobacco for 6 - 10 years of duration and lowest (mean score 5.0) among those who had used tobacco for more than 30 years of duration. Similarly, nicotine dependency was highest (mean score 6.2) for both subgroups such as single e - cigarette users and those who are triple users, while it was lowest (mean score 3.2) for dual tobacco users who used both cigarette and smokeless tobacco.

Through compare means, it was also revealed that nicotine dependency was highest (mean score 6.2) among those who used camel hard cigarette and lowest (mean score 3.0) among those who used Dunhill cigarette. Likewise, it showed that nicotine dependency was highest (mean score 7.3) for those who used tobacco 21 - 40 times a day or who used 21 - 40 cigarettes daily and lowest (mean score 3.3) for those who used tobacco less than 5 times a day or consumed less than 5 cigarettes daily. Furthermore, it also described that nicotine dependency was highest among those who used tobacco every day of the month than those who used tobacco less than 15 days of the month with a mean score of 5.6 and 3.4 for almost every day and 6 - 15 days respectively, yet inferentially it does not show any significant difference.

In addition, nicotine dependency was highest among those who always inhaled tobacco smoke or liquid in and lowest among those who never inhaled tobacco smoke or liquid in with mean score of 5.9 and 3.1 for always and never inhaled tobacco smoke or liquid in respectively.

Finally, it concluded that nicotine dependency is highest (mean score 7.7) for those who consumed tobacco within 5 minutes of wake up and lowest (mean score 2.3) among those who consumed tobacco after one hour of wake up.

6. Discussion

The present study is aimed to identify nicotine dependence and its variation among tobacco users who attended tobacco cessation clinic at one of the Urban Primary Healthcare Center (Dhamanaveshi) from 2017 to the end of 2023 which is located in Greater Male' Area. The specific objectives were identifying variation in nicotine dependence amongst tobacco users with regards to their demographic characteristics and practices of tobacco use.

It is noted from the present study results that mean Fagerstrom's Test for Nicotine Dependency (FTND) score is 5.6 indicating moderate nicotine dependency amongst tobacco users. The finding is corroborated by Ransing et al (2016) [18] who reported 6 as mean FTND score, which denotes

moderate nicotine dependency amongst tobacco users. Moderate nicotine dependency was also expressed in some other previous studies conducted in Korea and India (Jeong et al., 2021, Kumar et al., 2019) [19, 20].

The present study also reported that less than half (45.2%) of the study subjects had moderate nicotine dependence and 21.5% had severe or higher nicotine dependence concluding that majority (66.7%) of study subjects had moderate to high nicotine dependence which is in line with a study conducted in West Bengal India by Dasgupta et al (2021) [10] where it showed 47.5% of the tobacco users had moderate to high nicotine dependence. Furthermore, another study conducted in India by Aryal et al (2015) [13] has reported moderate to high nicotine dependence among 51% of the study participants. Whereas a previous study by Aryal et al (2015) [13] has shown higher nicotine dependency in one quarter of tobacco users who participated in the study, which is comparable to the present study. Establishing an agreement with the present study, multiple studies formerly conducted across diverse cultures have notified higher nicotine dependence among tobacco users (Du Plooy, Macharia & Verster, 2016, Saha et al., 2017 & Koks et al., 2019) [9, 8, 21]. The notably moderate to higher nicotine dependence among majority of tobacco users participated in this study could be due to higher tobacco consumption as majority consumed tobacco more than 10 times or more than 10 cigarettes in a day and majority used tobacco within half an hour of waking up.

The existing study described that majority (73.9%) of tobacco users used tobacco within half an hour of wake up. This finding establishes an agreement with some previous studies such as a study by Majumdar et al (2015) [22] who reported 88% of tobacco users consume tobacco within half an hour of waking up and study by Catherine et al (2021) [23] where 62% of study subjects stated using tobacco within half an hour of wake up. Similarly, Gabr et al (2019) [24] discovered majority (63.2%) of smokers started to smoke their first cigarette within 30 minutes after waking up.

Nevertheless, out of aforementioned 73.9% who started tobacco use within half an hour, nearly 43.8% of tobacco users used tobacco within 5 minutes of wake up. This is consistent with the findings by some previous studies (Subedi et al., 2021, GATS - India, 2016 - 2017) [12, 25]. In the same manner, almost similar finding was reported by Timilsina, Bhatta & Devkota (2022) [26] as 42.5% percentage of smokers consumed tobacco within 5 minutes after waking up. Very less number (3.9%) of tobacco users consumed tobacco after 60 minutes of wake up. In contrast, nearly one - third consumed their first tobacco product after 60 minutes (Subedi et al., 2021) [12], majority (61.3%) consumed their first tobacco product after 60 minutes (Reda et al (2013) [27] and a quarter (25%) consumed their first tobacco product after 60 minutes of wake up (Catherine et al., 2021) [23].

The study also reported that (64.3%) more than half of tobacco users had not used more tobacco during their first hours of the day and 34.2% used more during the first hours of the day. In contrast, the finding by Subedi et al (2021) [12] reported 83% of smokers used tobacco more during rest of the day than during the first hours of the day. Nonetheless, the same researcher (Subedi et al., 2021) [12] stated that smokeless tobacco users consumed more tobacco in the first 1 hour of the day. The current study also makes disagreement with some previous studies such as research by Timilsina, Bhatta & Devkota (2022) [26] who demonstrated (61.4%), Du Plooy, Macharia & Verster (2016) [9] who expressed 61.3% and Aryal et al (2015) [13] who described 52.6% smoked more frequently during the first hours after waking.

The current study also revealed that majority (63.6%) of tobacco users consumed tobacco during their illness. This is in accordance with the findings by Subedi et al (2021) [12], who discovered 76% of tobacco users used tobacco during their illness. This was further confirmed by Timilsina, Bhatta & Devkota (2022) [26] who discovered 48.6% of smokers consumed cigarettes during their illness and Du Plooy, Macharia & Verster (2016) [9] who reported 51.9% smokers used cigarettes while they were sick and on bed during most of the day.

Nicotine dependence varies with regards to the age. The present study reported nicotine dependence is highest among age group 18 - 25 years and lowest among age group 65 years and above. Contrary to this, Saha et al (2017) [8] reported a higher level of nicotine dependence amongst older age groups. It is verified that nicotine dependence increases with increase in age (Koks et al., 2019, Saha et al., 2017, Wu et al., 2012, Jayakrishnan et al., 2011) [21, 8, 28, 29], but this study opposes previous literatures from diverse populace.

This study identified that Nicotine dependency is higher among male than female. The finding is in accordance with two previous studies such as a study conducted in Turkey, which reported male smokers had higher nicotine dependence when compared with females (Guzel, 2022) [30]. A study conducted in West Bengal India also reported higher nicotine dependence among male tobacco users (Saha et al., 2017) [8].
The current study revealed higher nicotine dependence among single or unmarried and lower among widowed and married tobacco users. This is in line with a study by Schmidt et al (2010) [31] who reported higher nicotine dependence amongst unmarried tobacco users. Nevertheless, in contrast with this finding, Saha et al (2017) [8] and Wu et al (2011) found higher nicotine dependence among married tobacco users.

The existing study found higher nicotine dependence among employed tobacco users. This makes an agreement with the finding by Guzel (2022) [30] who reported higher nicotine dependence among those tobacco users who work in paid jobs. However, an opposing result was shown by Han et al (2023) [32] who discovered higher nicotine dependence in unemployed than fully employed tobacco users.

Previous studies have reported higher nicotine dependence among those who initiated tobacco use at age between 11 - 15 years (Saha et al., 2017, Robert's et al., 2013, Breslau & Peterson, 1996) [8, 33, 34]. This was corroborated by the findings of present study which found higher nicotine dependence among age group 11 - 15 years with FTND of 6.0. Furthermore, some studies have demonstrated that nicotine dependence was higher when tobacco use was initiated before 15 or 16 years of age (Charkazi et al., 2016 & Timilsina, Bhatta & Devkota, 2022) [15, 26]. Yet Saha et al (2017) [8] verified

that FTND score gradually decreases with increase in age of commencement of tobacco use.

Existing literature showed established nicotine dependency occurs after longer period of smoking and number of years of smoking is more crucial in nicotine dependency development rather than the of age of initiation (Koks et al., 2019) [20]. However, contrary to the previous literatures and contrasting to what was predicted, this study found lower nicotine dependence among those who had used tobacco for more than 30 years of duration and highest nicotine dependence was found among those who have been using tobacco for the past 6 - 10 years of duration. Opposing to this, Saha et al (2017) [8] confirmed lower nicotine dependence among those who used tobacco for less than 10 years of duration.

Formerly, it was discovered that use of multiple tobacco products or use of tobacco in mixed form is associated with higher nicotine dependence (Gomez et al., 2020. Manimunda et al., 2012 & Chandra et al., 2005) [35, 36, 37]. The presented study establishes an agreement with aforementioned literature as this study affirmed higher nicotine dependence among triple tobacco product users.

Already proven literature shows a greater nicotine dependence is associated with frequent tobacco usage and smoking rate (Oliver & Foulds, 2021 & Gomez et al., 2020) [38, 35]. The current study supported the previous conclusion as it found highest nicotine dependence among those who used tobacco 21 - 40 times per day or who used 21 - 40 cigarettes daily and lowest for those who used tobacco less than 5 times per day or consumed less than 5 cigarettes daily. Furthermore, this study also described that nicotine dependency was highest among those who used tobacco every day of the month compared with those who used tobacco for less than 15 days of the month.

7. Limitation

The research was conducted utilizing secondary data of one tobacco cessation clinic (a clinic in urban primary healthcare setup called "Dhamanaveshi") that has been collected in the past 7 years; hence this data cannot be generalized neither to all cessation clinics in Greater Male' Area, nor nationwide. With this data it is suggested that future researches can be conducted to discover the given objectives using data of other cessation clinics and do a comparative analysis.

This piece of research work assessed data pertaining to given objectives; thus, data unrelated to given objectives were not considered for this study. Moreover, chance of information bias and recall bias are highly likely especially while reporting the items included in Fagerstrom's test for nicotine dependence and practices of tobacco use.

8. Conclusion

The study concluded that majority of tobacco users initiated this habit before 18 years of age and most of them consumed at least 10 cigarettes in a day with majority consuming tobacco for at least 10 years of duration. Large amount of tobacco users were cigarette smokers who consumed mostly camel brand cigarettes and most of them inhaled tobacco smoke or liquid in for their use. Majority of the tobacco users had moderate nicotine dependence. Majority used tobacco within half an hour of waking up, while most of them did not use tobacco during the first hours of the day Most used tobacco during the rest of the day than morning hours and majority used tobacco while they were ill and most of the day on the bed.

Awareness on health risks of tobacco use, benefits of quitting, targeting children and young adults, orientation about cessation services for the healthcare providers needs to be implemented or strengthened and more tobacco cessation trainings to be conducted for healthcare workers, which will consequently motivate tobacco users to quit. Furthermore, introduction of cotinine testing and conduction of a prospective study is also required to analyze the perception of people towards the cessation clinics, assessing reasons for relapse and barriers for quitting.

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Disclaimer: This is an article produced by selecting certain objectives from original research. Nevertheless, no article has been published yet with this title in a peer reviewed journal. An article by titled "Characteristics of tobacco users who visited the tobacco cessation clinic in an urban primary healthcare center in Male' Maldives from 2017 - 2023: A retrospective, descriptive cross - sectional study" (A. A. Hameed, 2024) [39] was produced and published by same author in a peer reviewed journal. Future articles may be created using different objectives from original research and may be published in the near future in peer reviewed journals.

Conflict of interest: The author is the primary researcher who works as a team member at tobacco cessation clinic established in one of the urban primary health care centers (Dhamanaveshi) in Greater Male' Area, Maldives. The author received no financial benefits or incentives while doing this research.

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