

Relationship of Cigarette Nicotine Dependence Level in Male Schizophrenic Patients and Their Parents

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Abstract

Tobacco smoking is a major leading cause to prevented death, high prevalence of nicotine cigarette smoking has been found in many psychiatric disorders especially in schizophrenic patient that makes therapy for this disease become more complicated. Smoking behavior has multi factorial reinforcement in general population and schizophrenic patient. This is descriptive analytic study with cross sectional method using Fagestrom test for nicotine dependence (FTND) to measure level of nicotine dependence in 80 male schizophrenic patient and their parents. The result found correlation between high level of nicotine dependence within age group 25-29 and 35-39 years, low educated unemployment, and consistent level of cigarette nicotine dependence among patients with their father. The strength of this relationship has a weak degree with $r = 0.452$, that indicates there is a certain of people that is susceptible to the development of nicotine dependence and state of schizophrenic disorders.

Keywords: schizophrenic, father, cigarette nicotine dependence

1. Introduction

Tobacco smoking is the leading cause of preventable death in the United States (US), smoking has long been the target of public health interventions and research that has been directed at specific populations such as the population of pregnant women, adolescents and patients with psychiatric disorders.¹

Many studies have found that smoking is more frequent in males than female.¹ Patients with mental health problem the prevalence of smoker $\pm 76\%$ and smokers were diagnosed with psychiatric disorders consume as much as 44% of the total consumption of cigarettes in the US. The prevalence of nicotine dependence in psychiatric disorders $\pm 65\%$,² prevalence of smoking in schizophrenic patients approaching 70-90%³ and the prevalence of cigarette nicotine dependence in schizophrenic patients reached 28.5% with odds ratio 2.8 times greater than the general population⁴. Smoking in schizophrenia important in the field of health care expenditures for the physical, financial and quality of life, $\pm 33\%$ of schizophrenic patients suffering from coronary artery disease, 2 times greater than the general population, suffering from lung cancer 2 times larger than the general population.⁵

In schizophrenic patients an increasing level of nicotine and cotinine in the body of a schizophrenic smokers is caused by increase intake of nicotine in each cigarette smoked as a characteristic of this population.⁶ There are various theories why there is a high prevalence of smoking in schizophrenic patients. Recent emphasis on the factors that lead to the neurobiology of the basic physiological state. One model states that smoking is a schizophrenic person's attempt to reduce the side effects associated with the use of antipsychotics.^{3,6-8} Likewise, there are many discoveries about the abnormality of expression or distribution of the various components of the schizophrenic patient's brain cholinergic system.⁹ Meanwhile other substances in cigarette like tar which is polycyclic aromatic hydrocarbons induce cytochrome enzymes (CYP1A2) increase the metabolism of antipsychotic drugs and will cause an increase in the dose of antipsychotic and indirectly associated with increased side effects.⁶

Furthermore organizers of psychiatry and mental health services themselves do not really show seriousness to forbid cigarette consumption in schizophrenic patients where smoking is still used as a kind of reward, medical and non-medical staff smoking within the hospital area, and not routinely diagnose nicotine dependence among patients.⁵

Cigarette tobacco smoking is the way most appropriate to consume nicotine, but dangerous as this can maximize the chance to developed nicotine dependence. Smoking will deliver a large dose of nicotine into the brain "reward" circuit but also deliver a variety of carcinogens and other toxins that can destroy cells in the liver, lungs and other body tissue.¹⁰

Until recently there are two known nicotinic receptor subtype in the brain is a major $\alpha 4 \beta 2$ nicotinic found on postsynaptic dopaminergic neurons also on Gamma Amino Butyric postsynaptic interneurons Ergic Acid (GABA - Ergic) in the ventral tegmental area (VTA), and $\alpha 7$ nicotinic which can be found on presynaptic glutamate neurons, in theory the action of nicotinic on VTA associated with addiction, while the action of nicotine on $\alpha 7$ nicotinic receptors in the prefrontal cortex associated with procognitive activity and mental alertness. $\alpha 4 \beta 2$ nicotinic receptor is adapting to a chronicaly and intermittent delivery dose of nicotine and could cause addiction. At the beginning this receptor is in a resting state and then desensitizes when smoking

so it can not react with the addition of nicotine, the length of desensitization roughly all the time to spend a single cigarette (± 7 minutes), and after that it takes time to resensitization the receptor and the time required is approximately equal to the distance required between a cigarette and the next one which is about 45 minutes so it takes no less than 20 cigarettes for nicotine needs in 16 hours and by any chance suit to the physical form of cigarettes that we know which length about 7 cm and 1 pack may consist of 20 cigarettes. If all receptors have desensitized all the time, will lead to an increase number of receptor neurons (up regulating). This condition responsible for craving behavior.¹⁰

Population based prevalence studies concluded, individuals with mental illness have a tendency to smoke 2-3 times greater than other individuals.¹² Research on clinical practice and epidemiology in mental health, a brief report on a patient with a mental disorder who are hospitalized in a psychiatric care unit in relation to assessing changes in smoking habits, an increase from 56 % to 70 % smoking habits found before being admitted and after treatment inpatient and there are 17 % who decreased smoking and about 63 % smoke more than before. The average number of smoking tobacco in a day increased 5 to 13 times more. The main reason for smoking is boredom, stress and a desire to be able socialize.¹²

Research that examines aspects of smoking motivation schizophrenic patients concluded the biggest motivation is for the pleasurable effects of smoking tobacco cigarettes and the effects of psychomotor stimulation which is significantly related to the amount of antipsychotic doses per day. Anxiolytic sedative effects of smoking are associated with increase used of anticholinergic psychiatric drugs,^{1,13} But animal studies comparing the increase in the number of nicotine receptors in the group given nicotine alone compared with the group given nicotine with antipsychotic haloperidol showed an increase number of cortical nicotinic receptors in both groups, which ultimately concluded that the abnormal regulation of nicotinic receptors that occur simultaneously with nicotine treatment was not associated with chronic antipsychotic treatment.¹⁴

The high rate of smoking among schizophrenic patients reflects the effect that smoking has become a habit, and an inability to control impulses. In the past, tobacco has been used in the hospital as a kind of reward. Psychiatric disorders patients usually hypohedonic and are less responsive to other driving factors and smoking is one of the few factors that effective.¹²

Although management has changed and the trend these days leads to a smoke-free hospital, but the high levels of unemployment, decline in social activity and boredom in general contributed to the schizophrenic patient's smoking habits.¹²

In biological research suggests that nicotine interactions with dopamine contribute to smoking behavior in schizophrenic patients, nicotine acts as a regulator of mood and increase alertness and attention. A depressed prefrontal dopamine is hypothesized to be related to negative symptoms may be reduced by nicotine. Therefore some patients utilizing smoking when the moment he started using it.^{13,15-17} The negative effect of smoking should be wary, especially in schizophrenic patients because schizophrenic patients tend to smoke cigarettes with higher tar, inhale more deeply and with longer periods so that it can lead to physical illness such as lung cancer and respiratory disorders.^{1,3,13,18}

2. Subject and Methods

This study was approved by the Research Ethics Committee of Medical Faculty University of Sumatera Utara. This a descriptive analytic research with cross sectional design that uses a questionnaire of Fagerström Test for Nicotine Dependence (FTND), which has been translated into Indonesian to determine the level of dependence on nicotine tobacco cigarettes. Selection of sample with consecutive sampling of 80 schizophrenic male patients. Research conducted at the clinic of Province North Sumatra Government's Mental Hospital in Medan, Indonesia from January 29 to March 12, 2011. Inclusion criteria male schizophrenic patients who were diagnosed based on ICD-10 who smoke and get treatment at the clinic, are addicted to nicotine cigarettes accordance to the DSM - IV - TR, aged 15-45 years, cooperative and can be interviewed, having a biological parent who is willing to be interviewed. Exclusion: difficulty to communicate unable to read and writing. The whole subject of study has been given an explanation of the study were then asked to consent, as well as the subject of parents who participated in this study. This study was approved by the Health Research Ethics Committee at the Faculty of Medicine, University of Sumatera Utara.

2.1 Assessment and Rating

The entire male schizophrenic patients who smoke and meet the inclusion criteria filling written consent to participate in the study after receiving a detailed explanation, then the subjects filled out a FTND questionnaire that has been translated into Indonesian and assisted by parents. The results of each FTND questionnaire filled out by the patients were then assessed whether it has value to nicotine dependence in two levels of low or high, his biological parents were also given the same questionnaire to determine if they also have or are experiencing cigarette nicotine dependence. The results of the interviews and assessment questionnaire is then processed by the chi-square statistical test and Spearman correlation test.

2.2 Statistical Analysis

Univariate analysis was performed to describe each variable and was described by frequency table. The statistical analysis were assessed by T-test for the independent sample, using SPSS 15.5. A significant level was considered as 5%.

3. Result

Eighty male schizophrenic subjects addicted to cigarettes and nicotine can be retrieved information on smoking behavior from biological parents. Based on the demographic characteristics of the highest proportions are age 30-34, residing in Medan, Batak tribe, equivalent of high school education, worked. In the interview, the measurement of nicotine dependence level in patients and parents was found, in 46 subject with low dependence and 34 subjects with high dependence. In Father the absence of dependence found as many as 13 subjects, 39 subjects with low dependence, 28 subjects with high dependency. In mother was found absence of dependence 74 subjects, 6 subjects with low dependence and high dependence was not found. With the chi-square test found a significant difference $p < 0.05$ at the level of cigarette nicotine dependence based demographic characteristics of age, education level and employment status. It was also found significant differences in the level of dependence of the father and with the Spearman correlation test the strength of this relationship is found with $r = 0,452$.

4. Discussion

In this study, all subjects were male schizophrenic patients. Smoking is common and is usually found in men. This corresponds to the cohort study performed on recruit's teenage boys to become soldiers in Israel. The teenager has been previously examined to rule out psychiatric disorders and then subjects were followed until 4-16 years, from 14.248 subjects, 4052 reported smoking at least one cigarette / day, the population prevalence of schizophrenia is later found a relative risk of 0.3 % and more high against smokers is equal to 1.94 with 95 % CI for 1:05 to 3:58 for undiagnosed schizophrenic later in life. In smokers 1-9 cigarettes / day had 1.38 times the risk of suffering from schizophrenic treated later, and smokers ≥ 10 cigarettes / day had a risk of 2.28 kali.²⁰

By age group found that the largest proportion of subjects studied age is 30-34 years age group of 20 people (25 %) and 20-46 year age intervals subject. In studies in Geneva on patterns of smoking behavior change were compared between schizophrenic patients and the general population has a mean age of 36.1 years with a sample interval of 19-65 years of age. While in this study the age interval becomes narrower because the patient still must have a parent who could be interviewed so that the oldest subject is 46 years of age.³ The chi-square statistical tests established correlation between the level of dependence on nicotine cigarettes male schizophrenic patients based on age characteristics were analyzed at a significance level of ≤ 0.05 , resulting in $p = 0.038$. Where low nicotine cigarettes dependence ($n = 46$) was found highest in the 30-34 age group as many as 14 persons (30.4 %), whereas higher cigarette nicotine dependence ($n = 34$) the highest found in the age group 25-29 as many as 10 people (29.4 %) and in the age group 35-39 as many as 10 (29.4 %).

From the characteristics of the patient's residence is located in the largest city of Medan as many as 60 people (75 %) and outside the city of Medan as many as 20 people (25 %). In a study in Bangalore, India found the number of patients who come to the Mental Hospital, more came from the countryside (rural areas) in contrast to the study, more patients residing in the city of Medan. This is possible because the clinic is in the city of Medan and makes it received a visit from the town more frequently than in patients from outside city.²

From the characteristics of tribe, most of the largest tribe of subject is Batak tribe as much as 49 people (61.3 %) and non Batak tribe 31 (38.8 %). The tribes that exist in the city of Medan is very varied and Batak tribe itself has subtribe consisting of five types: Batak Toba, Mandailing, Karo, Simalungun and Pak - Pak / Dairi usually found dominant in their home areas around the city of Medan. While non Batak subject in this study include the Malayu, Javanese, Sundanese, Acehnese, Padang and Madura.

From the characteristics of educational level is at the senior high school level as many as 56 subject (70 %), junior high school 10 subject (12.5 %), primary school 8 subjects (10 %), University 6 subject (7.5 %). Research in Geneva about the pattern of changes in smoking behavior were compared between schizophrenic patients and the general population also take patients based on the range of education data length of time (in years) subjects received a formal education. Found subjects received a mean of 12.2 years of formal education for 4-22 year intervals are approximately equal to the time formal education in Indonesia and the largest study on the subject of education level is roughly the equivalent of high school which is ever received an education until graduating from high school or less 11-13 years and the study sample was not found patients who did not graduate from 5th grade means a minimum of 4-7 years received a formal education and higher education are roughly scholars receive formal education 16-18 years, although the average education formal according to research but the interval is found to be higher levels of education on the research in Geneva 3. the chi-square test statistic with a significance level ≤ 0.05 discovery of the relationship between the patient's level of dependence on nicotine cigarettes based on the characteristics of the education level of $p = 0,02$. A low level of

nicotine dependence largest cigarette at a rate of as many as 33 subject with senior high school education (71.7 %) and unior high school 9 people (19.6 %), whereas higher levels of nicotine dependence was found most cigarettes are also at the level of senior high school education as much as the 23 (67.6 %) and in all subject of primary school of 8 people (23.5 %) . Low levels of education tend to have higher cigarette nicotine dependence, possibly because these subjects were not working and were in family environment all the time , it is also consistent with the results of the analysis in which the factor unemployed tend to be high on the subject of nicotine dependence .

From the characteristics of the marital status of the subject, the largest proportion of the subjects who did not married as many as 59 people (73.8 %) married 19 persons (23.8 %) and widowed by 2 people (2.5 %). Subjects who are not married and live with their parents or family has the largest proportion in this study.

Based on the status of employed on the subject that the largest proportion employed subjects by 48 people (60 %) and unemployed as many as 32 people (40 %). Although the study did not include type of job , but from the data base, very few of schizophrenic patients have a permanent job , and most job are unskilled laborers who are paid daily as construction laborers, couriers, rickshaw pullers and farm laborers. Above in consistent with the state of the research in Geneva on how schizophrenic patients spent money from the income in this study concluded that 72 % from the rest of routine expenses, is still used for the purchase of psychoactive substances like tobacco cigarette.²¹chi square test with significance level ≤ 0.05 found a relationship between the level of cigarette nicotine dependence based on employment status ($p = 0.0001$) in which patients have low levels of nicotine dependence with status of employed 36 persons (78.3 %) while high nicotine cigarettes dependence were found in subjects with unemployed status as many as 22 people (64.7 %) .

A large proportion of the age of smoking initiation was found most active at the age of 15-19 years as many as 46 people (57.5 %). The results of the above in consistent with the Finnish study on the relationship of smoking initiation with the prodromal phase find age start to smoke regularly are at a mean age of 18.8 years with a standard deviation of 4.5 years in male subjects diagnosed with schizophrenia.²²

From the data of FTND scores found 6,025 FTND mean score and standard deviation 1,53 . The highest and the smallest subjects score 9 and 3. In the present study found the proportion of cigarette nicotine dependence in patients ($n = 80$) more on the level of dependence of low nicotine cigarettes as many as 46 people (57.5 %) compared with the high- nicotine cigarettes as many as 34 people (42.5 %) . in the Spanish study schizophrenic patients tend to start smoking 5 years before the onset of the disease and the onset of schizophrenic subjects appeared at a mean age of 20 years , after the age of 20 years smoking habit be more severe than the normal control study using Spanish FTND, with FTND score ≥ 6 interpreted as higher cigarette nicotine dependence . The study has a schizophrenic male subjects ($n = 146$) and found 76 % of subjects had higher cigarette nicotine dependence and the results of the research in Spain is much larger than the results of the current study , but the research when re-assessed the percentage of heavy smokers (> 30 cigarettes / day) found only 43%²³ . Difference scores and interpretation of cigarette nicotine dependence in current research is made possible due to the modification of the measuring instrument used FTND with a maximum value of 11 and > 6 can only be categorized as high cigarette nicotine dependence (FTND Indonesian) . Modified FTND was found also in studies in India that include the measurement of tobacco cigarette use homemade or called by beedi, chewed tobacco (in size cans / pack) and the use of betel nut (containing arecholine which stimulates nicotinic receptors and muscarinic and is usually used in conjunction with chewed tobacco.² Something similar may occur in patients with schizophrenic men and their parents , but in this study only a limited measure nicotine delivery by cigarettes . Patients themselves may also try to not tell the actual habits and their consumption of cigarettes because of many complaints of parents and caregivers that the patient himself is often picking up the rest of the cigarette butts to smoke and often join other smokers or patients together to share a cigarette and inhaling the smoke together. It also can provide the supply of nicotine this statement is supported by research that extracting nicotine levels in cigarette filters contained cigarette butt , which had a mean nicotine contains 0,31mg,²⁴ comparative study between mainstream smoke is the smoke that is inhaled by the smoker compared side- stream smoke or fumes that are released into the environment however, the number nicotine on the side stream smoke was found 4 to 6 times greater (3,758 – 7,457mg) than mainstream smoke , which implies that passive smoking can also consume nicotine even though were not using any tobacco products.²⁵

Data analysis of the results of the biological father FTND scores $n = 80$ found a mean score of FTND 5,175 with a standard deviation of 2.87 with a median value score 6.in frequency measurements the greatest proportion of cigarette nicotine dependence of biological father is a low level of dependence on nicotine cigarettes as many as 39 sujects(48.8 %) , then higher cigarette nicotine dependence were 28 people (35 %) and no nicotine cigarettes were 13 (16.3 %) . From the chi-square test with a significance level of $p \leq 0.05$ found a relationship between the level of nicotine dependence in patients with his biological father with $p = 0.0001$ fathers with low cigarettes nicotine dependence, found in son(male schizophrenic patients) with low cigarette nicotine dependence were 31subjects (67.4 %) . Father with high cigarette nicotine dependence found in son

(male schizophrenic patients) with higher cigarette nicotine dependence were 22 subjects (64.7%). This shows the level of nicotine dependence similar between father and son (male schizophrenic patients) in a weak positive association of cigarette nicotine dependence rate of patients with a biological father which was analyzed by Spearman correlation statistical test ($r = 0.452$). In the Finnish study on the relationship of smoking initiation by prodromal phase also found an increasing trend of smoking in schizophrenic patients related to smoking habits on the father in the family.²

5. Conclusion

Cigarette nicotine dependence in schizophrenic patients is a situation that contributes to the overall poor quality of life of patients because it can affect the progress of therapy for schizophrenia, aggravate the side effects of antipsychotics and increase the risk of severe physical illnesses.

From this study found the largest proportion of subjects by age group is at age 30-34 were 20 people (25%), the proportion of the characteristics of the patient's residence is located in the largest city of Medan as many as 60 people (75%), the proportion of the largest ethnic group is Batak tribe as much as 49 people (61.3%), the proportion of the largest education level is at the senior high school level as many as 56 people (70%), the largest proportion of the subject of marital status is not married as many as 59 people (73.8%), the largest proportion in the subject based on the status job is employed for 48 people (60%), the largest proportion of ages ranging from active smoking in subjects aged 15-19 years was found in as many as 46 people (57.5%).

From the results of this study found a relationship between the level of nicotine dependence cigarette male schizophrenic patients based on demographic characteristics, age ($p = 0.038$), education level ($p = 0.02$) and employed ($p = 0.0001$).

Found FTND mean score of 6,025 in patients, the mean FTND score of 5,175 in fathers. Found the relationship of cigarette nicotine dependence levels in patients based on the level of dependence on nicotine cigarettes father ($p = 0.0001$). But the strength of the relationship between cigarette nicotine dependence levels of patients with the biological father have a weak degree of statistical tests were analyzed by Spearman correlation ($r = 0.452$).

Advice for this study are:

- Substance use and dependence are common in the community, it is part of the problems related to the field of public health, medical, educational, social, economic and legal. The seriousness and cooperation between these areas will be able to reduce the harm of cigarette use.
- In the field of psychiatry itself associated with substance use disorders is a clinical disorder that usually accompanies other psychiatric disorders are often clinically referred to as dual diagnosis. Comprehensive management as well as directed, will help to achieve the goals and targets of prevention, treatment and rehabilitation of both general and special populations such as schizophrenic patients.
- It should be encouraged non smoking in Hospital environment awareness to encourage behavior change, starting from providing space for smoking, posters or information of the harm of smoking.

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