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# CIGARETTES WASTE RECYCLING, NICOTINE METABOLISM RELATIONSHIP TO OBESITY RATE IN OMAN; SURVEY STUDY

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## 1. Abstract

Nicotine is recently reported for potential applications in the medical sector as a drug for Parkinson's disease and obesity. Oman is one of the countries which suffer from obesity. This study is based on survey distribution to estimate the amount of cigarette waste produced in different areas to recycle them for nicotine extraction. Moreover, this survey will support finding the relation between smoking and obesity in Oman. It was conducted in Oman to study the obesity rate, awareness of people, and knowledge about the risk of cigarette waste on the environment and possible solutions for this problem such as recycling useful products. The study population consisted of participants from 11 governorates in the Sultanate of Oman. The findings reveal that women (11.11%) in Oman are less likely to smoke than men (88.89%). Overall, only 5% of the smokers were obese, while more than half of the smoked participants (54.4%) were having a body mass index less than 25 (underweight and healthy). A high percentage of smokers was clearly observed among workers (35%), then students, and finally job seekers especially from Muscat. About 28% of obese people have high blood pressure and high cholesterol .11.11% of people from 18-25 had more awareness towards the danger of smoking. Most of the respondents agreed with recycling cigarettes waste (57.6%). This shows that a high number of cigarettes butts have made their way into the environment, so it is strongly recommended to recycle cigarettes waste into usable and environmentally friendly medications.

**1.4 Keywords:** Nicotine, Smoking, Cigarettes, Obesity, Health, Recycling Cigarettes' Waste, Oman.

## 2. Introduction

Nicotine (contained naturally in the tobacco leaf, it has a large concentration of leaves. It accounts for a range between 0.3 and 5 percent of the plant via dry weight. Biosynthesis occurs in the roots and is stored in the leaf (Maheshwari, 2012). More than 10,000 people defined Nicotine as one of the most popular Prominent groups of natural ingredients of toxicological and medicinal significance have played a major role in the removal of insects (Ujváry, 1999). The alleged health danger linked with smoking cigarettes and nicotine are used as insecticides due to Nicotine has many harmful chemical and physical characteristics. Toxicity, ionization, oxidizing, volatile, and corrosive and the inflammability are the most common chemical properties in nicotine. It has also an acrid smell and a burning taste (Kishore, 2014) as physical characteristic. Add to this, it has high pH which is responsible for its addictive nature. Nicotine powerfully alkaline (pH= 8-12) and is the most characteristic constituent, (Jahn, 2002). It catches fire when it in powder form and absorbed by the skin easily. In addition, nicotine is volatile when it is

extracted as oil and rapidly oxidized when in contact to the air and light. It has been interpreted that a strongly basic nitrogen atom is needed for greater ionization (Yamamoto, 1999). High nicotine toxicity in 36 mammals (half lethal dose, LD50 = 50 mg/kg). Yamamoto has established a universal principle that all toxicity nicotinoids handled with a 3-pyridylmethylamine moiety usually contains an extremely basic nitrogen atom (Yamamoto, 1999).

Waste has become one of the world's most urgent issues today. People have been consuming nicotine in different ways. Cigarettes are the most polluted things among all of this trash. Cigarettes account for a whopping 1.2 trillion tons of litter per year, accounting for 38 percent of all litter (Rosete, 2015). Nicotine is one component can extract from cigarette and it used in environment in different ways. Pyrethrum, rotenone, nicotine, and other botanical pesticides were the only pesticides used in the Western World until WWII (Jacobson, 1989).

The Tobacco Plant- *Nicotiana tabacum*- is possibly taking responsibility for more death than any drug. Current, illogical use of tobacco responsible for more than 3 million deaths worldwide every year from cancer, emphysema and heart disease and if existing patterns remain an average daily death is projected to reach 10 million by approximately 2030. (Kishore, 2014). More than 4,000 chemicals are released when this herb is burning; which has effects on the brain and lungs (Kishore, 2014).

Actually there are several unhealthy impacts behind taking tobacco and nicotine too. Kishore, (2014) classified the sequences into two categories based on the period of its effect on the human body which are short- and long-term effect. The short terms it has been confined in addiction of nicotine which will Increased the probability of opioid use and unhealthy behavior. Also, it causes some mouth health issues such as trouble in chewing, swallowing and lifting tongue or mouth, dirty and sensitive teeth or tooth loss and excess saliva development, drooling and poor breath. Moreover, affects the characters and the personality in which the stains on clothing and smelly hair and clothes are obvious on smokers (Adeniyi and Ghazal, 2012). On the other hand, taking tobacco and nicotine has many effects on heart health. Long term smoking can cause hypertension, blood vessels blockage, degraded beating of the heart and also it can weaken supply of blood to the brain which will cause strokes (Sivanandam, 2010). They also cause disorders of the lungs -Changing the size and form of the lungs airways, the Emphysema- a lung disease characterized by abnormality- and also they increase the risk to infection of respiratory system (Sivanandam, 2010). Coronary artery can contribute to thrombosis; needs improvements in the activity of epithelial cells, white cells, fibrinogens, and blood clotting factors. (Barua and Ambrose, 2013). They have been many effects on the reproductive condition for men like impotence and women; early menopause and trouble sustaining pregnancy (Gambo et al., 2013). Fetal death, low birth weight, sudden death phenomenon, kids born may have upper respiratory problems, ear problems, allergy, behavior problems, prematurely discolored skin, gum and teeth loss and missing or poor sense of taste and scent for the newborns as a result of taking during pregnancy. The most common and dangerous effect of dealing with nicotine and tobacco is cancer diseases (Sivanandam, 2010). Cancers of the lung, upper respiratory tract, kidney, cervical, throat, stomach cancer, mouth, larynx, pancreas and bladde (Barua & Ambrose, 2013) (Kishore, 2014).

Obesity plays an important role in negative affect cardiovascular dangerous factors and diabetes mellitus. As research into the molecular mechanisms underlying energy homeostasis progresses, it is becoming clear that neuropeptides' modulating effects are also important in the control of energy homeostasis (Li et al., 2005). In many areas of the autonomic nervous system, nicotine has been shown to produce effects and, in particular, to cause catecholamine's to be released from the adrenal medulla. In turn, the catecholamine's released from the adrenal medulla are capable of producing extensive effects on different aspects of general body metabolism, and some of these changes have been suggested to be significant in the medulla (Schechter & Cook, 1976).

Some epidemiologic studies indicate that nicotine may protect against chronic diseases like Alzheimer's, obesity and Parkinson (M. Li et al., 2005). Parkinson's disease (PD) is a neurodegenerative disease that affects people as they get older, with a prevalence rate of 1–2% in mature aged 55 and above. A recent degeneration of dopaminergic neurons in the substantia nigra pars compacta was used to characterize it., which leads to tremor, tension, bradykinesia, and, most likely, dementia (Bezard et al., 2001). Nicotine has been suggested as a potential treatment for Parkinson's disease, with a central role in controlling striatal hobbies and patterns of behavior mediated by the dopaminergic system. (Ma et al., 2017).

Nicotine from cigarette waste was analyzed using a variety of chemical and physical methods. Tobacco elements were analyzed using inductively coupled plasma mass spectroscopy (ICP- MS) (Rafiqi et al., 2019). Nicotine was extracted from cigarette waste using a liquid-liquid solvent extraction process (Joseph-Nathan, 1967). Moreover, the polarimeter used to examine the characterizations of nicotine such as density, mass weight (MW), boiling point (BP) and milting point (MP) measurements and pH determined by pH meter (Karastogianni et al., 2015). In addition, the functional groups of nicotine could be determined by using IR spectrophotometer (Y. Ma et al., 2018).

Eventually, a survey was designed to study the relation among smoking and obesity in Oman and the essentiality of recycling cigarette waste to turn it into beneficial products. Basically, the major focus of this research is to investigate the impact of nicotine metabolism in decreasing obesity ratio in Oman which is one of the areas with high obesity rate in Middle East.

## 2.1 Need of the study:

The rate of obesity in Oman increases to reach 60.5% in 2017 (Yousuf,2017). Due to the early 1980s oil boom, a growing number of Omanis have left villages areas and labor-intensive traditional employment in favor of more sedentary jobs as civil servants in Muscat. This of one reasons for obesity in Oman (Al-Lawati & Jousilahti, 2004). This study will focus on the prospective of recycling cigarette waste, studying obesity in Oman and investigate the relationship between the nicotine inside cigarette and reducing the body weight. To achieve this aim, the following goals will be pursued: Preparation a questionnaire to investigate obesity, nicotine intake by smokers, health effect, environmental problem and recycling cigarette waste. Distribution of the survey on a variety of platforms (e-mails, Microsoft Teams, linked-in, WhatsApp, Instagram, etc.). Determination of the degree to which different Omani generations are aware of the effect of cigarettes' waste. Studying Oman society's attitudes toward the product created by recycling cigarettes' waste and Investigation possible waste collection methods for recycling cigarettes waste into medicinal products to treat obesity.

# 3. Material and Methods

Employing Google forms, a cross-sectional questionnaire was conducted in Oman over the period of 13 days, from May 11 to May 24, 2021. Omanis and expatriates from 11 governorates across the Sultanate of Oman made up the study population, the governorates are: Muscat, Musandam, Al-Wusta, Dhofar, Al-Buraymi, Al-Sharqiyah North, Al-Sharqiyah South, Al-Batinah North, Al-Batinah South, Al-Dakhiliyah, and Al-Dahra. The survey was distributed among different generations including young (19-40 years old), mature (40-60 years old), and elderly (above 60 years old). The survey was conducted digitally on a variety of platforms (e-mails, Microsoft Teams, linked-in, WhatsApp, Instagram, etc.). Each governorate's sample was selected randomly.

The Omani population was studied using the approved and translated English version of the questionnaire (Appendix 1). The questionnaire was divided into four sections, each with a mix of closed-ended and short-open-ended questions. At the beginning of the questionnaire, a brief cover letter explaining the importance and key goals of the study was attached. The survey was created with the following topics in mind:

The first section was about Demographic and characteristics, with seven questions collected data about

governorate, gender, age, weight, height, social status, and work status. Obesity and related diseases are in the second section, participants answered the question if they are obese or suffer from related-obesity health problems. In the following part, Smoking and its effects, the participants asked if they smoke. Moreover, participants who are smokers were asked to answer questions about the age they have started smoking, how many cigarettes they smoked per day, the level of remaining smoked cigarette and what kind of cigarette they used. In addition, participants asked if they take other tobacco product, if their answered was yes, they asked to mention what is the product. Furthermore, this section includes another question to determine the opinion of smokers toward their belief about how smoking is dangerous. The responses were measured by using five points Likert scale (Very dangerous, dangerous, does not affect, do not care, useful). The smoker participants were asked also about the health effects resulting from their smoking habit and their disposal methods of the cigarette after finishing. The last section was under name Recycling cigarettes wastes, all participants (smokers and non-smokers) were asked if they believe in recycling cigarettes wastes and their knowledge about the products that can be produced from recycling cigarette wastes.

# 4. Results & Discussion

Obesity in Oman is being investigated, as well as the correlation between nicotine inside cigarette and weight loss. A total number of 570 respondents contributed and supported the aim of this research. This chapter will detail the results analysis of the questionnaire, different parts will be discussed including demographic characteristics, distribution of the smokers over the governorates, effect of smoking on the weight status based on BMI, obesity and related health problems, smoking recognition depending on age and gender, smokers knowledge towards health problem resulting from smoking, health effects resulting from smoking remaining part of smoked cigarette, other tobacco product consumed by smokers, disposal methods of the cigarette waste and awareness towards the uses of products produced from recycling cigarette wastes.

## 4.1 Demographic characteristics

The total sample size was 570 of respondents whether an expatriate or resident took a part in this survey. The questionnaire was distributed to all of the eleven governorates of Oman (Muscat, Musandam, Al-Wusta, Dhofar, Al-Buraymi, Al-Sharqiyah North, Al-Sharqiyah South, Al-Batinah North, Al-Batinah South, Al-Dakhiliyah, and Al-Dahra.). It is targeting various generations who's their ages from eighteen and above. The demographic characteristics and information of responses is outlined in Table 1. In addition, the sample size was carried out by 570 participants with about 57.89% of respondents were females and 42.11% were male. The age ranges of respondents were 18-25, 26-33, 34-41 and more than 42 years. The age of the majority respondents was in the range between 18-25 year (n = 267) by 46.84%. The highest per cent of participants was found as workers (n = 228) which carries about 40.00% comparing with job seekers and students, 23.16% and 36.84% perceptively.

Table 1: Characteristics of study sample

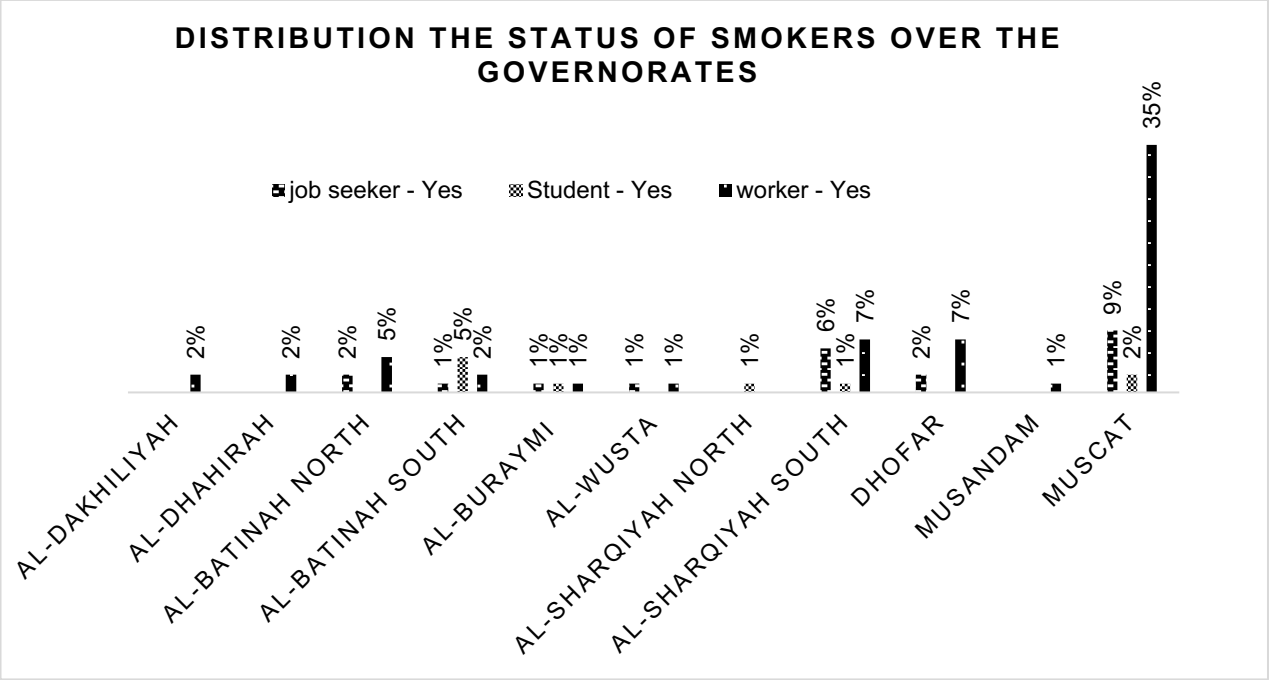
| Variable | Total out of 570 | Percentage % |
|---|---|---|
| Governorate | | |
| Al-Dakhiliyah | 51 | 8.95% |
| Al-Dhahirah | 21 | 3.68% |
| Al-Batinah North | 83 | 14.56% |

| | | |
|---|---|---|
| Al-Batinah South | 128 | 22.46% |
| Al-Buraymi | 13 | 2.28% |
| Al-Wusta | 13 | 2.28% |
| Al-Sharqiyah North | 36 | 6.32% |
| Al-Sharqiyah South | 26 | 4.56% |
| Dhofar | 23 | 4.04% |
| Musandam | 7 | 1.23% |
| Muscat | 169 | 29.65% |
| Gender | | |
| Female | 330 | 57.89% |
| Male | 240 | 42.11% |
| Age in years | | |
| 18-25 | 267 | 46.84% |
| 26-33 | 140 | 24.56% |
| 34-41 | 94 | 16.49% |
| More than 42 | 69 | 12.11% |
| Social status | | |
| Married | 259 | 45.84% |
| single | 306 | 54.16% |
| Status | | |
| job seeker | 132 | 23.16% |
| Student | 210 | 36.84% |
| worker | 228 | 40.00% |
| Smoker | | |
| Yes | 489 | 14.21% |
| No | 81 | 85.79% |



## 4.2 Distribution of the Smokers Over the Governorates

Based on the responses, most participants were from Muscat governorate by 29.65%, as illustrated in Table 1. Besides that, around 45.68% of smokers present in the capital of Oman (Muscat) and 35% of them are workers. However, the majority of smokers over the governorates were workers, where Dhofar and Al-Sharqiya South were the second highest of smokers from them by 7% and 5% of workers was from Al-Batinah North. In addition, smokers who are job seekers were the high in Muscat, Al-Sharqiya South compared to Dhofar and Al-Batinah North contributing by 9%, 7%, 2% and 2% perceptively. In contrast, the lowest percentage of smokers was from student's category and shown in Al-Batinah South with 5%.

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The high percentage of smokers is clearly observed among workers Figure 1then students and finally job seekers especially from Muscat. This can be due to the high population in Muscat. Moreover, starting with the discovery and export of crude oil, the Sultanate of Oman experienced rapid socio-economic development, which was accompanied by a transformation from traditional to "Western" lifestyles, including diet changes, lack of physical activity, and an obvious increase in smoking rates among employees in the capital Muscat (Al-Lawati & Jousilahti, 2004). Furthermore, there was a study done between a workers and found about a quarter (25%) of the participants were habitual smokers (Haukka et al., 2012). According to (Prochaska et al., 2020), (61%) of job seekers declared they have earned the habit of smoking because they live with a smokers. As mentioned above, the highest percentage of smokers in Al-Batinah South were students. The published paper done by (D. Li et al., 2020) is similarly supporting that the (72.9%) of people with a high school diploma and some college (no degree) or associates degree were more likely to vape and smoke than individuals with other levels of education. According to the survey conducted in some cities of the Sultanate of Oman by (Al-Harthi et al., 2018), 41% admitted that they were influenced by friends in the practice of

smoking and this is one of the expected reasons for the high percentage of students who smoke in this governorate.

## 4.3 Effect of smoking on the weight Status based on BMI

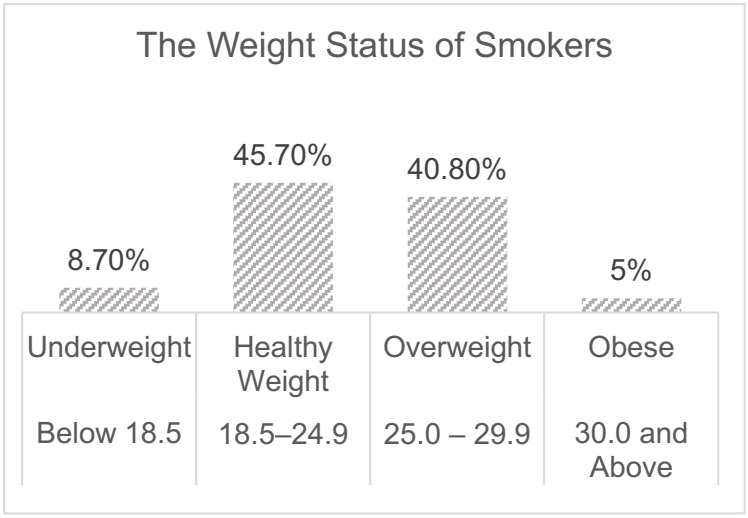



Figure 2:Percentages of Smokers Participants and their Weight Status

As shown in Table 1 among all the participants 14.21% were smokers. About 8.70% of smokers are underweight, while 45.70% have a healthy weight Figure 2. In addition, the smokers were their Body Mass Index (BMI) from 25-29.9 undergoes to overweight categories by 40.80%. However, least per cent of smokers was 5% that shows the obese status. As a result of that, more than half of them 54.4% have the Body Mass Index (BMI) less than 25 which mean they are not suffer from overweight or obese. There are many researches which approved the relationship between smoking and BMI. Besides that, loss of appetite was indicated as a smoking-related symptom by 20% of those polled in the study (Al-Harthi et al., 2018). According to (D. Li et al., 2020), the obese ratio of non-smokers was more than current smokers by 2.51% . Similar trend to Figure 2, the highest percentage of current smokers (34.6%) and dual users (34.7%) were investigated in normal or healthy weight group. According to (Abdul Rahim et al., 2014), proved that smokers are non-obese as Lebanon record the highest ratio 37·6% of current tobacco smoking on a daily basis, but has low percentage of people who suffer from High-Body Mass Index among the Arab World countries. Before seven years, the same scientific paper has been shown a reversal results in Oman as the high tobacco smoking rate increases the BMI value too (Abdul Rahim et al., 2014).

## 4.4 Obesity and related health problems

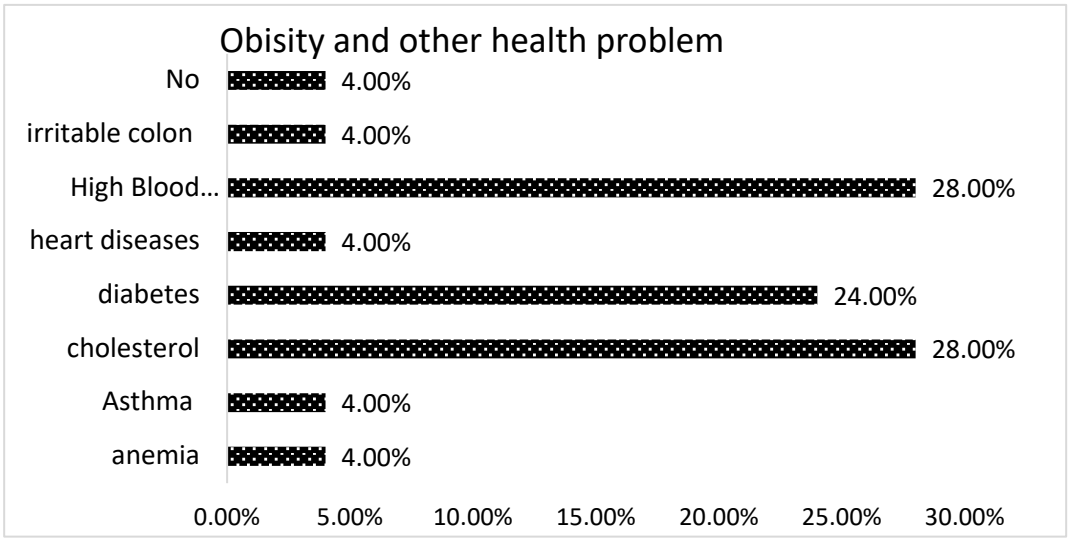



Figure 3:Health problems related to obesity

When it comes to the diseases that are linked to obesity Figure 3, about 28% of obese people (smokers and nonsmokers) have high blood pressure and high cholesterol. Diabetes disease was found around 24 percent among people who suffer from obesity. Other health problems like (anemia, heart disease and irritable colon) which recorded only 4%. The main disease among obese people in this survey are high blood pressure, diabetes and cholesterol. According to some studies, overweight people had hypertension rates that were 50 percent to 300 percent greater than persons who were normal weight or underweight (Mertens & Van Gaal, 2000). As per the Oman National Health Survey on Non-Communicable Diseases and Risk Factors, about 35.5%, 33.3% ,15.7% of people Suffer from high cholesterol, high blood pressure and diabetes respectively (Department of Information & Statistics,2019). These reported results are in agreement with the statistical data in the distributed questionnaire.

## 4.5 Smoking recognition depending on age and gender

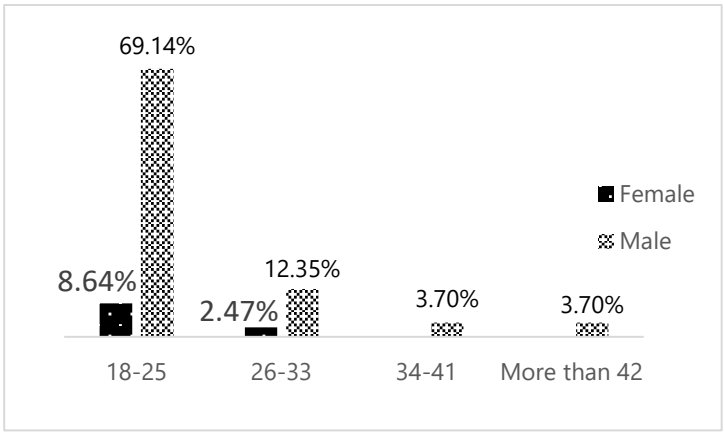



Figure 4: The age that smoker started smoke

This survey gathered information about the age at which smokers have started this habit Figure 4. It can be seen that more than half of the males and female smokers (69.14 percent of male and 8,64% female) began smoking between the ages of 18 and 25 years old. About 12% of men smokers started smoking between the ages of 26 and 33 while a few of woman started smoking at this aged (2.47%). These results are in contrast to the results reported by (Al Riyami & Afifi, 2004) in a prevalence and characteristics of smokers' survey illustrated that female smokers (31.6%) began smoking later in life more than 25 years (Al Riyami & Afifi, 2004). A couple of them began smoking when they were 34 to 42 years old. The smoking habit is changing with the new generations. This is might be because most of higher education students studied at universities away from their families as they are affected by their friends who smoke.

## 4.6 Smokers knowledge towards health problem resulting from smoking

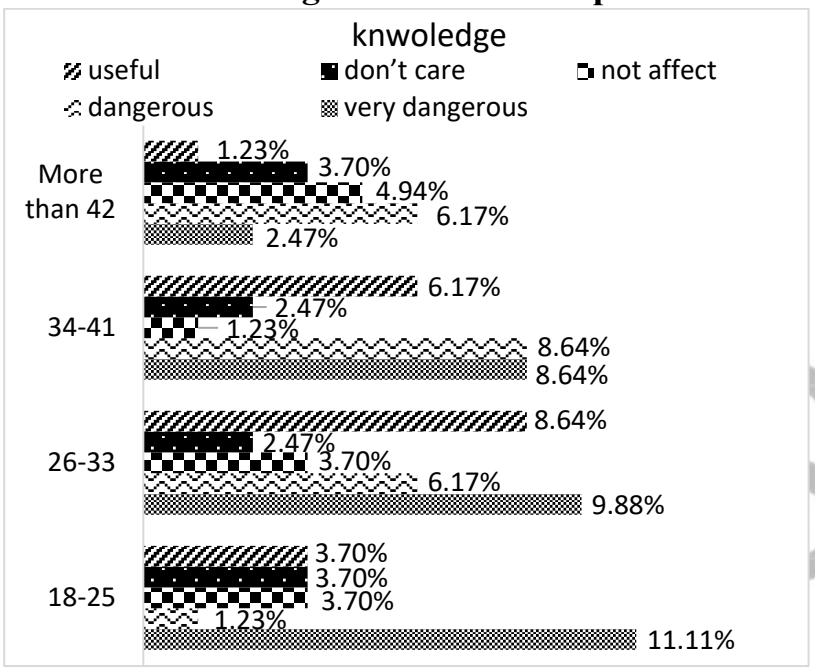
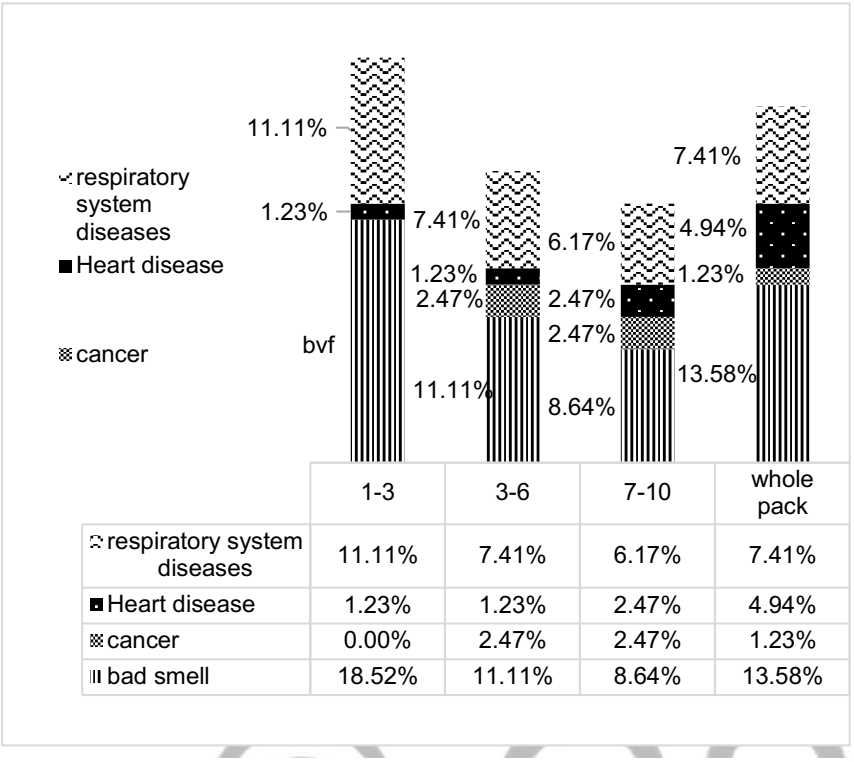



Figure 5:Belief of smokers about how the smoking is dangerous.

Participants were asked to rate them believe on health effect on a scale ranging from 0 to 5 (very danger to useful) as can be seen in Figure 5. It was found that about 32.1% of smokers they recognized that smoking is very dangerous to their health, most of them are in the age between 18 and 41 years old and 22.22% said it is dangerous and they are between 26 and 42 years old. On the other hand, 13.58 % they believe that smoking does not affect their health at all, and about 19.75% they believe that smoking is useful. Although, 12.35% doesn't care about the danger resulting from smoking and they are undergraduate (18-25 years old). This result shows that the smokers might need more awareness programs about health effect. In contrast, the results showed that 54.32% smokers in the group who said they know the effect but they are still smoking, and more than 45% need more awareness. As (Alzyoud et al., 2013) reported similar results for Waterpipe smokers. This study had also a larger proportion of undergraduate who are aware of health effect morn than non-smokers and about 51-49% believed that smoking will not affect their health if they smoke for period of time.

## 4.7 Health effects resulting from smoking




| | 1-3 | 3-6 | 7-10 | whole pack |
|---|---|---|---|---|
| respiratory system diseases | 11.11% | 7.41% | 6.17% | 7.41% |
| Heart disease | 1.23% | 1.23% | 2.47% | 4.94% |
| cancer | 0.00% | 2.47% | 2.47% | 1.23% |
| bad smell | 18.52% | 11.11% | 8.64% | 13.58% |

Figure 6: Effects of smoking on health. (Make the graph in % as the discussion shows %)

According to the responses Figure 6, the most common effect of smoking is the bad smell which was selected by about of 51.85% the smokers, 32.1% have respiratory diseases ,9.88%of them heart disease and 6.17% of them have cancer .6.17% of people who smoke more than 3 stick per day they have cancer. respiratory system and bad smell is more in people who smoke 1-3 stick. And the heart disease is more with smokers who smoke the whole pack. In Poland about 13.4% of smokers smoke more than 10 cigarettes, 6-10 are 24.7% ,2-5 are 39.3 and who just smoke one per day are 21.3 (Goniewicz et al., 2016). Also, In Oman about 46% of smokers smoke 6-15 per day, 32% smoke about 16-20, 16 % found to smoke 1-5 and only 6% were found to smoke more than 20 cigarettes (Al-Harthi et al., 2018) In addition, almost 54% of smokers reported coughing, 10% bronchitis -respiratory diseases -while 26% reported tooth discoloration and an unpleasant odor in their mouth. (Ezzati et al., 2002) 40% of cardiovascular diseases occurring among men at the age group of 30-69. In the United States, smoking is responsible for approximately 90% of all lung cancer deaths in men and women (Ezzati et al., 2005).

## 4.8 Remaining part of smoked cigarettes

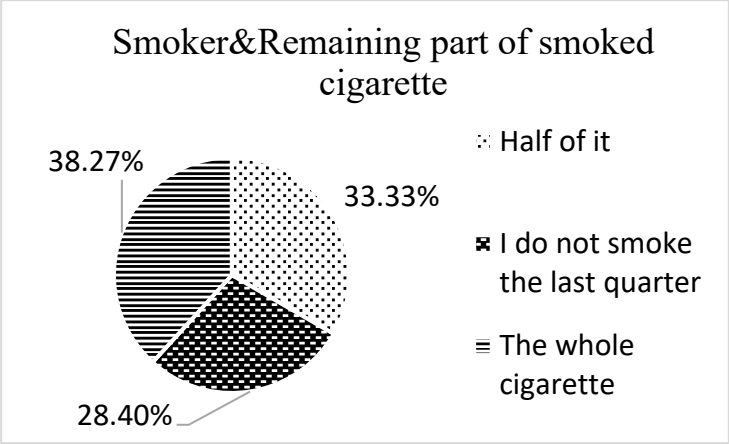



Figure 7:Smoker and Remaining part of smoked cigarette

It was considered that lung cancer risk could be linked not only to the quantity of cigarettes smoked, but also to the length of unburned cigarettes (Lindsey, 1959). Figure 7 above presents the portion of cigarettes remaining from smoked. The highest number of smokers said that they smoke whole cigarettes and it recorded 38.27percent of them. 33.33% of smokers smoked only half of it. Remaining smokers said that did not smoke the last quarter (28.40%). Depending on whether the highest or minimum figure of the ranges was utilized, the total stubs actually sent in constituted 78 to 81 percent of the total of the amounts regularly smoked per day (Journal et al., 2016). Among 61% of smokers ,53.7% total number of stubs and the length of it 18.7 mm (Journal et al., 2016). This suggests that a high amount of cigarettes butts have made their way into the environment.



## 4.9 Other tobacco product consumed by smokers

Table 2:Taking other tobacco product

| **Age** | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **18-25** | | | | **26-33** | | | | **34-41** | | | | **More than 42** | | | |
| Take other tobacco product | | Not take other tobacco product | | Take other tobacco product | | Not take other tobacco product | | Take other tobacco product | | Not take other tobacco product | | Take other tobacco product | | Not take other tobacco product | |
| No | % | No | % | No | % | No | % | No | % | No | % | No | % | No | % |
| 33 | 40.74% | 30 | 37.04% | 1 | 1.23% | 11 | 13.56% | 2 | 2.47% | 1 | 1.23% | 1 | 1.23% | 2 | 2.47% |
| **Other tobacco product** | | | | | | | | | | | | | | | |

| | | | |
|---|---|---|---|
| ➢ Electronic cigarettes<br>➢ Gum<br>➢ Waterpipe | ➢ Electronic cigarettes | ➢ Waterpipe<br>➢ Jxjsis | ➢ Electronic cigarettes |

Waterpipe tobacco smoke includes and creates hazardous compounds similar to cigar smoke, such as carcinogenic polycyclic aromatic volatile aldehydes hydrocarbons, carbon monoxide, and nicotine, according to research (Alzyoud et al., 2013). The result in Table 2 shown that more smokers take other tobacco product who aged between 18-25 around 40.74%. While the minority of them take other tobacco product between 26 and above. Gum is the majority product that smoker consumed, then waterpipe, according to Eissenberg and Shihadeh, a single waterpipe tobacco smoking session can include inhaling 50 to 100 times the amount of smoke generated by a single cigarette (Mzayek et al. 2012; Hampson et al. 2013). The lowest tobacco product consumption by smokers is electronic cigarettes (Goniewicz et al., 2016). In comparison to a study published in Poland, the number of smokers and take other tobacco product (dual users) reach 100 persons (Benowitz N, Goniewicz M. (2013).

## 4.10 Disposal methods of the cigarette waste

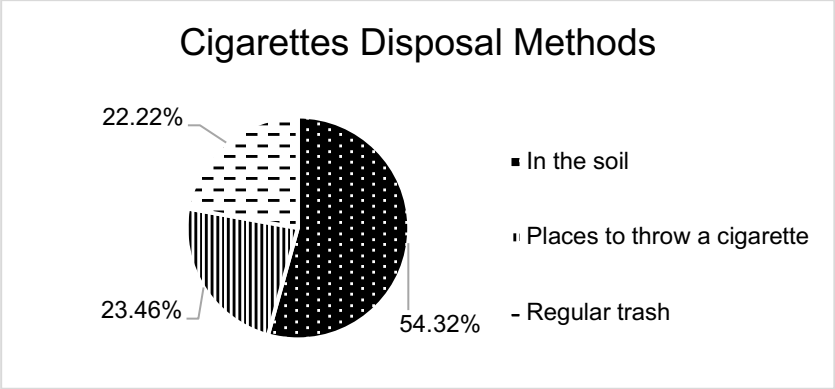



Figure 8 :Disposing of cigarettes waste

The method of disposing the wastes of cigarettes was questioned to help in finding the collection location and methods. According to the responses, about 54.32% of the smokers throw the waste in soil, 23.46% of smokers in cigarette containers and about 22.22% in the trash Figure 8. Therefore, around 45.68 % of smokers through their smoked cigarettes in proper ways while 54.32 % through it to the ground. This might indicate that smokers need more regulation and awareness about keeping the environment clean. It can also help in collecting and recycling a good amount of nicotine to convert into green product. It has also been found that smokers were defensive about discarding their tobacco butts and thus not very receptive to antilittering efforts. In fact, littering behaviors studies have found a littering rate of 17% overall, but for cigarette butt littering, this was 65% (Curtis et al., 2017).

## 4.11 Awareness towards the uses of Products produced

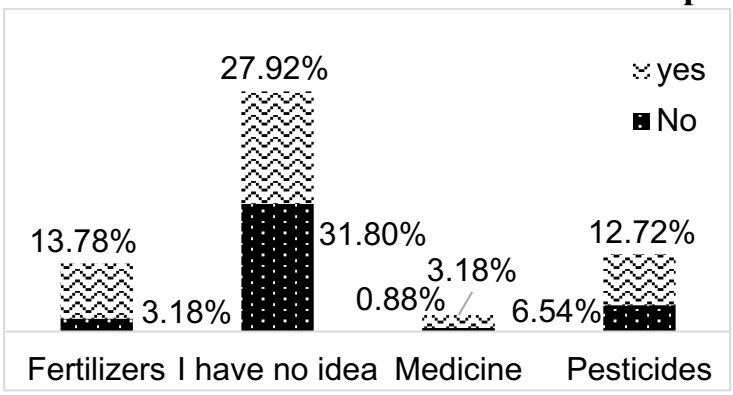



Figure 9: Products made from cigarette waste recycling.

Respondents were asked about the possible products that can be produce from recycling cigarettes wastes (Figure 9) shows that most of the response (70.32%) are not knowledgeable towards the uses of products produced from recycling cigarette wastes. Respondents with no idea are more than 59%, 27.77% of them are believing in recycling cigarette waste into useful product but 31.8% do not think it can be recycled. Only 3.16% of the response said the it can be used to produce medicine, 12.65 % said pesticide and 13.71% said fertilizer. In comparison, respondents with knowledge are 29.68% less than response who not knowledgeable. This indicates that most of people need more knowledge and awareness about recycling the waste and waste management filed. Many studies shows the uses of tobacco in industrial sector as a pesticide and fertilizer ,also in pharmacological industries they use it in many medicines for Parkinson disease but the exact technique is unknown (Mineur et al., 2011) and as Mosquito repellent lotion (Jufri et al., 2016).



# 5. Conclusion

The goal of this project was to investigate the possible role of extracted nicotine from cigarettes waste in lowering obesity rates. This study looked at the effects of smoking on weight, obesity, and other problems, smoking recognition by age and gender, smokers' knowledge of health problems caused by smoking, the remaining part of smoked cigarettes, and smokers' awareness of the uses of products made from recycled cigarette wastes and how to get rid of it. Omani citizens from 11 governorates across the Sultanate of Oman made up the study population. The survey was conducted digitally on a variety of programs (E-mails, WhatsApp, Instagram, etc.). There were 570 replies in all, with 14.21 percent of smokers and 85.79 percent of non-smokers. According to the statistics, women in Oman (11.11 percent) are less prone than men to smoke (88.89 percent). The overall percentage of obese smokers were 5%, however more than half of smokers (54.4%) were having a BMI of less than 25. Age, social position, education, gender, and governorate were the demographic characteristics related to smoking and obesity. Workers have the highest percentage of smokers (35 percent), followed by students, and finally job searchers. Obese people (both smokers and nonsmokers) have elevated blood pressure and cholesterol in about 28% of the respondent. 11.11 percent of 18-25-year-olds were having high awareness of the dangers of smoking. The most common side effect of smoking among participant was unpleasant odors, which was chosen by 51.85% of smokers. Only the upper part of the cigarette was smoked by 61.73 percent of smokers, and 54.32 percent of smokers threw their waste on the soil. This indicates that a large number of cigarette butts have gotten into the environment. The goal of this study is to convert cigarettes waste into useable and ecologically friendly medicine.

# 6. Recommendations

According to this report, a high percentage of individual's smoke. This must be taken into account through counseling, media, and social awareness programs in order to reduce and aid in the cessation of smoking in order to avoid so many connected diseases. Courses and policy courses may serve to educate the community about the dangers of smoking. Furthermore, more detailed and similar research are required in Oman, particularly with the increased number of expats from various Arab nations seeking better settling and career prospects. In recent years, the effect of expatriate cultures is highly visible in the increase in the number of open canteens and common shisha smoking, particularly in Muscat, the capital of Oman.

## Conflicts of Interest Statement

All authors declare that they have no conflicts of interest.

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# 8. Highlights

1. Distribution of a questionnaire to investigate obesity, nicotine intake by smokers, health effect, environmental problems, and recycling cigarette waste.
2. Determine the Omani population's awareness toward obesity, smoking and its health effects.
3. Determination of the degree to which different Omani generations are aware of the cigarettes' waste problems.
4. Oman society's attitudes toward the product created by recycling cigarettes' waste.
5. Possible waste collection methods for recycling cigarettes waste into medicinal products to treat obesity.