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HABITUAL SNORING IN HIGH SCHOOL CHILDREN: PREVALENCE AND ASSOCIATION WITH SLEEP-RELATED DISORDERS AND SCHOOL PERFORMANCE

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ABSTRACT

Objective: *To determine the prevalence of habitual snoring and its association with sleep-related disorders and school performance.*

Methodology: *A cross-sectional study was performed on 100 children randomly selected boys and females from high school located within the city of Sinjhoro. This study held from July 2019 to December 2019. To evaluate the prevalence of habitual snoring and sleep related problems a modified version of Snoring Questionnaire was used which contain 40 items.*

Results: *Data were collected related to habitual snoring, contains pattern of sleep and sleep-related disturbances. A low prevalence in the high school children was found. The overall prevalence of habitual snoring was 44.0% in the children. There was no any association of habitual snoring with the sleep-related problems and the habitual snoring does not affect the school performance of the children.*

Conclusion: *Habitual snoring in children may be associated with sleep related problems and also with daytime sleepiness and tiredness. This study shown that the sleep related disorders are not common in the children. However, there is no correlation between habitual snoring and sleep related disorders. There is also no any relation of habitual snoring and the school performance of the children.*

Key Words: *Prevalence, Habitual Snoring, Sleep-related disorders.*

INTRODUCTION

CHAPTER I

1. Prevalence

The percentage of individuals in a population having a disease or characteristic, prevalence is a statistical term that refers to the number of cases of a disease that occur in a specific population at a given time. (1) Depending on the estimated timeframe, there are several ways to measure and report prevalence.The Period prevalence provides a better factor measure as it includes all cases between two dates, while the point prevalence only counts cases on a specific date. It is a disease measure that enables us to determine the likelihood that a person will have a disease. (2) It is identified most notably as the number of cases as a fraction of the total population at risk. We measure prevalence to assess the disease burden in a population and assessing the need for health

services, to compare the disease occurrence in different populations, to determine trends in the prevalence or severity of diseases over time. (3)

2. Habitual Snoring

Snoring is characterized as a harsh buzzing noise created by the soft palate vibration and the oropharyngeal inlet pillars, primarily induced by sleep. Habitual snoring (HS) is characterized as loud snoring at least 3 nights per week and is strongly linked to obstructive sleep apnea (OSA), even in the absence of OSA.While the snoring effect is an acoustic phenomenon, there may be important upper airway pathophysiology in the case of snoring. (4) Snoring is associated with narrowing of the upper airway, decreased airway resistance and pharyngeal collapse. When upper airway resistance increases, in order to maintain breathing, there is a compensatory improvement in respiratory effort. The increased effort may be associated with sleep-related transient anticipation associated with breathing effort. (5) In population surveys, the prevalence of the snoring is increased progressively with age, but snoring is a hallmark of Obstructive Sleep Apnea and the diagnosis of Obstructive Sleep Apnea is unlikely in its absence. Snoring happens after the onset of sleep, although it is present even during drowsiness in some patients with OSA. The frequency increases with the use of sedative drugs and alcohol in the night time. In general, in the supine position, snoring is loudest (dorsal recumbency) and in the side-lying position decreases in volume. Loud snoring interrupts silence that indicates pathological apnea. (6) Although snoring is often considered a secondary symptom, it may indicate the presence of sleep apnea or a lesser mode of breathing with sleep disorder. Habitual Snoring is associated with health and social consequences such as fragmentation of sleep, family discord, excessive daytime sleepiness and, more seriously, the development of systemic hypertension in people <50 years of age. However, many individuals regard Habitual snoring as a benign and a common behavior; moreover, physicians often disagree snoring as a disorder in their clinical practice. The tissues in the throat and upper airways are open for easy intake of air into the lungs during waking hours. The soft tissues and tongue relax during sleep and may partially block the airway. If the air coming in and out of the airway meets enough resistance vibration or snoring can occur. Obesitysmoking alcohol consumption or frequent nasal congestion all increases the risk of regular snoring. (7)

3. Sleep Related Disorders

Sleeping related disorders are conditions that change the way you sleep. The overall health, safety, and quality of life may be affected by a sleep disorder. Deprivation of sleep can affect your ability to drive safely and increase your risk of other health issues. (7)

4. Sign And Symptoms

Some of the sleep-related disorder signs and symptoms include prolonged daytime sleepiness, rapid breathing, and increased sleep movement. Certain signs and symptoms include an abnormal period of sleep and wake-up and sleeping problems. (8) The main problem which is most common in sleep-related disorders is Obstructive Sleep Apnea. It is a sleep disorder that is potentially serious. Obstructive Sleep Apnea occurs when the muscles of your throat relax and block the airway during sleep. Snoring is a noticeable sign of obstructive apnea for sleep. (9)

5. Types of Sleep Related Disorders

There are many types of sleep-related disorders. They are often grouped into categories explaining why they are happening or how they are affecting you. Sleep-related disorders can also be categorized by behavior, issues with your natural cycles of sleep-wake, breathing problems, sleeping difficulties, or how tired you feel during the day. Some other types of Sleep-Related Disorders are: (10)

6. Insomnia

Insomnia is when you have trouble sleeping all night long.Individuals with insomnia may feel unhappy with their sleep and typically experience one or more of the following symptoms exhaustion, low energy, concentrating problems, mood disturbances, and reduced work or school performance. Insomnia is characterized depends

upon its duration. Acute insomnia is brief and often occurs due to circumstances of life e.g., when you can't sleep the night before an examination, or after receiving stressful or bad news. This form of passing sleep disturbance may have been encountered by many people, and it appears to resolve without any intervention.Chronic sleep deprivation is disturbed, happening at least three days a week and lasting for at least three months. There are many reasons for chronic insomnia disorders. Environmental changes, unhealthy sleep habits, shift work, other clinical disorders, and certain medications may lead to insufficient long-term sleep patterns.Those with insomnia appear to have trouble falling asleep (installation), remaining asleep (maintenance), and/or waking up in the morning too early. Insomnia treatment may include, or some combination of behavioral, psychological, medical components. You and your doctor will need to address your particular condition and insomnia history and its causes in order to decide the best treatment. (11)

Restless Leg Syndrome

Restless leg syndrome (RLS) is a type of disorder of sleep movement. Restless leg syndrome, also known as Willis-Ekbom disorder, triggers an uncomfortable feeling and an urge to move your legs when you prepare to fall asleep.The condition causes in the legs an uncomfortable feeling of "itchy," "pins and needles," or "creepy crawly."It typically occurs when you sit or lie down in the evening or nighttime hours. Moving temporarily relieves the unpleasant feeling.The severity of RLS symptoms ranges from mild to moderate. Symptoms can come and go and the severity can also vary. Restless Leg Syndrome affects both genders, but is more prevalent in women and can start at any age, even in young children. Many people who are severely affected are middle-aged or older.There is no medical test for diagnosing restless leg syndrome however, to rule out other conditions, doctors may use blood tests and other tests. Restless Leg Syndrome diagnosis is based on the symptoms and responses of a person to questions about family history of similar symptoms, use of medication, existence of other symptoms or medical conditions, or daytime sleepiness issues.Treatment for restless leg syndrome includes Lifestyle changes, such as beginning a regular exercise program, developing regular sleep schedules, and avoiding or reducing the use of caffeine, alcohol, and tobacco, which can be beneficial for people with mild to moderate restless legs syndrome.(12)

Narcolepsy

Narcolepsy is a neurological disorder affecting your wake-up and sleeping ability. Individuals with narcolepsy have severe daytime sleepiness that is uncontrollable; they may also suddenly fall asleep at any moment.There is currently no cure for narcolepsy, but drugs and behavioral treatments can change people's symptoms so that they can lead healthy, productive lives.People diagnosed with narcolepsy must seek advice across networks of education and support groups. It can be overwhelming to get a diagnosis of narcolepsy and manage the symptoms. It helps others with the disorder learn best practices and access support. (13)

7. Causes of Sleep Related Disorders

There are many conditions, diseases that can cause sleep disturbances. As a consequence of an underlying health condition, sleep disorders frequently arise. Breathing at night can be difficult due to allergies, colds, and upper respiratory infections. The nose's inability to breathe can also cause sleeping problems. Nocturia, or frequent urination, can interfere with your sleep by causing you to wake up at night. Hormonal imbalances and urinary tract diseases may contribute to this condition's development.(14) Most sleep disorders, such as anxiety or depression, are linked to or caused by another underlying condition. Some people are born with them. Others grow simply because of poor sleep hygiene, such as not keeping a regular schedule or late at night using electronics. Due to a variety of underlying medical diseases, people who feel they sleep perfectly well may still be troubled by excessive daytime sleepiness. Some common conditions frequently associated with sleep problems are Heartburn, hypertension, cardiovascular disease, musculoskeletal disorders,

kidney disease, mental health problems, neurological disorders, respiratory problems, and thyroid disease. However, a number of prescription and over-the-counter medicines used to treat these and other health problems can affect the quality and quantity of sleep If you are suspected of having a sleep disorder, your health care provider may refer you to a sleep clinic for sleep specialist evaluation. (15)

8. Diagnosis

To determine your sleep problem, a sleep specialist will use a variety of information. It may include a detailed history, history of treatment, physical examination, journal of sleep, analysis of sleep and other examinations. In detailed history,you will be asked by a sleep specialist about your health and symptoms.The sleeping partner may be asked questions about what he or she experiences. Questions will be asked about your sleep habits and sleep schedule. In Medication History Your medication will be reviewed to see that if these may be playing a role in your symptoms or not. In Physical examination, your doctor may check for a deviated nasal septum, nasal inflammation, swollen tonsils or a restricted airway during a complete physical examination, which may provide evidence for snoring and sleeping apnea. In Sleep Diary In a period of one to two weeks, you will record information about how well and how often you sleep. Your doctor may discuss the sleep diary data of yours with you and determine the next steps to take.A sleep study may be ordered to make a diagnosis. It is of two types: (15)

9. Polysomnography

Polysomnography (PSG) is a non-invasive examination that tracks the physical condition in different sleep phases. This includes important information to determine symptoms and problems related to sleep, such as recognizing sleep stages, body position, blood oxygen rates, respiratory events, muscle tone, heart rate, eye movement, brain waves, snoring levels, and general sleep behavior. (15)

10. Electroencephalogram

Electroencephalogram(EEG) a test that measures electrical activity in the brain and detects any potential problems related to this activity. For sleep apnea, a home sleep study may be requested. This study is carried out without the presence of a sleep technologist in your own home. Fewer sensors are used than with a study in the laboratory. As a result, less information is obtained, resulting in less accurate testing than laboratory testing however, this test is usually sufficient for sleep apnea assessment. Other Testing You may order other tests to determine your sleep schedule, your sleepiness level, or your ability to stay awake. Testing for stimulants, opiates, and anti-anxiety medicines that may contribute to your symptoms may be performed. Blood testing a blood test widely used for the diagnosis of narcolepsy and other underlying health issues that may cause sleep problems. (16)

11. Treatment

Depending on the type and underlying cause, treatment for sleep disorders can differ. This usually includes, however, a mix of medical treatments and changes in lifestyle.Medical treatment for sleep disturbances may include any of the following are Sleeping pillsmedication for any underlying health issues as breathing device or surgery (usually for sleep apnea), a dental guard (usually for teeth grinding).Adjustments to lifestyle can significantly improve your sleep quality, especially when done with medical treatments. Perhaps you'd like to consider: include more vegetables and fish into your diet, and reducing sugar intake in diet, reducing stress and anxiety in your daily life by exercising, creating and sticking to a regular sleeping schedule, drinking less water before bedtime, limiting your caffeine intake, especially in the late afternoon or evening, decreasing tobacco and alcohol use eating smaller low carbohydrate meals before bedtime. Every day going to bed and waking up at the same time can also greatly improve the quality of your sleep. (17)

CHAPTER II
LITERATURE REVIEW

The study was conducted by UnalSahin, OnderOzturk, Mustafa Ozturk, NeclaSongur, AhmetBircan, AhmetAkkaya, Departments of Respiratory Disease and Public Health, SüleymanDemirel University, Isparta, Turkey in between March and June 2007. The study was done to know the prevalence of Habitual Snoring and determine its association with sleep-related disorders, school performance, and behavioral disturbances. The result shows Children with habitual snoring were more likely to have symptoms related to sleep during the day and at night. There was no significant association between habitual snoring and poor performance at school.(18)

The study was conducted byNaoko Sakamoto, David Gozal, Dale L. Smith, Limin Yang, Noriko Morimoto, Hiroo Wada, Kotatsu Maruyama, Ai Ikeda, Yohei Suzuki, Meiho Nakayama, ItsukoHoriguchi, Takeshi Tanigawa, in Japan, October 2014. The study was done to know Sleep-disordered breathing (SDB) snoring has been associated with behavioral problems in school-age children. The result shows that sleep-disordered breathing which is due to habitual snoring increases restless behaviors, fidgety behaviors and poor concentration in school.(19)

The study was conducted by AhyanSogut, OzgeYilmaz, GonulDinc, HasanYuksel on 27 June 2009. The study was done to know the prevalence of habitual snoring and symptoms of sleep-disordered breathing. The result shows that with the habitual snores Habitual snorers have more symptoms during the night, including recurrent apneas, breathing difficulties, restless sleep and breathing of the mouth during sleep compared to intermittent and non-snorers.(20)

The study was conducted by Hawley E. Montgomery-Downs, Ph.D.; Louise M. O'Brien, Ph.D.; Cheryl R. Holbrook, MAT, RPSGT; David Gozal, MD in 2004. The aim of the study was to determine the predictive validity of the parental snoring study and other activities by comparing such reports with objective findings from overnight polysomnography for sleep-disordered breathing evaluation. The result shows that frequent snoring are highly sensitive and specific.(21)

The study was conducted by Albert M Li,AviSadeh, Chun T Au, Daniel YT Goh, and Jodi A Mindell in 2013. The purpose of the study was to evaluate the prevalence of habitual snoring among children in 14 different countries across Asia and its correlation with habitual snoring in Caucasians, Chinese and non-Chinese and in-Caucasians Asians. The result shows that in Chinese non-Caucasians non-Chinese had a low prevalence of habitual snoring but boys have higher habitual snoring than girls.(22)

The study was conducted by Albert M. Li, MD;Chun T. Au, MPhil; Hung K. So, Ph.D.; Joseph Lau, Ph.D.; Pak C. Ng, MD; and Yun K. Wing, MBChB in August 2009. The purpose of the study was to evaluate the prevalence of habitual snoring among primary school students along with its symptoms which are related to it. The result shows that habitual snoring was associated with day time, nocturnal, parasomniac and sleep-related breathing symptoms.(23)

The study was conducted by David S. C. Hui, MBBS, FCCP; Joseph K. W. Chan, MBBS, FCCP; Alice S. S. Ho, MBBS, FCCP; Dominic K. L. Choy, MBBS; Christopher K. W. Lai, DM, FCCP; and Roland C. C. Leung, MD, FCCP in 9 December 1989. The study was done to know the symptoms and prevalence of sleep-disordered breathing in a student population using a questionnaire survey followed by home sleep monitoring. The result shows that sleep-disordered breathing is not common in student population, Snoring and self-reported questionnaire symptoms are poor sleep-disordered breathing predictors. As an independent indicator of snoring, male gender showed an increase, but not for sleep disorders breathing.(24)

The study was conducted by KwangIkYanga, Jee Hyun Kimb Young Hwangboc, Dae Lim KoodDaeyoungKimeKyoung Jin Hwang Seung Bong Hong in April 2017. The purpose of the study was to know the prevalence of snoring and sleep apnea in Korean high school students and their associations with daytime sleepiness. The result shows that obesity is associated with snoring and the snoring and apnea are associated

with excessive day time sleepiness. The prevalence of snoring and apnea was much higher in high school male and obese students.(25)

Thestudy was conducted by M. Zucconi, L. FerriniStrambi", G. Pestalozzab, E. Tessitoreb, and S. Smirne in July 1992. The purpose of the study was to determine the sleep disturbance, daytime symptoms and hemodynamic changes and chronic tonsils and adenoids are often associated with chronic snoring. The result shows that the most frequently reported symptoms were nocturnal motor agitation and daytime forced oral respiration with little daytime sleepiness or irritability complaint and there was a high occurrence of habitual snoring in the parents or first-grade siblings. (26)

The study was conducted by Dean W. Beebe, Ph.D.,a,b Joseph Rausch, Ph.D.,a,b Kelly C. Byars, PsyD, Bruce Lanphear, MD, MPH,d and Kimberly Yolton, Ph.D.,e in May 2010. The purpose of the study was to determine the relationship between persistent snoring and its association with behavioral and cognitive development. The result shows that with the persistent snoring there is a strong relationship with the behavioral problems while those who are nonsnorers they had strong cognition. (27)

The study was conducted by Eeva T. Aronen, MD, Ph.D.,KatjaLiukkonen, MD,PetteriSimola, MA, Paula Virkkula, MD, Ph.D., AnuUschakoff, MA,MaritKorkman, PhD,TurkkaKirjavainen, MD, PhD, Anne Pitka¨ranta, MD, PhD in 2009. The purpose of thisstudy is to evaluate the emotional and behavioral problems along with sleep and cognitive performance in snoring and nonsnoring. The result shows that sleep disorders breathing which is due to snoring are a risk factor for mood disorders and cognitive thinking. (28)

The study was conducted by VincezaCastronovo, Marco Zucconi, LuanaNosetti, Carlo Marazzni, Michael Hensely, Fabrizoveglia, Luigi Nespoli, , and Luigi Ferini-Stramb, MD on 5 June 2002. The purpose of the study was to evaluate the prevalence of habitual snoring and sleep-disordered breathing. The result shows that habitual snoring was associated with daytime symptoms, Children with habitual snoring are more likely to have snoring and morbidity measured objectively. (29)

The study was conducted by Seo Yi Chng, MRCPCH,* Daniel Yam ThiamGoh, MMedPaediatrics, Xiao Shan Wang, MSc, TengNging Tan, BSc Hons, and Natalie Bee Hwa Ong, MRCPCH in Singapore on 4 November 2003. The purpose of the study was to determine the prevalence and association with the snoring and habitual snoring in preschool and primary school children in Singapore. The result shows that the snoring and habitual snoring is strongly associated with the Asians. (30)

The study was conducted by NicoleDelasnerie-Laupretre N1, Patois E, Valatx JL, Kauffmann F, AlperovitchAin June 1993. The purpose of the study was to evaluate the relationship between snoring, smoking and sleep in high school students. The result shows that snoring is associated with daytime sleepiness in both sexes male and female, and smoking is the risk factor for snoring. (31)

The study was conducted by Ana Maria Ferreira, MD; Vanda Clemente, MS; David Gozal, MDi; Ana Gomes, MS; CelsaPissarra, MD; Helena Ce´sar, MD; Isabel Coelho, MD; Carlos F. Silva, PhD*; and Maria Helena P. Azevedo, MD on 7 April 2007. The aim of the study was to evaluate the prevalence of snoring and its association with sleep problems, such as daytime symptoms, medical conditions and school performance in Portuguese students. The result shows that snoring is a common problem in Portuguese students that are associated with daytime symptoms and sleep disturbance. (32)

The study was conducted by Steffen Eitner, Michael S. Urschitz, Anke Guenther, Pilar M. Urschitz-Duprat, Bettina Bohnorst, Martin Schlaud, and Christan F. Poets on 1 October 2006. The purpose of the study was to evaluate the association between habitual snoring and sleep problems in students. The result shows that habitual snoring was strongly associated with sleep problems and Long-term snorers were more likely than children who quit snoring spontaneously to have sleep problems. (33)

The study was conducted by T.P. Ng, A. Seow, W.C. Tan on 26 August 1997. The purpose of the study was to evaluate the prevalence of snoring and symptoms of sleep breathing-related disorders among Chinese, Malay, and Indians in

Singapore and their ethnic differences. The result shows that there was a clear ethnic difference between Chinese Malay and Indians. In Chinese, there is a low prevalence of snoring and Indian has the highest. (34)

The study was conducted by Albert M. Li, MD; Yin Zhu, MM; Chun T. Au, MPhil; Dennis L. Y. Lee, MB; Crover Ho, RPSGT; and Yun K. Wing, MB in March 2013. The purpose of the study was to evaluate the prevalence of snoring and to identify clinical symptoms and associated risk factors related to obstructive sleep apnea. The result shows that students with snoring progressed with obstructive sleep apnea. (35)

The study was conducted by A.I. Scher, Ph.D.; R.B. Lipton, MD; and W.F. Stewart, Ph.D. on 24 June 2002. The purpose of the study was to determine the habitual snoring as a risk factor for chronic daily headache. The result shows that headache caused by sleep disorders, chronic headache and depression is due to disturbed sleep and the sleep disorders are may be due to snoring. (36)

The study was conducted by HeikkiPalomaki, MD, MarkkuPartinen, MD, SeppoJuvela, MD, and MarkkuKaste, MD on 6 January 1989. The purpose of the study was to evaluate the stroke symptoms related to sleep disorders and possible risk factors related to brain infarction. The result shows that brain infarction occurs during sleep or early morning hours. (37)

The study was conducted by A.M. Zicari, F. Occasi, A. CesoniMarcelli, V.Lollobrigida, C. Celani, L. Iindinnimio, G. TancrediG. DE Castro and M. Duse on 7 February 2013. The purpose of the study was to evaluate the prevalence of allergy with habitual snoring. The result shows that who are having allergy from any food in their early life, they must develop habitual snoring later in life. (38)

The study was conducted by Zhang G1, Spickett J, Rumchev K, Lee AH, Stick S, 4 November 2004. The purpose of this study was to evaluate domestic environment factors that are associated with snoring. The result shows that snoring is growing among children in primary sch ool. Increasing the frequency of snoring may play a significant role in domestic environments. In th e home environment, exposure to nitrogen dioxi de is correlated with children's snoring. (39)

The study was conducted by Ronald D. Chervina, Kristen Hedgera, James E. Dillonb, Kenneth J. Pituch, 4 October 1999. The purpose of this study was to the purpose the questionnaire scales to use in Sleep-Related Breathing Disorder (SRBD) and its symptoms are snoring, day time sleepiness and behavioral changes. The result shows that these questionnaire scales are valid and reliable. (40)

The study was conducted by RefikaErsu, MD; AyseRodopman Arman, MD; Dilsad Save, MD; BulentKaradag, MD; FaziletKarakoc, MD; MeralBerkem, MD; and ElifDagli, MD, 1 July 2004. The purpose of this study was aimed to evaluate the incidence of snoring in Istanbul primary school children and to assess the diurnal symptoms and conditions associated with sleep problems. The result shows Habitual snoring is a major problem for children and may be associated with diurnal symptoms. Cigarette smoke inhalation at home and asthma and fever can be the likelihood of frequent snoring. (41)

The study was conducted by Fidan, Fatma&Unlü, Mehmet &Sezer, Murat & Kara, Ziya, 2005. The purpose of this study was to investigate the prevalence of habitual snoring and sleep-disordered breathing in primary school students in Afyonkarahisar city. The result shows that sleep disorder breathing is higher in habitual snorers. (42)

Objective of The Study

The aim of this study is to determine the habitual snoring and its prevalence and association with sleep-related disorders and school performance in high school children.

Significance of The Study

This study was beneficial to find out the signs and a symptom related to sleep disorders occurs by the habitual snoring, and by this early diagnosis occur. This aids to prevent complication which may occur in the nearby future.

Rational of The Study

This study gives an idea that snoring can be a reason for sleep related disorders and it affects the children's school performance and daily life behavior.

CHAPTER-III
MATERIAL AND METHODS

1. STUDY DESIGN

This study was Cross sectional study

2. STUDY SETTING

Participants were recruited from "High School", Hyderabad.

3. DURATION OF THE STUDY

Six months after the approval of synopsis.

4. SAMPLING TECHNIQUE

Convenient sampling was used

5. SAMPLE SIZE

100participants were selected for the study.

5.1 Inclusion Criteria

1. Male and female participants selected.
2. Participant who were studying in high school were selected.

5.2 Exclusion Criteria

1. Primary school students were excluded.

6. Data Collection Tool

An adopted questionnaire from the original article conducted in senior high school in Korea was used.

7. Data Analysis Procedure

Data was analyzed by Statistical Package for Social Sciences (SPSS) version 21.

8. Ethical Consideration

The attached consent form with all the ethical considerations was placed with the confidentiality of the names of participants and their academic results.

9. Budget

The budget of the study was around 30000 PKR.

CHAPTER IV
RESULT

The total number of high school children was 100 in which 50 were male and 50 were female.

The very first question was regarding the snoring,44(44.0%) say yes and 56(56.0%) say no as shown in Table IV 1 and Figure IV 1.

The second question was that is they snore every night, 39(39.0%) say yes and 61(61.0%) say no as shown in Table IV 2 and Figure IV 2.

The third question was that is their snoring getting worse, 8(8.0%) say yes and 92(92.0%) say no as shown in Table IV 3 and Figure IV 3.

The fourth question was that they snore loudly at night, 26(26.0%) say yes and 74(74.0%) say no as shown in Table IV 4 and Figure IV 4.

The fifth question was about that they wake themselves up, 17(17.0%) say yes and 83(83.0%) say no as shown in Table IV 5 and Figure IV 5.

The sixth question was regarding their restless disturbed sleep, 14(14.0%) say yes and 86(86.0%) say no as shown in Table IV 6 and Figure IV 6.

The seventh question was does their bed partner move out of the room because of their snoring, 2(2.0%) say yes and 98(98.0%) say no as shown in Table IV 7 and Figure IV 7.

The eighth question was regarding their stop breathing during their sleep, 6(6.0%) say yes and 94(94.0%) say no as shown in Table IV 8 and Figure IV 8.

The ninth question was about their pauses were frequent, 2(2.0%) say yes and 98(98.0%) say no as shown in Table IV 9 and Figure IV 9.

The tenth question was they ever had a sleep study or been evaluated for sleep apnea, 1(1.0%) say yes and 99(99.0%) say no as shown in Table IV 10 and Figure IV 10.

The eleventh question was about if they ever tried any snoring device, 1(1.0%) say yes and 99(99.0%) say no as shown in Table IV 11 and Figure IV 11.

The twelfth question was about if they tired no matter how much they sleep, 36(36.0%) say yes and 64(64.0%) say no as shown in Table IV 12 and Figure IV 12.

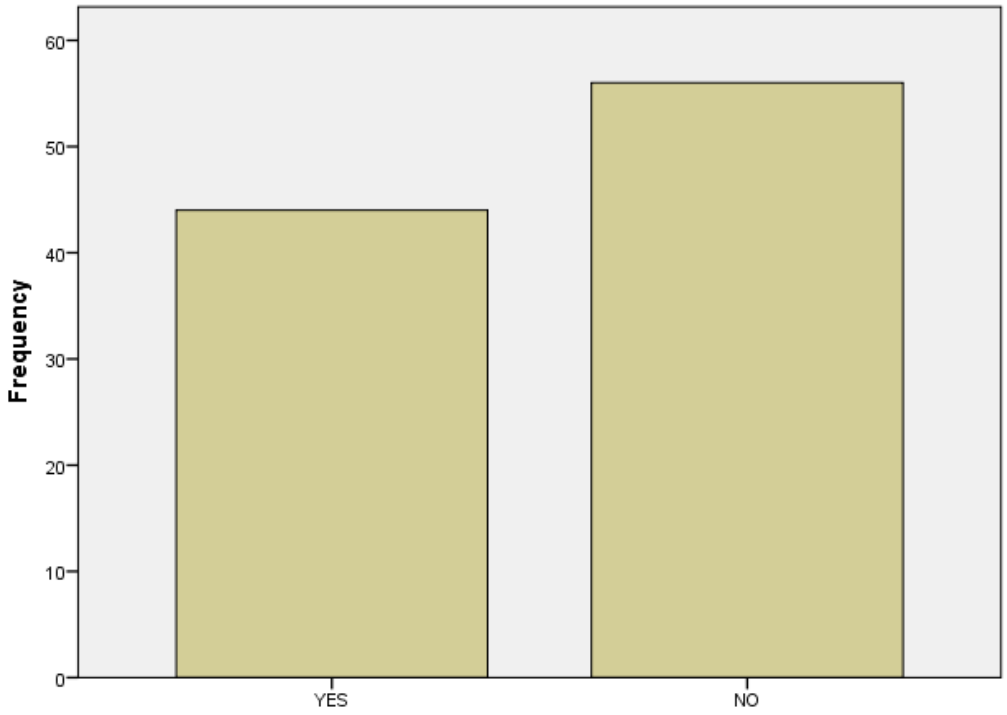
The thirteenth question was about does they often wake up in the morning with a headache, 45(45.0%) say yes and 55(55.0%) say no as shown in Table IV 13 and Figure IV 13.

The fourteenth question was does they drowsy or sleepy during the day, 11(11.0%) say yes and 89(89.0%) say no as shown in Table IV 14 and Figure IV 14.

The fifteenth question was regarding daytime sleepiness interfere with their work, 4(4.0%) say yes and 96(96.0%) say no as shown in Table IV 15 and Figure IV 15.
The sixteenth question was if they were ever fallen asleep while driving or eating, 2(2.0%) say yes and 98(98.0%) say no as shown in Table IV 16 and Figure IV 16.
The seventeenth question was regarding their naps during the day, 4(4.0%) say yes and 96(96.0%) say no as shown in Table IV 17 and Figure IV 17.
The eighteenth question was does they easily fall asleep in quiet places, 15(15.0%) say yes and 85(85.0%) say no as shown in Table IV 18 and Figure IV 18.
The nineteenth question was does they drink coffee, tea, cola or take caffeine to stay awake, 38(38.0%) say yes and 62(62.0%) say no as shown in Table IV 19 and Figure IV 19.
The twentieth question was if their sleep/snoring problem causing any emotional problems, 2(2.0%) say yes and 98(98.0%) say no as shown in Table IV 20 and Figure IV 20.
The twenty-first question was does they work varying shifts at work such that their sleep pattern is irregular, 1(11.0%) say yes and 99(99.0%) say no as shown in Table IV 21 and Figure IV 21.
The twenty-second question was regarding the age of the participant, the weight of the 65(65.0%) participants was between 30-50kg and the weight of the 35(35.0%) participants were in between 50-100kg as shown in Table IV 22 and Figure IV 22.
The twenty-third question was related to their nasal allergies or hay fever, 100(100.0%) participants say no as shown in Table IV 23 and Figure IV 23.
The twenty fourth question was does they have trouble breathing through their nose, 2(2.0%) say yes and 98(98.0%) say no as shown in Table IV 24 and Figure IV 24.
The twenty-fifth question was does they ever broken their nose, 1(1.0%) say yes and 99(99.0%) say no as shown in Table IV 25 and Figure IV 25.
The twenty-sixth question was if they had nasal surgery, 1(1.0%) say yes and 99(99.0%) say no as shown in Table IV 26 and Figure IV 26.
The twenty-seventh question was if they had prior tonsil, adenoid or palate surgery, 1(1.0%) say yes and 99(99.0%) say no as shown in Table IV 27 and Figure IV 27.
The twenty-eighth question was does their teeth fit together properly, 92(92.0%) say yes and 8(8.0%) say no as shown in Table IV 28 and Figure IV 28.
The twenty ninth question was does they trouble opening their mouth, 2(2.0%) say yes and 98(98.0%) say no as shown in Table IV 29 and Figure IV 29.
The thirtieth question was does they gag easily, 100(100.0%) participants say no as shown in Table IV 30 and Figure IV 30.
The thirty-first question was related to cigarette smoking, 100(100.0%) participants say no as shown in Table IV 31 and Figure IV 31.
The thirty-second question was about how much alcohol does they drink per day, 100(100.0%) participants say no as shown in Table IV 32 and Figure IV 32.
The thirty third question was does they drink alcohol near bedtime, 100(100.0%) participants say no as shown in Table IV 33 and Figure IV 33.
The thirty-fourth question was about their high blood pressure, 100(100.0%) participants say no as shown in Table IV 34 and Figure IV 34.
The thirty fifth question was about their irregular heartbeat, 100(100.0%) participants say no as shown in Table IV 35 and Figure IV 35.
The thirty-sixth question was does they need SBE prophylaxis for their heart, 100(100.0%) participants say no as shown in Table IV 36 and Figure IV 36.
The thirty-seventh question was about their neurological disease, 100(100.0%) participants say no as shown in Table IV 37 and Figure IV 37.
The thirty eighth question was related to diabetes or thyroid disease, 100(100.0%) participants say no as shown in Table IV 38 and Figure IV 38.
The thirty ninth question was does anyone else in their family snore or have a sleep problem, 53(53.0%) say yes and 47(47.0%) say no as shown in Table IV 39 and Figure IV 39.
The fortieth question was does they on anticoagulant therapy (medications to prevent blood clotting, 100(100.0%) participants say no as shown in Table IV 40 and Figure IV 40.

Table IV-1: Do you snore?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	44	44.0	44.0	44.0
	NO	56	56.0	56.0	100.0
	Total	100	100.0	100.0	



FigureIV-1: Do you snore?

Table IV-2: Do you snore every night?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	39	39.0	39.0	39.0
	NO	61	61.0	61.0	100.0
	Total	100	100.0	100.0	

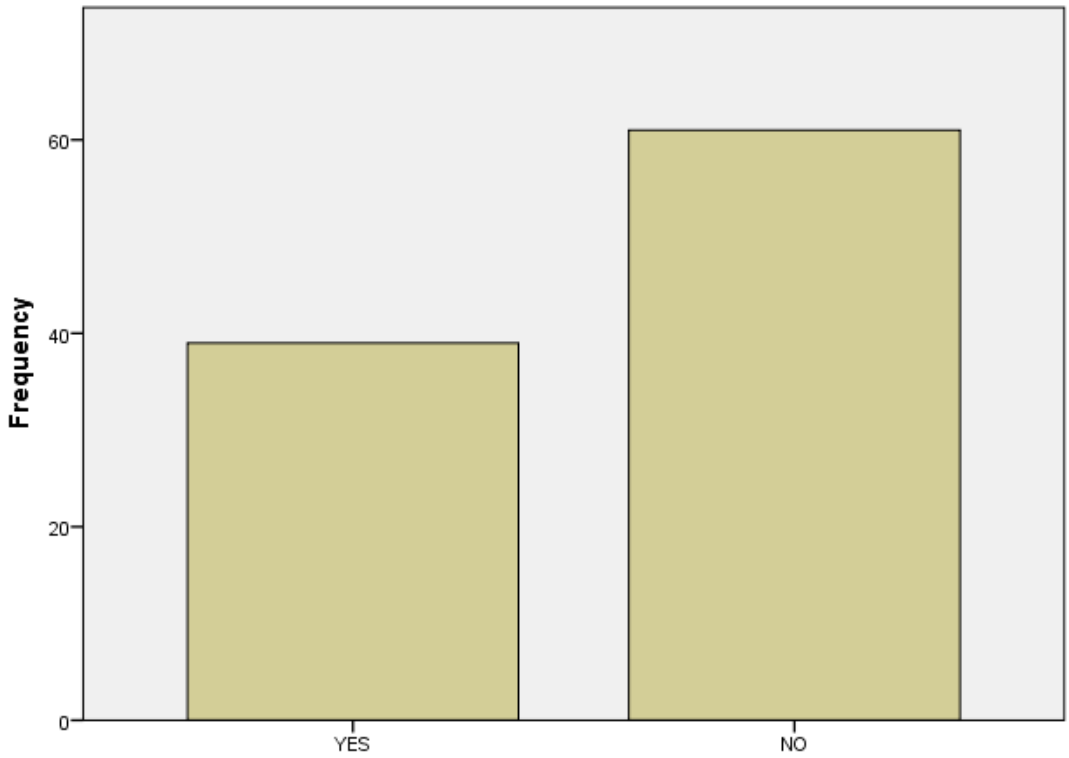


Figure IV-2: Do you snore every night?

Table IV-3: Is snoring getting worse?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	8	8.0	8.0	8.0
	NO	92	92.0	92.0	100.0
	Total	100	100.0	100.0	

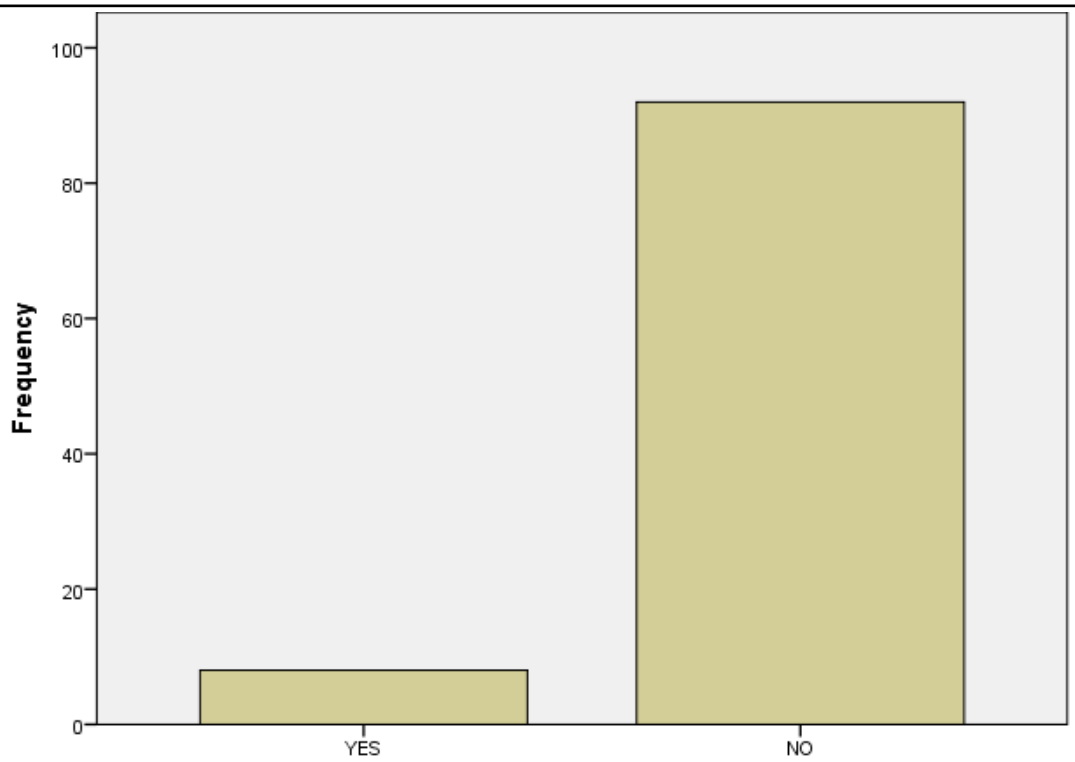


Figure IV-3: Is snoring getting worse?

Table IV-4: Do you snore loudly at night?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	26	26.0	26.0	26.0
	NO	74	74.0	74.0	100.0
	Total	100	100.0	100.0	

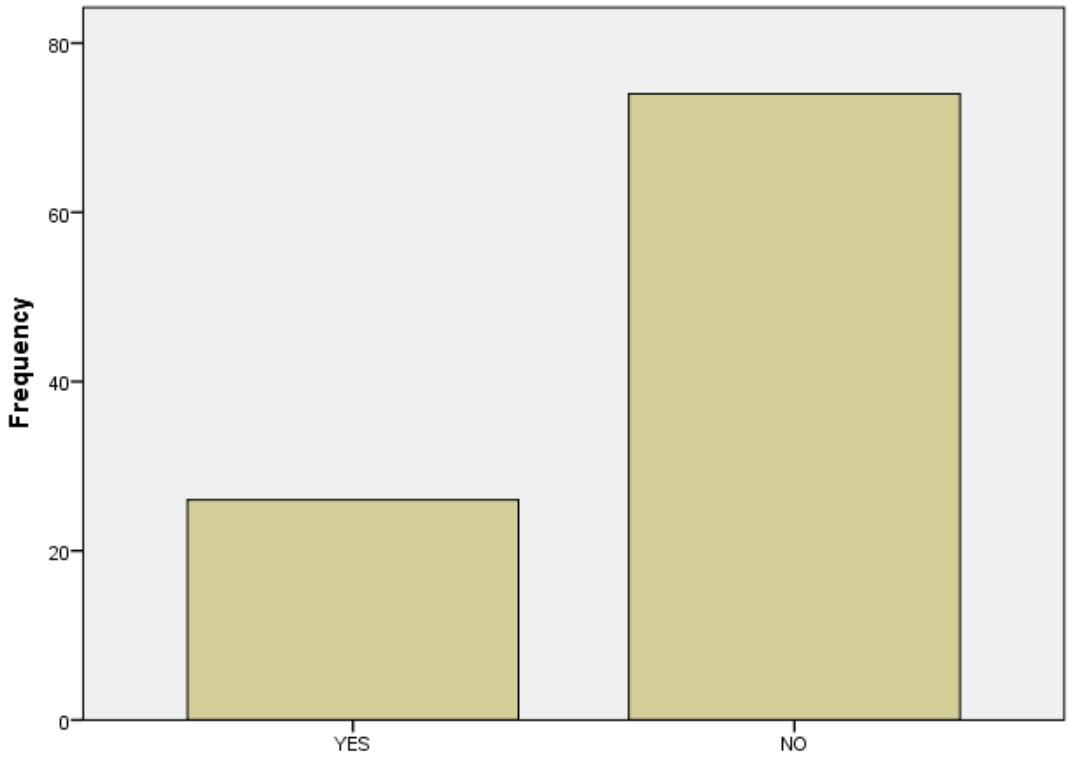


Figure IV-4: Do you snore loudly at night?

Table IV-5: Do you wake yourself up?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	17	17.0	17.0	17.0
	NO	83	83.0	83.0	100.0
	Total	100	100.0	100.0	

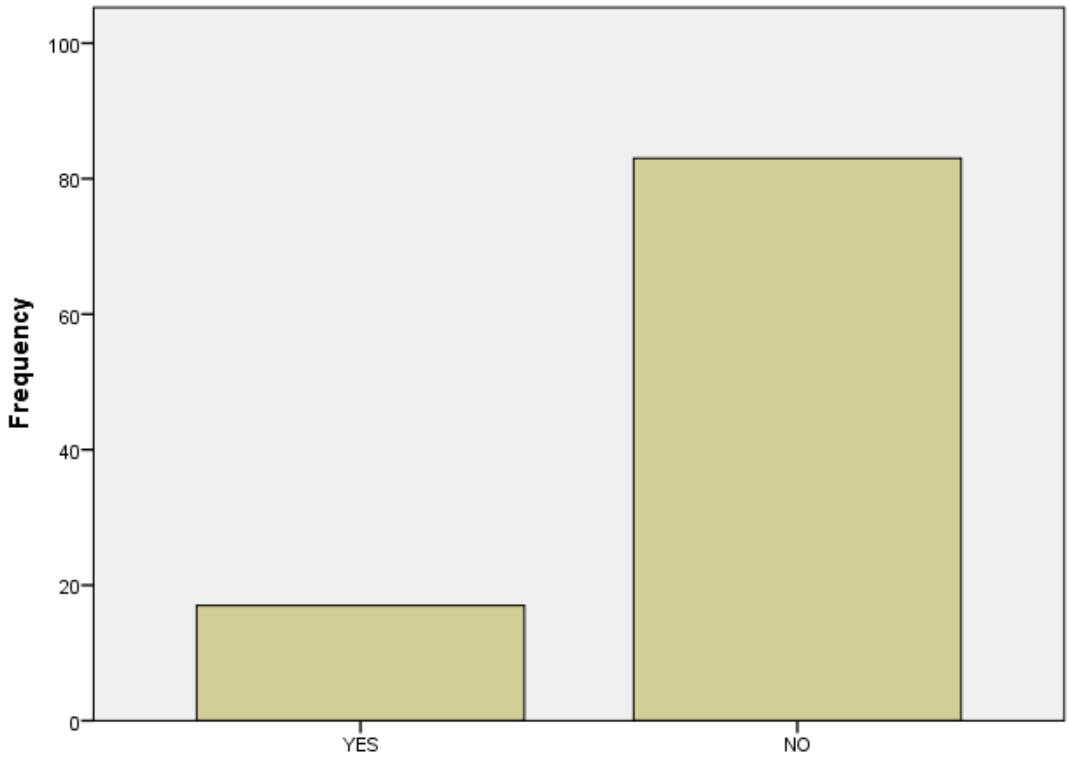


Figure IV-5: Do you wake yourself up?

Table I- 6:Do you have restless disturbed sleep?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	14	14.0	14.0	14.0
	NO	86	86.0	86.0	100.0
	Total	100	100.0	100.0	

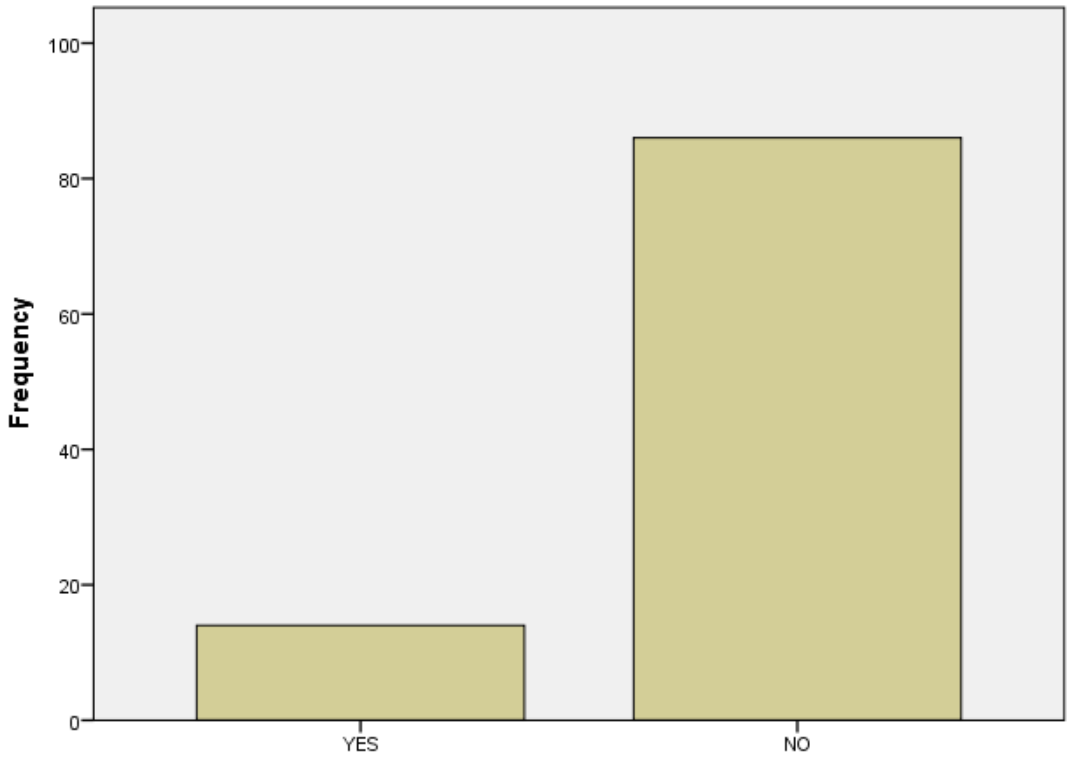


Figure IV-6: Do you have restless disturbed sleep?

Table IV-7:Does your bed partner move out of the room because of your snoring?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	2	2.0	2.0	2.0
	no	98	98.0	98.0	100.0
	Total	100	100.0	100.0	

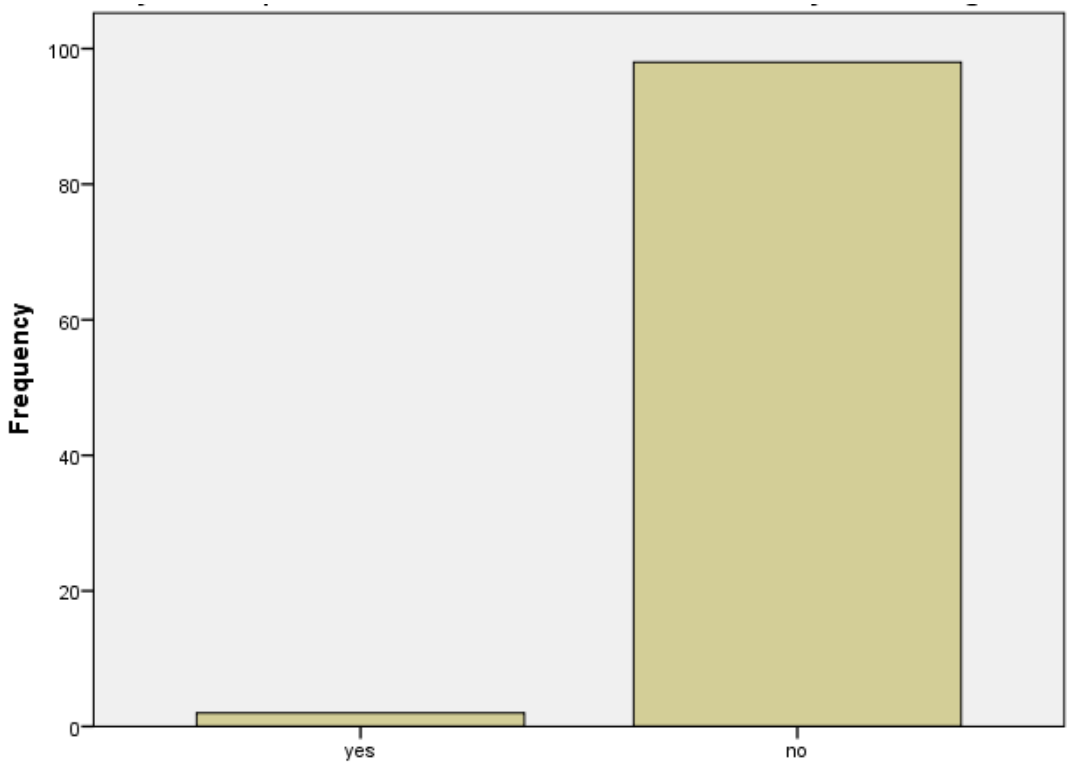


Figure IV-7: Does your bed partner move out the room because of your snoring?

Table IV-8:Do you ever stop breathing during your sleep?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	6	6.0	6.0	6.0
	no	94	94.0	94.0	100.0
	Total	100	100.0	100.0	

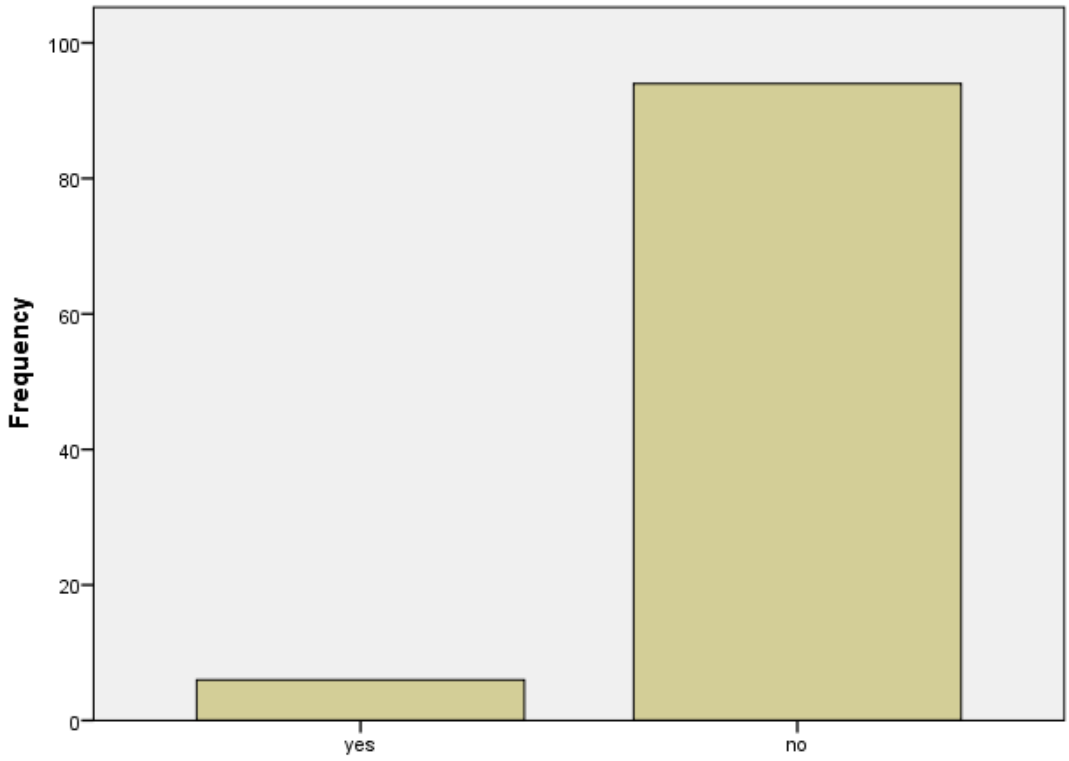


Figure IV-8:Do you ever stop breathing during your sleep?

Table IV-9: Are the pauses frequent?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	2	2.0	2.0	2.0
	no	98	98.0	98.0	100.0
	Total	100	100.0	100.0	

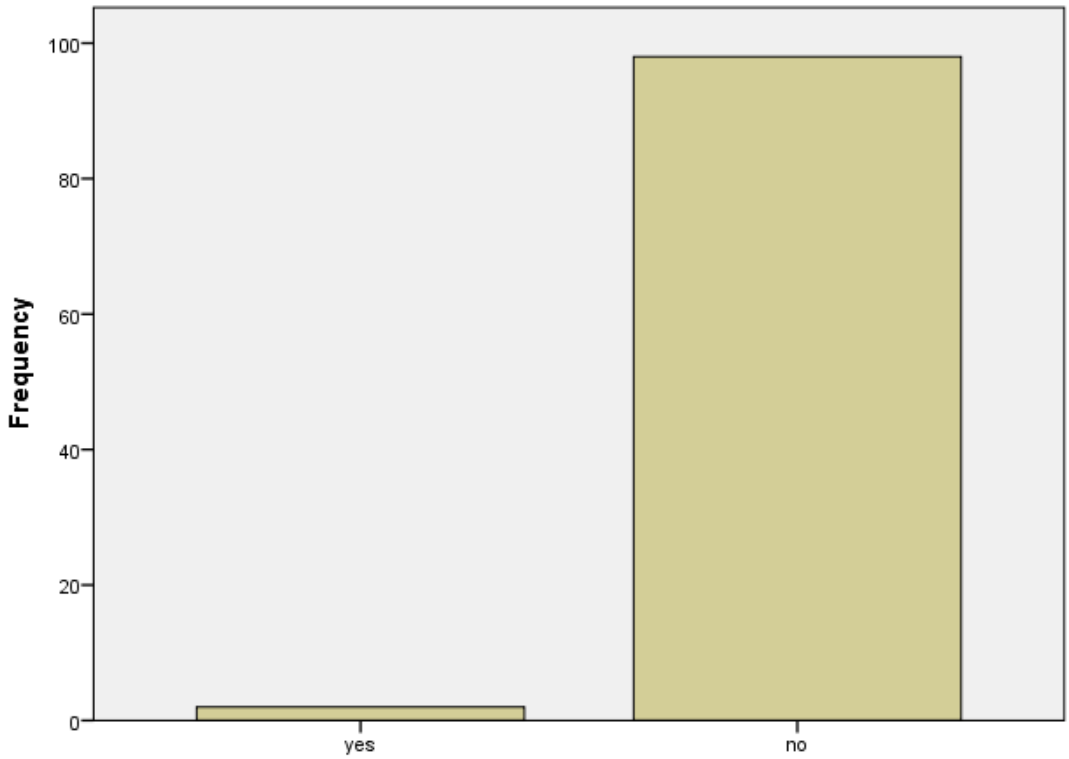


Figure IV-9:Are the pauses frequent?

Table IV-10: Have you ever had a sleep study or been evaluated for sleep apnea?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	1	1.0	1.0	1.0
	no	99	99.0	99.0	100.0
	Total	100	100.0	100.0	

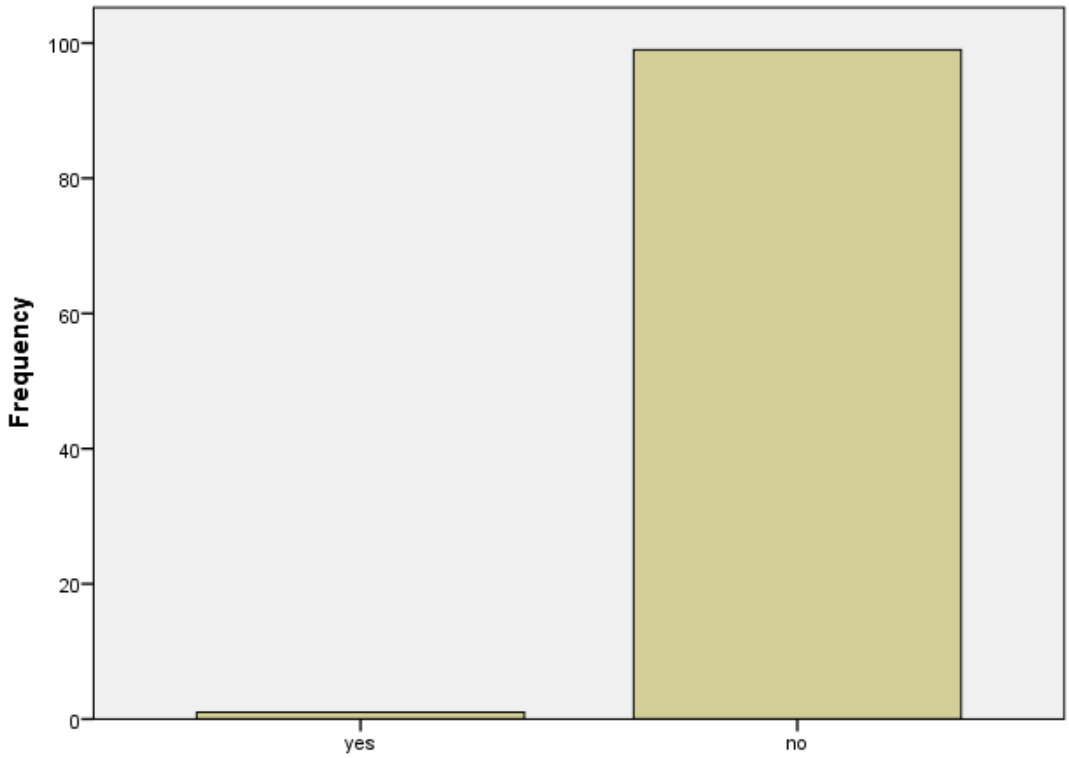


Figure IV-10: Have you ever had a sleep study or been evaluated for sleep apnea?

Table IV-11: Have you ever tried any snoring device?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	1	1.0	1.0	1.0
	no	99	99.0	99.0	100.0
	Total	100	100.0	100.0	

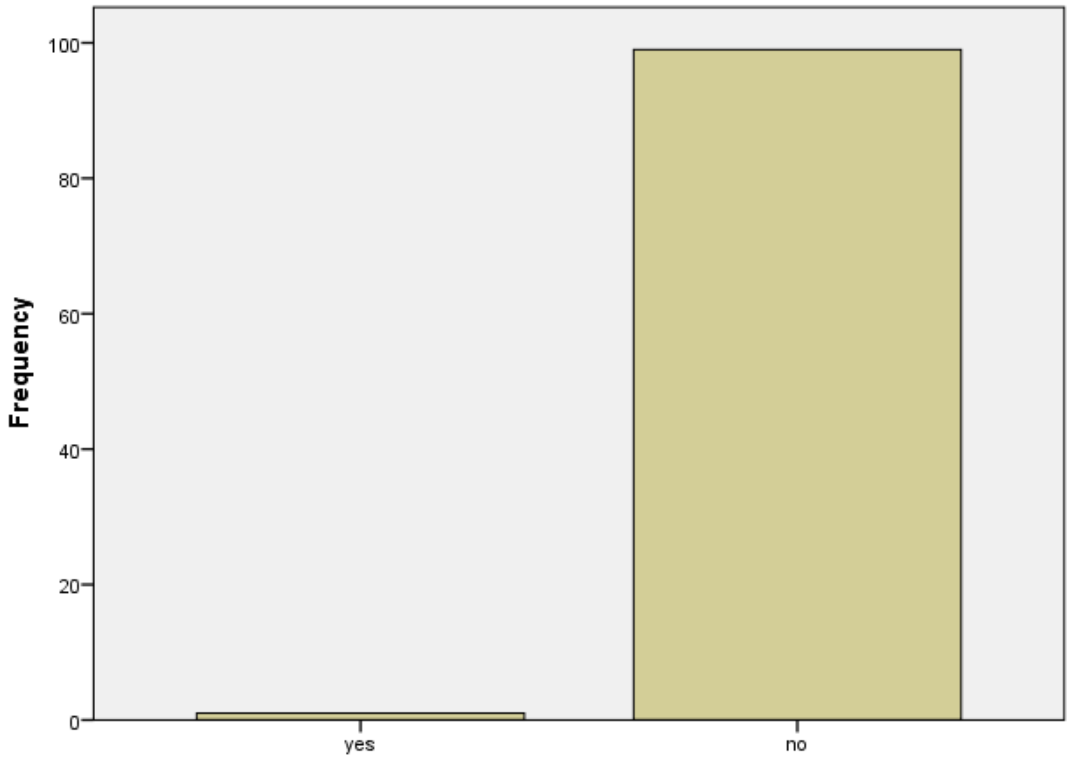


Figure IV-11: Have you ever tried any snoring device?

Table IV-12: Are you tired no matter how much you sleep?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	36	36.0	36.0	36.0
	no	64	64.0	64.0	100.0
	Total	100	100.0	100.0	

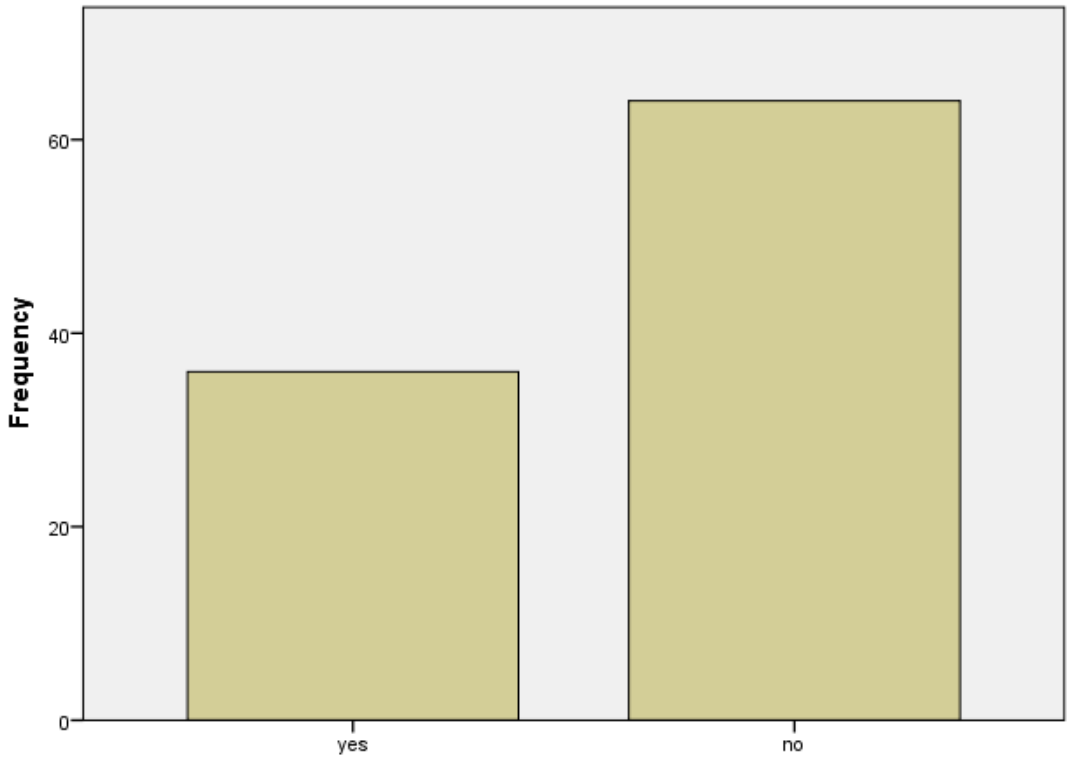


Figure IV-12: Are you tired no matter how much you sleep?

Table IV-13: Do you often wakeup in the morning with a headache?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	45	45.0	45.0	45.0
	no	55	55.0	55.0	100.0
	Total	100	100.0	100.0	

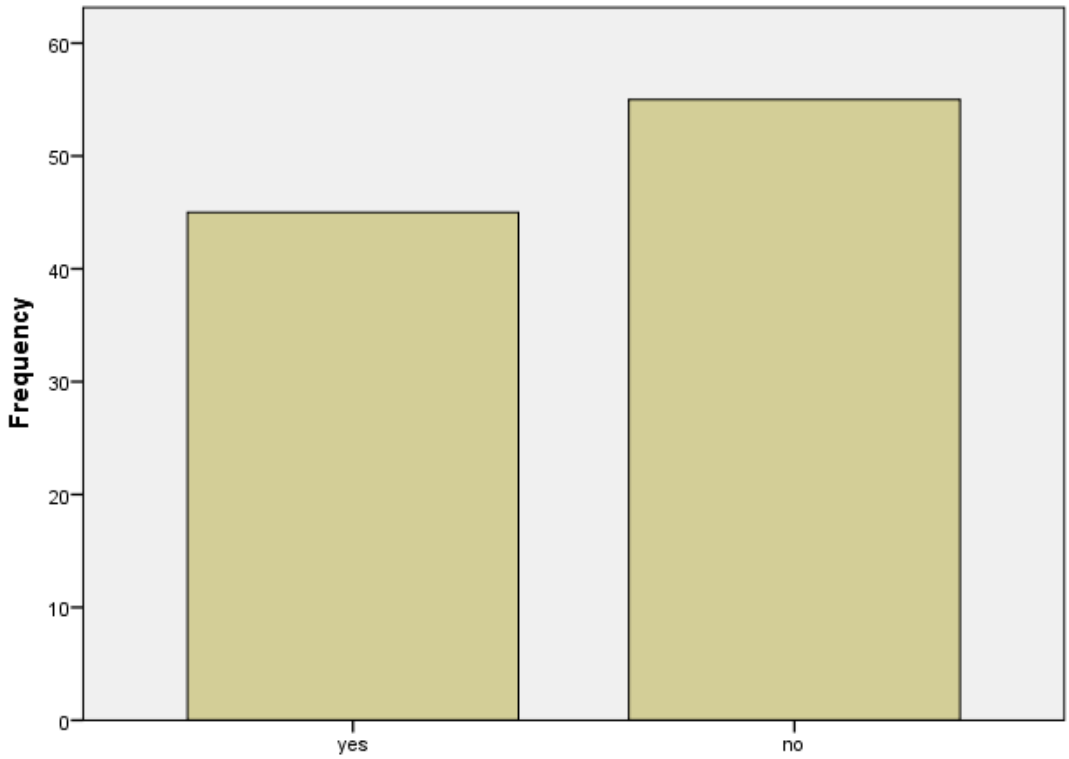


Figure IV-13:Do you often wakeup in the morning with a headache?

Table IV-14: Are you drowsy or sleepy during the day?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	11	11.0	11.0	11.0
	no	89	89.0	89.0	100.0
	Total	100	100.0	100.0	

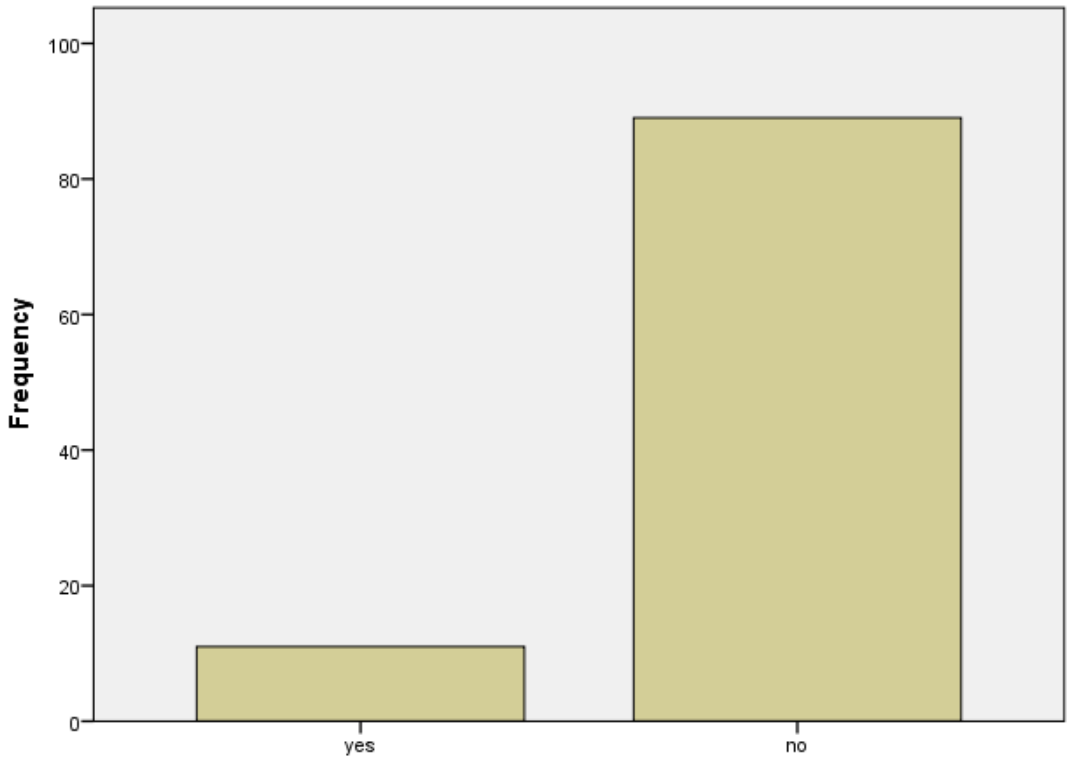


Figure IV-14:Are you drowsy or sleepy during the day?

Table IV-15:Does day time sleepiness interfere with your work?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	4	4.0	4.0	4.0
	no	96	96.0	96.0	100.0
	Total	100	100.0	100.0	

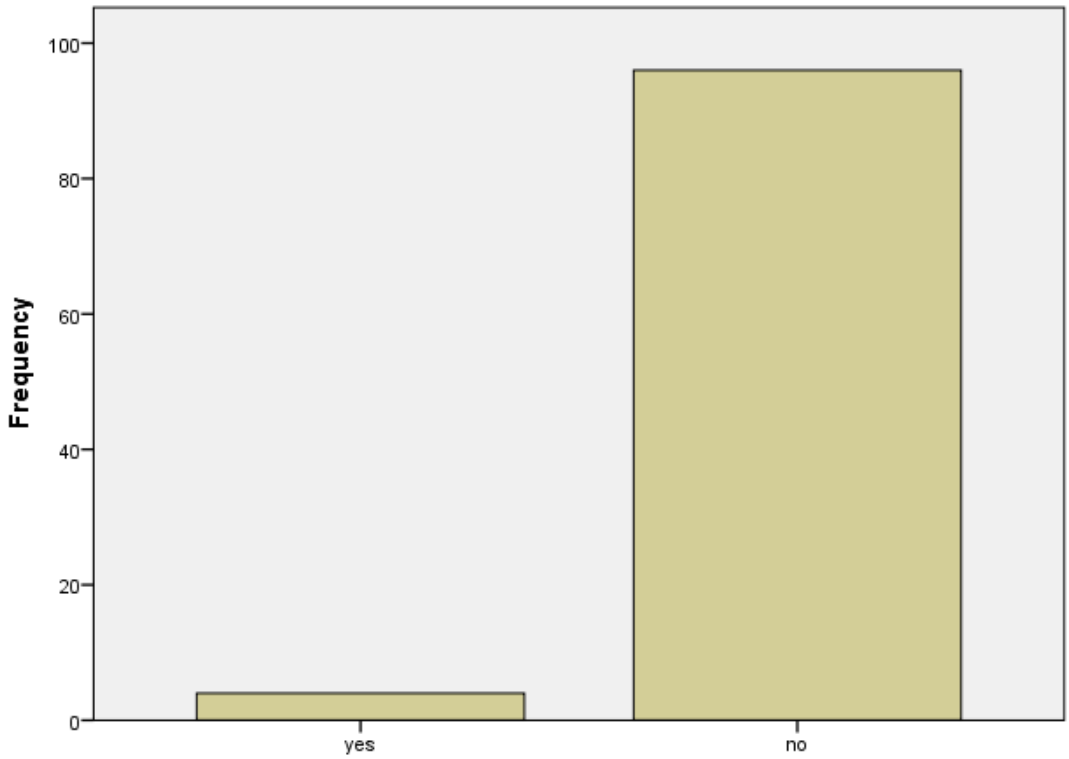


Figure IV-15:Does day time sleepiness interfere with your work?

Table IV-16: Have you ever fallen asleep while driving or eating?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	2	2.0	2.0	2.0
	No	98	98.0	98.0	100.0
	Total	100	100.0	100.0	

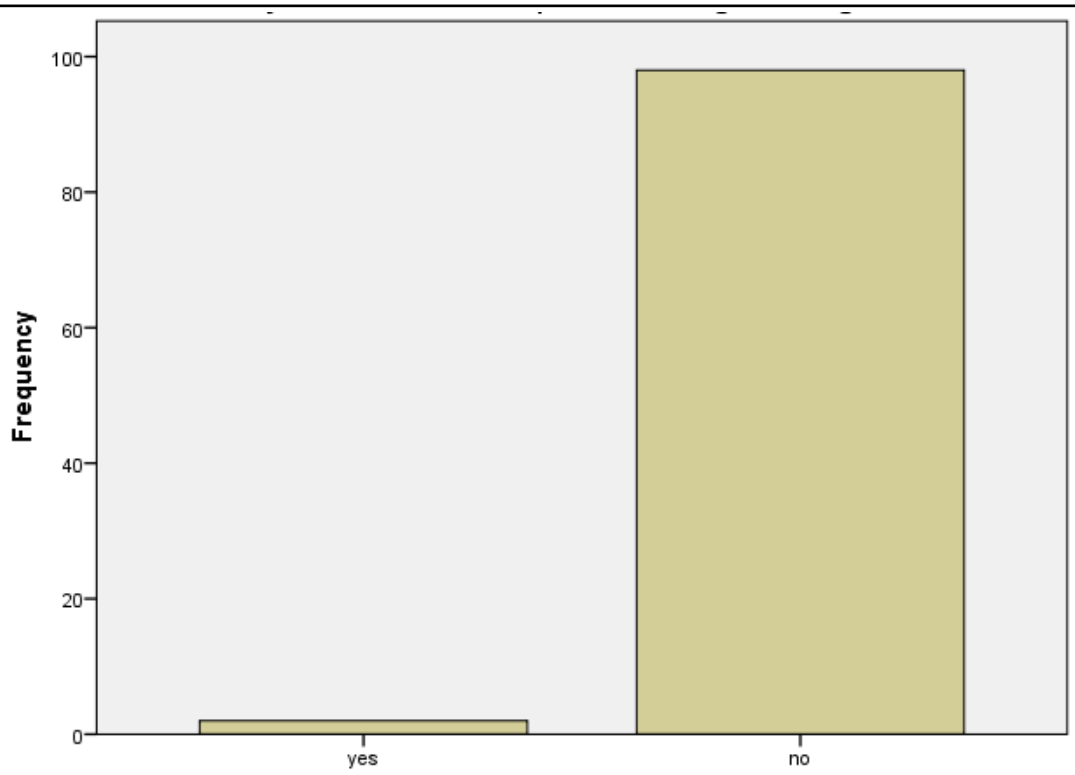


Figure IV-16: Have you ever fallen asleep while driving or eating?

Table IV-17:Do you take naps during the day?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	4	4.0	4.0	4.0
	no	96	96.0	96.0	100.0
	Total	100	100.0	100.0	

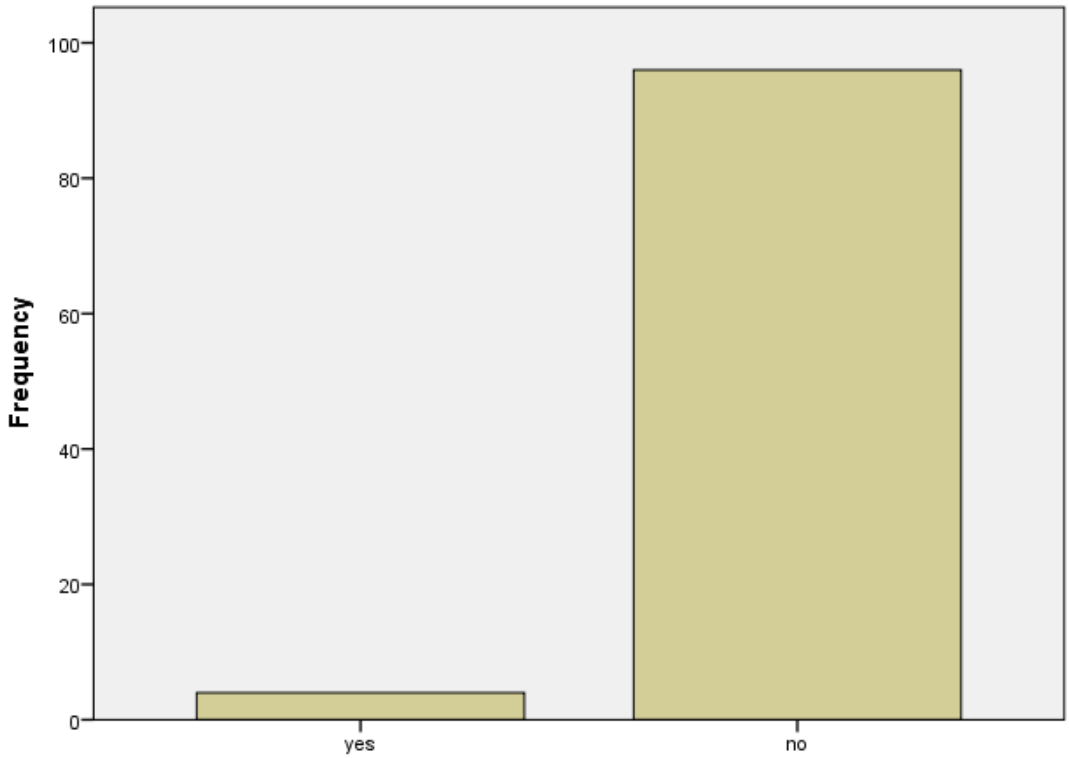


Figure IV-17:Do you take naps during the day?

Table IV-18:Do you easily fall asleep in quite places?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	15	15.0	15.0	15.0
	no	85	85.0	85.0	100.0
	Total	100	100.0	100.0	

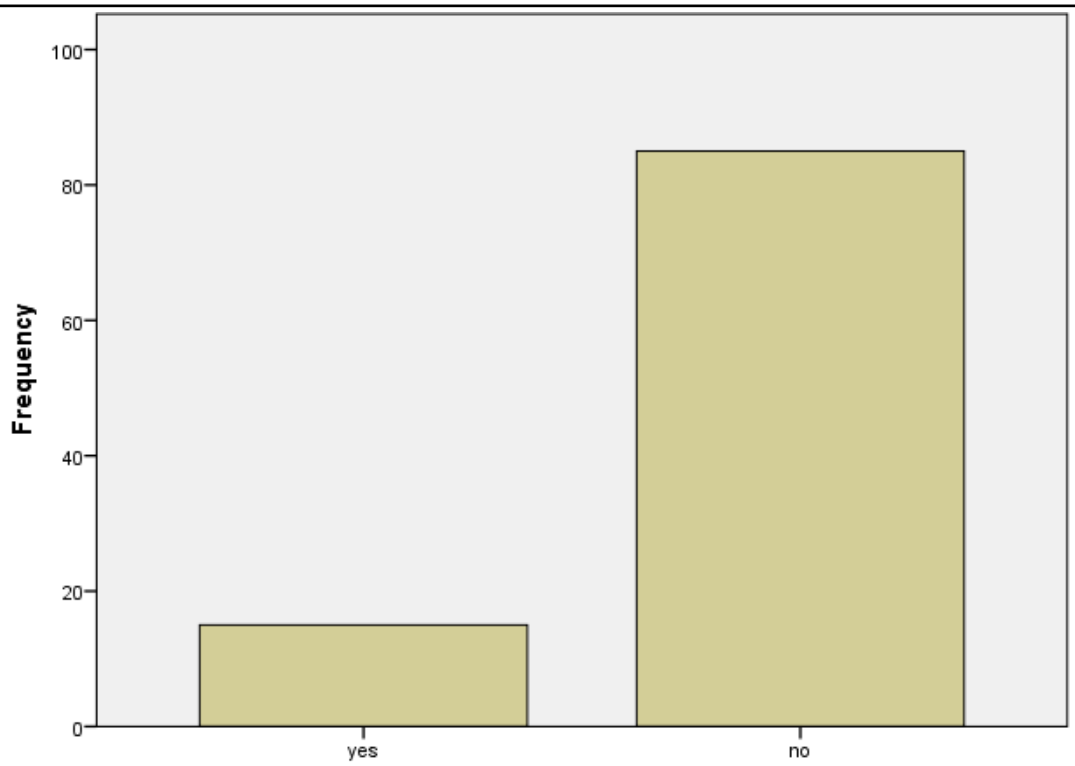


Figure IV-18: Do you easily fall asleep in quite places?

Table IV-19: Do you drink coffee, tea, cola or take caffeine to stay awake?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	38	38.0	38.0	38.0
	no	62	62.0	62.0	100.0
	Total	100	100.0	100.0	

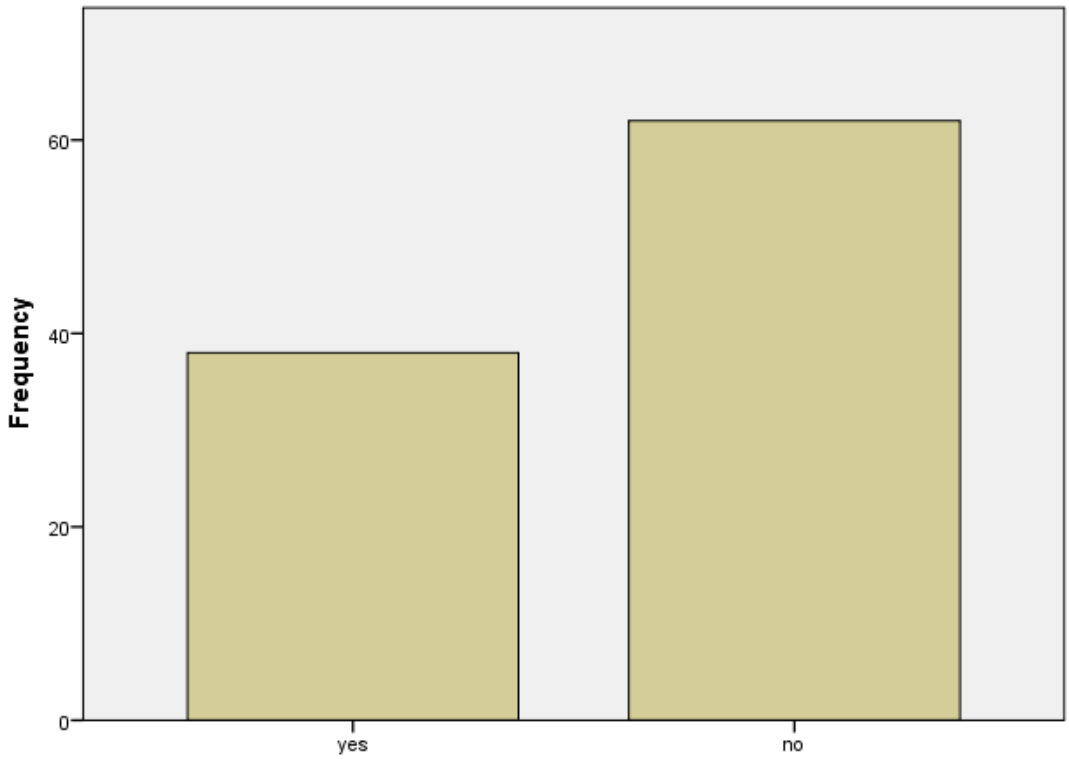


Figure IV-19:Do you drink coffee, tea, cola or take caffeine to stay awake?

Table IV-20: Is your sleep/snoring problem causing any emotional problems?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	2	2.0	2.0	2.0
	no	98	98.0	98.0	100.0
	Total	100	100.0	100.0	

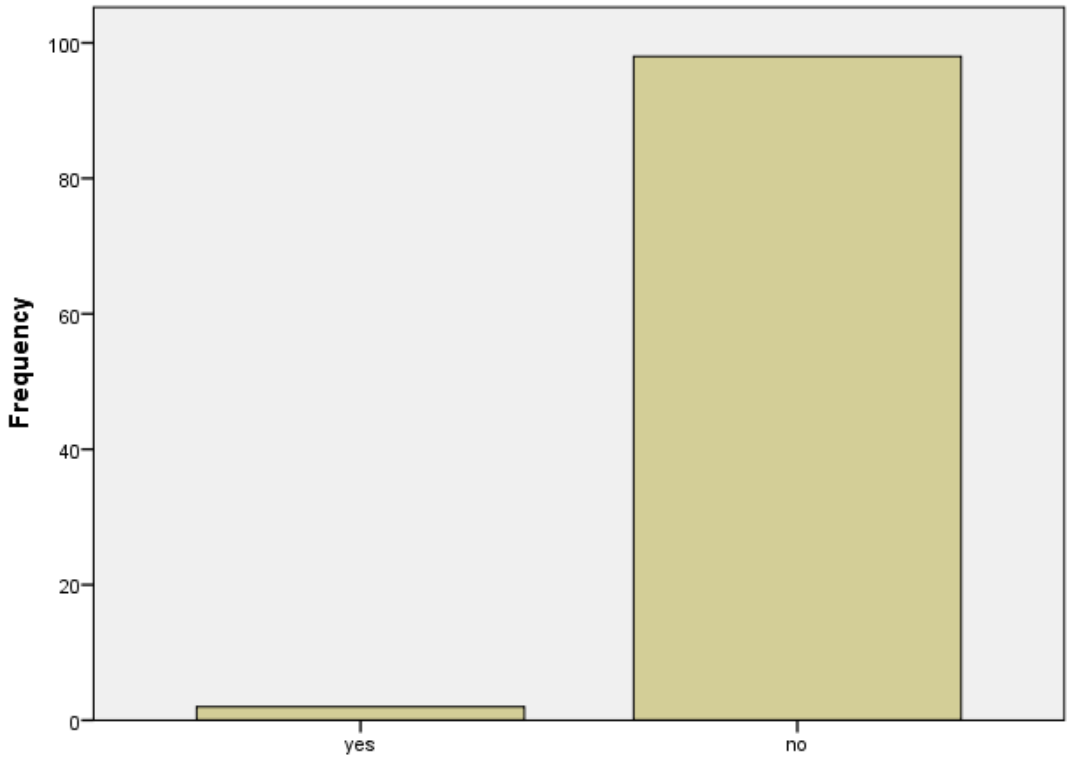


Figure IV-20:Is your sleep/snoring problem causing any emotional problems?

Table IV-21: Do you work varying shifts at work such that your sleep pattern is irregular?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	1	1.0	1.0	1.0
	no	99	99.0	99.0	100.0
	Total	100	100.0	100.0	

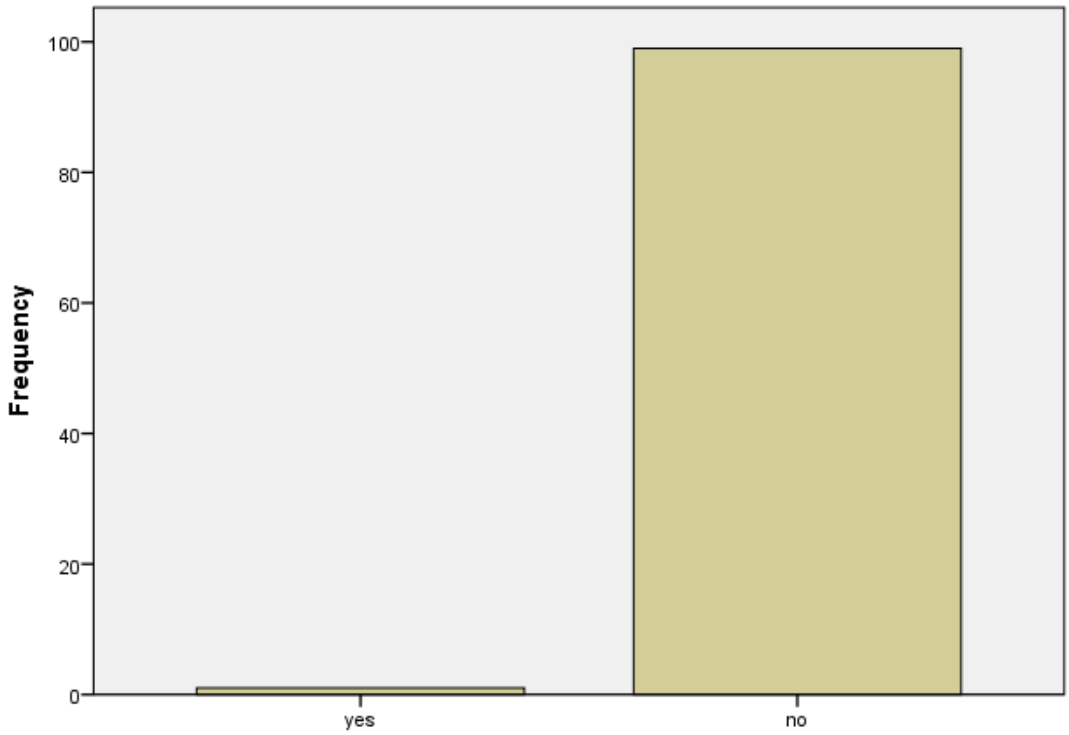


Figure IV-21:Do you work varying shifts at work such that your sleep pattern is irregular?

Table IV-22: How much do you weight?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	30 to 50	65	65.0	65.0	65.0
	50 to100	35	35.0	35.0	100.0
	Total	100	100.0	100.0	

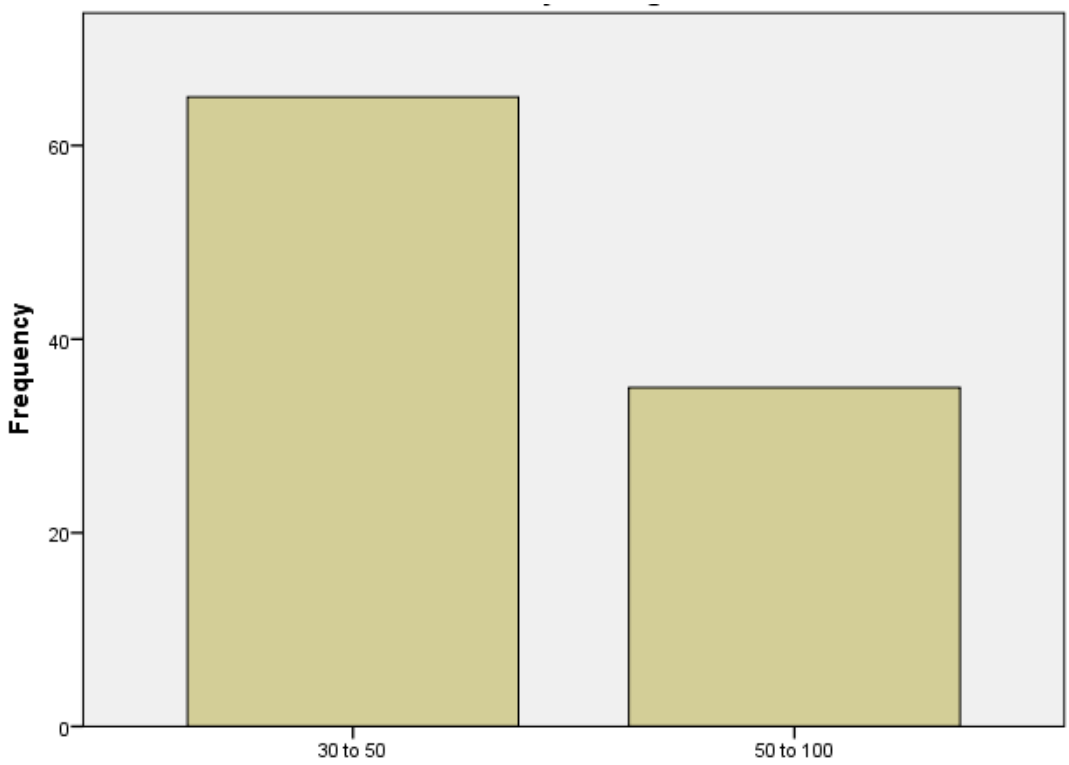


Figure-IV: 22 How much do you weight?

Table IV-23:Do you have nasal allergies or hay fever?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	100	100.0	100.0	100.0

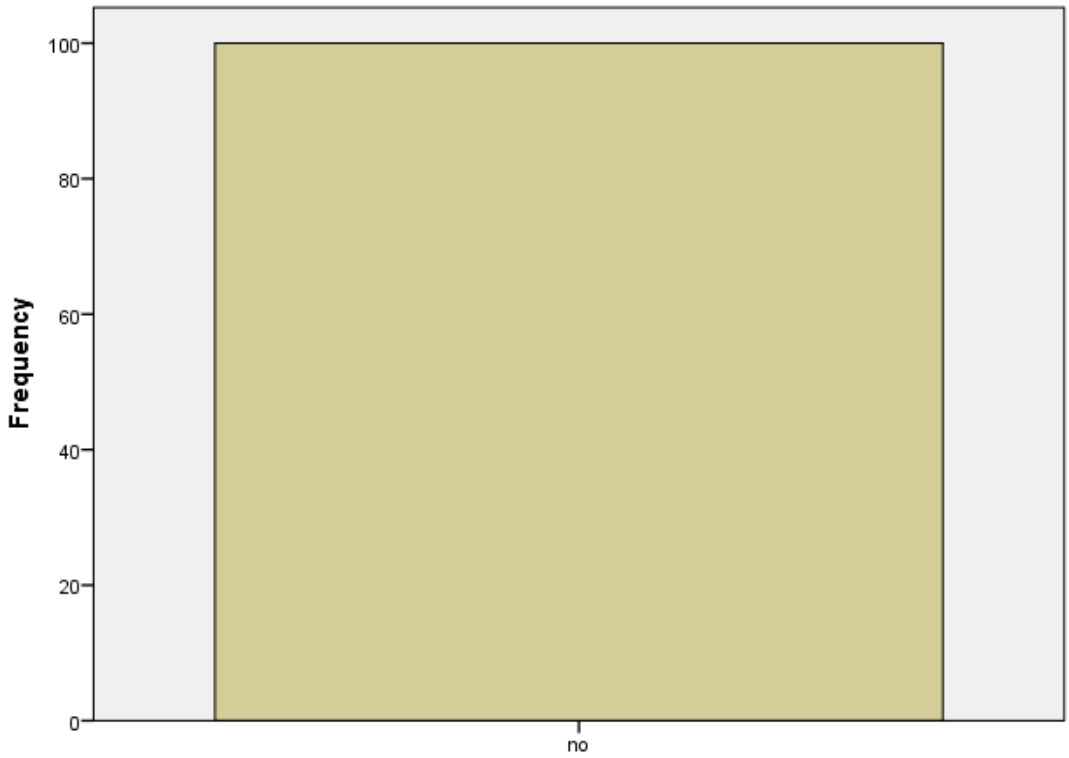


Figure IV-23: Do you have nasal allergies or hay fever?

Table IV-24: Do you have trouble breathing through your nose?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	2	2.0	2.0	2.0
	No	98	98.0	98.0	100.0
	Total	100	100.0	100.0	

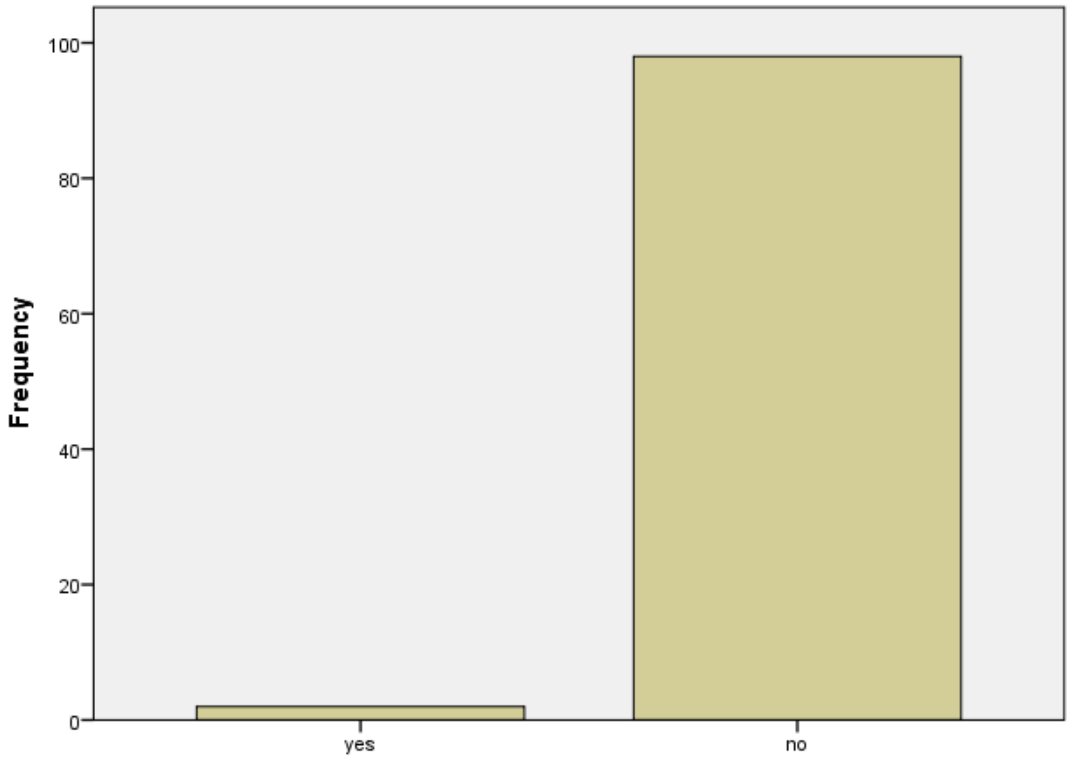


Figure IV-24:Do you have trouble breathing through your nose?

Table IV-25: Have you broken your nose?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	1	1.0	1.0	1.0
	NO	99	99.0	99.0	100.0
	Total	100	100.0	100.0	

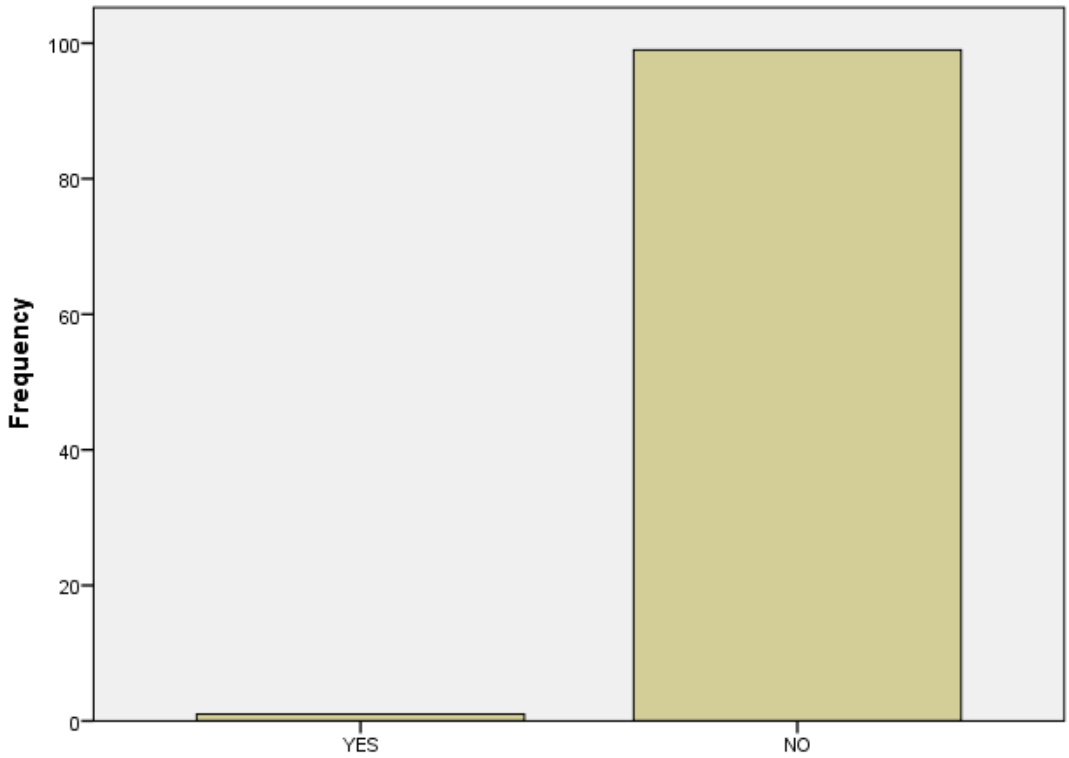


Figure IV-25: Have you broken your nose?

Table IV-26:Have you had nasal surgery?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	1	1.0	1.0	1.0
	no	99	99.0	99.0	100.0
	Total	100	100.0	100.0	

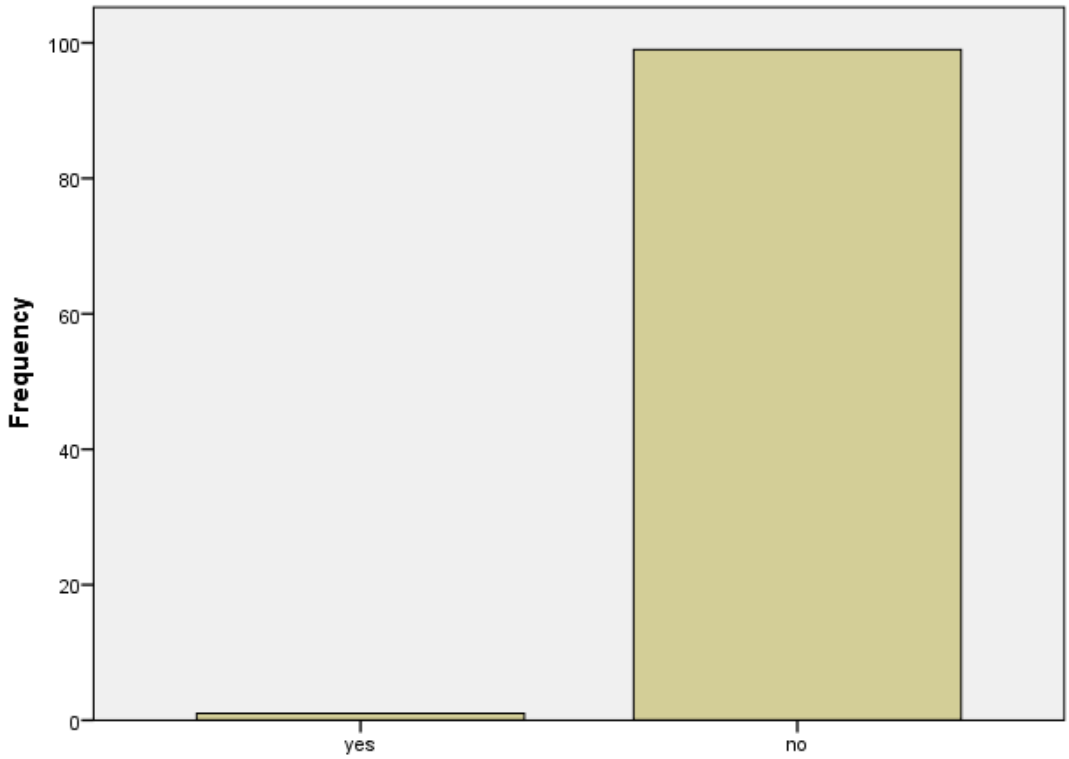


Figure IV-26:Have you had nasal surgery?

Table IV-27: Have you had prior tonsil, adenoid or palate surgery?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	1.0	1.0	1.0
	No	99	99.0	99.0	100.0
	Total	100	100.0	100.0	

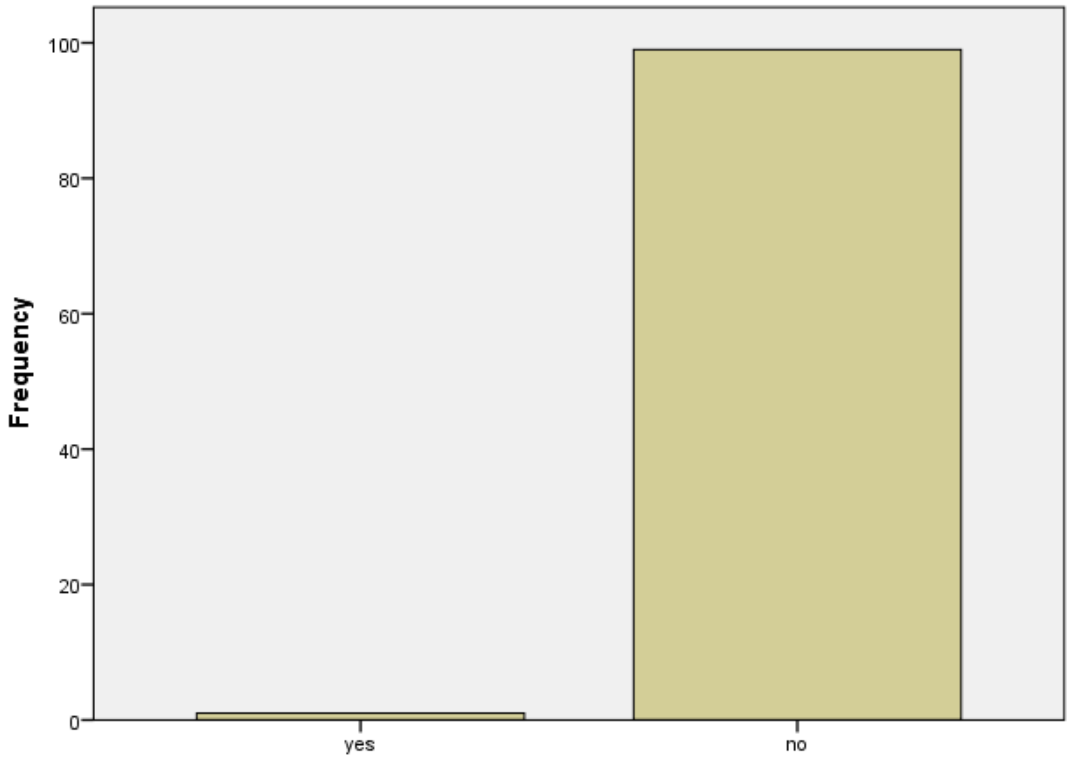


Figure IV-27:Have you had prior tonsil, adenoid or palate surgery?

Table IV-28:Do your teeth fit together properly?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	92	92.0	92.0	92.0
	no	8	8.0	8.0	100.0
	Total	100	100.0	100.0	

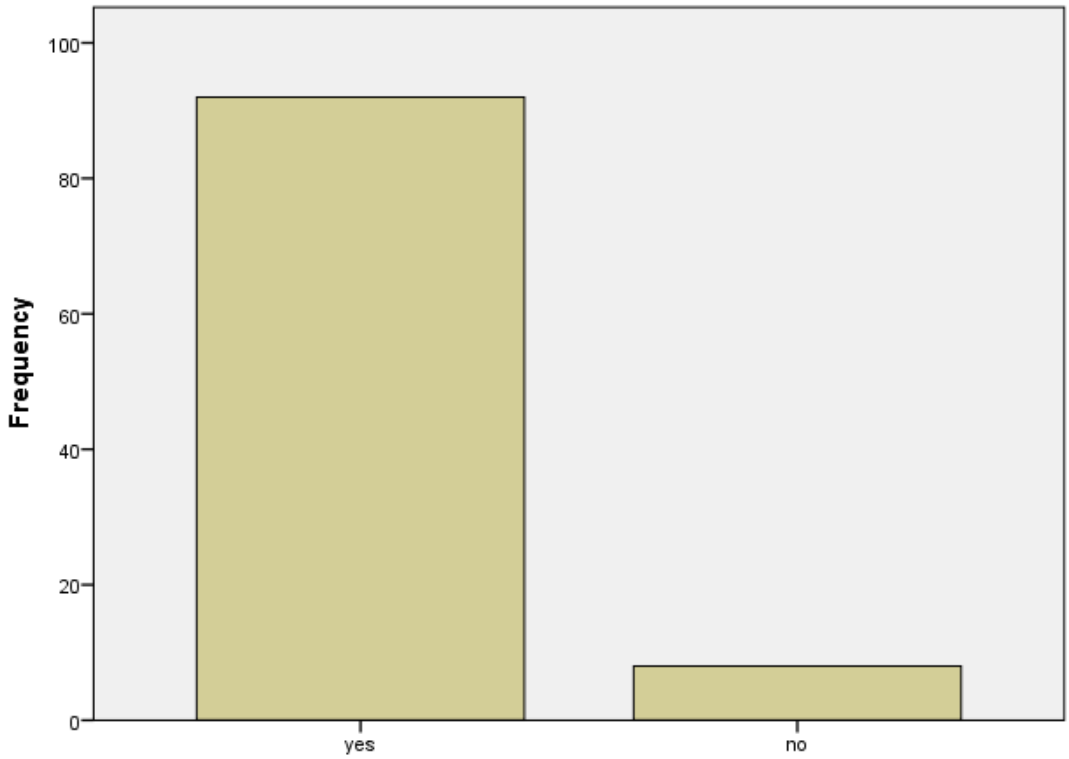


Figure IV-28:Do your teeth fit together properly?

Table IV-29:Do you have trouble opening your mouth?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	2	2.0	2.0	2.0
	no	98	98.0	98.0	100.0
	Total	100	100.0	100.0	

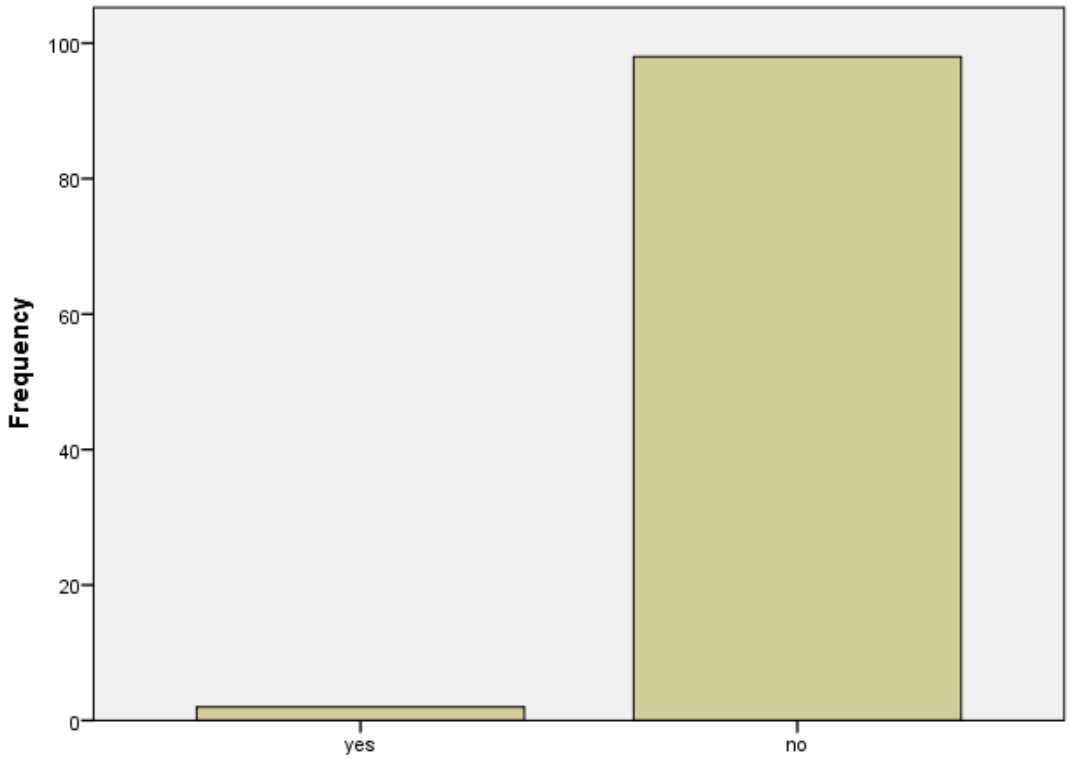


Figure IV-29:Do you have trouble opening your mouth?

Table IV-30:Do you gag easily?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	100	100.0	100.0	100.0

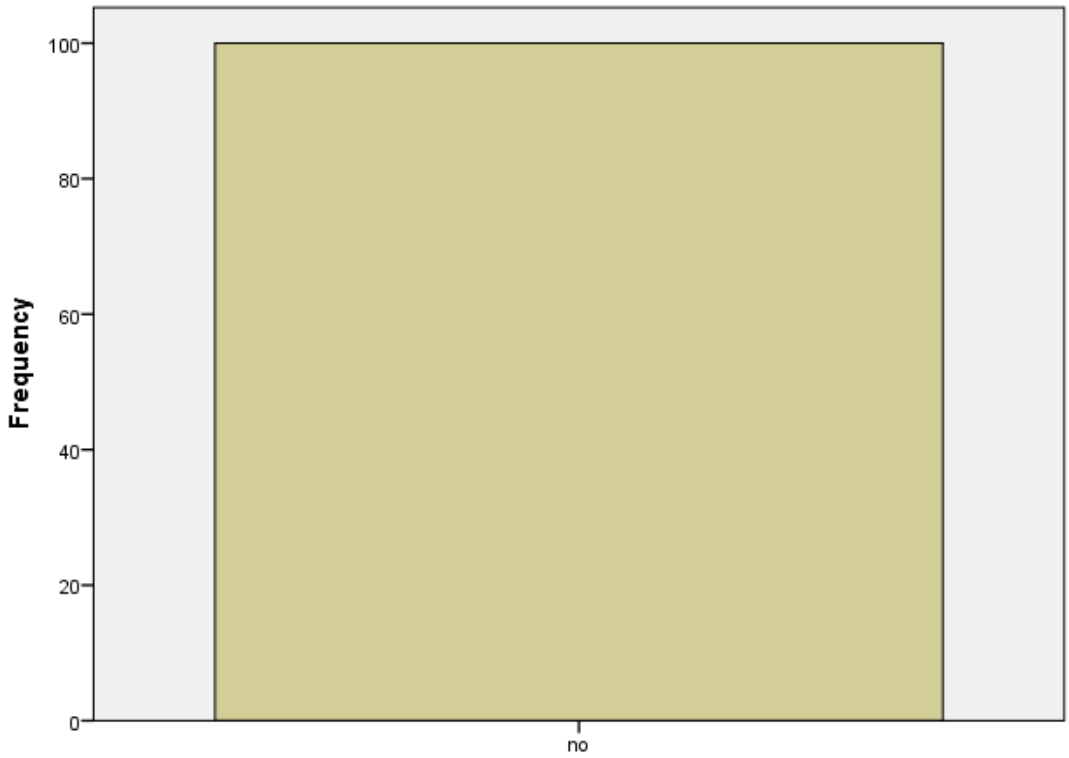


Figure IV-30:Do you gag easily?

Table IV-31:Do you smoke cigarettes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	100	100.0	100.0	100.0

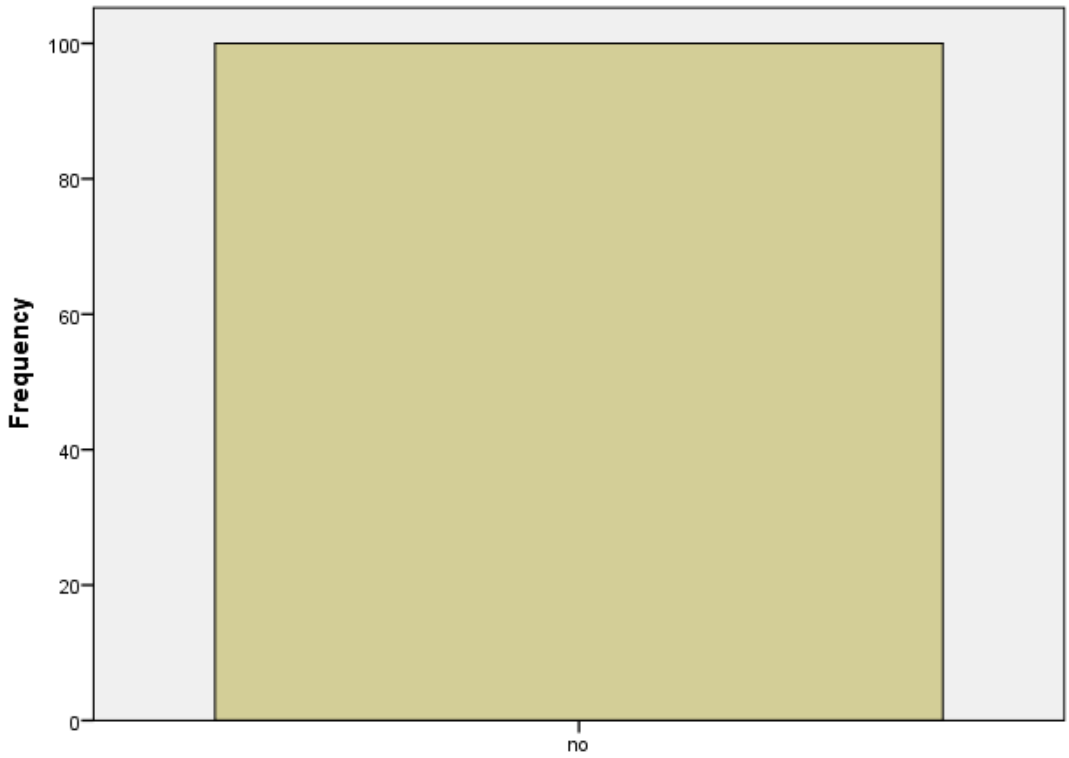
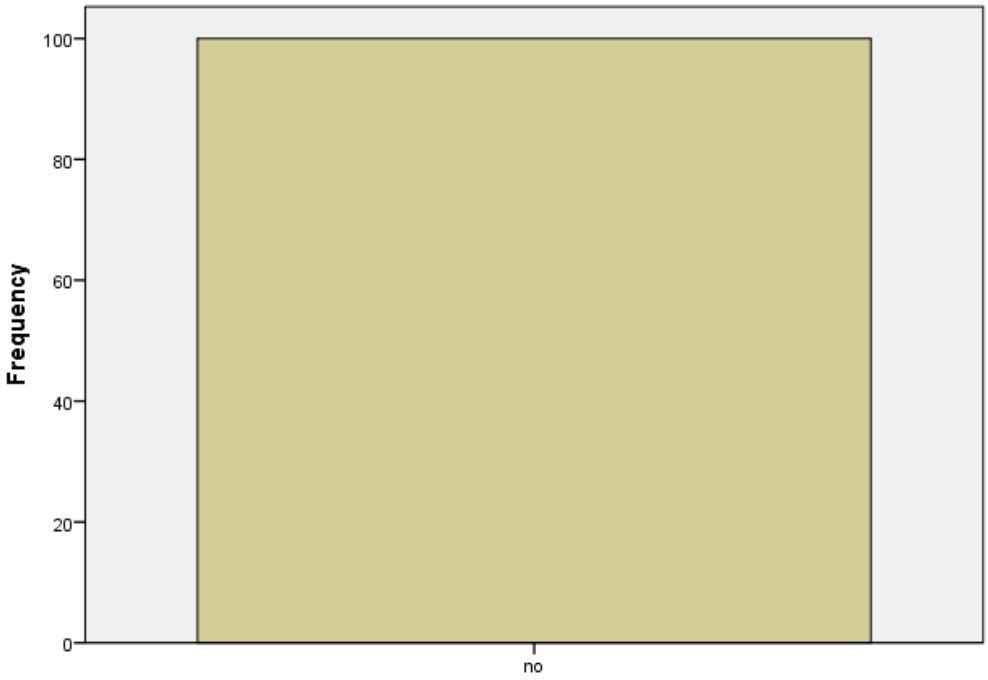


Figure IV-31:Do you smoke cigarettes?

Table IV-32: How much alcohol do you drink per day?_____ drinks per day?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	100	100.0	100.0	100.0



Graph IV-32: How much alcohol do you drink per day?_____ drinks per day?

Table IV-33: Do you drink alcohol near bed time?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	100	100.0	100.0	100.0

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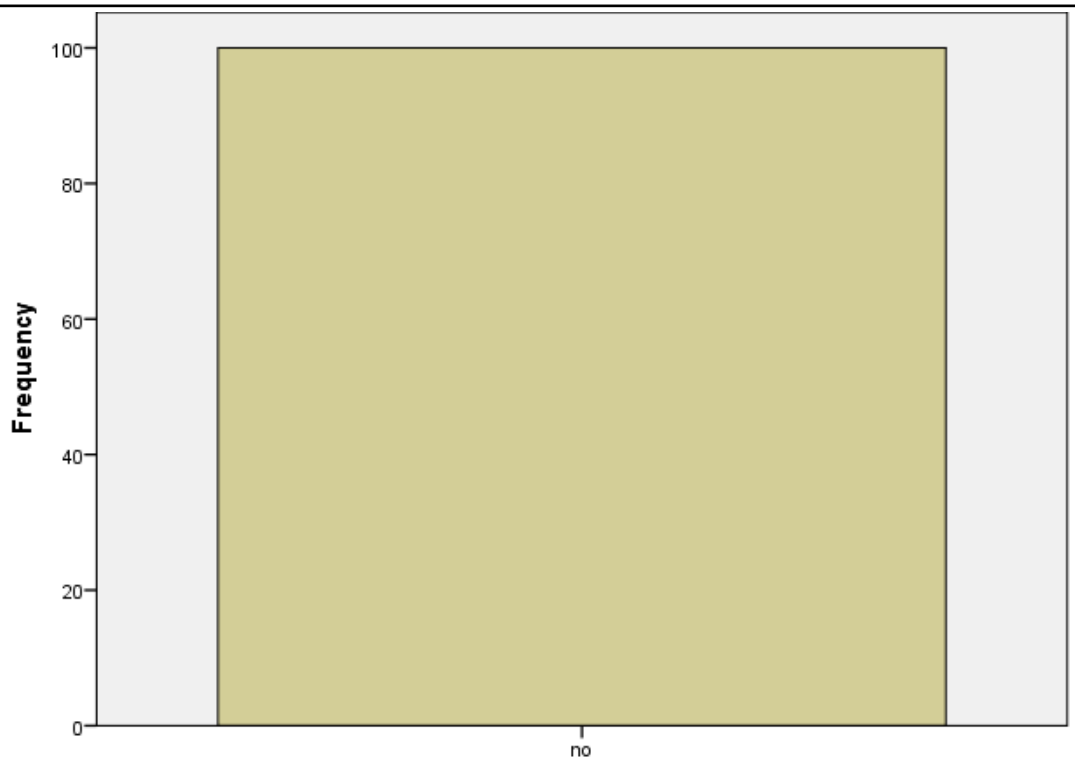


Figure IV-33: Do you drink alcohol near bed time?

Table IV-34: Do you have high blood pressure?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	100	100.0	100.0	100.0

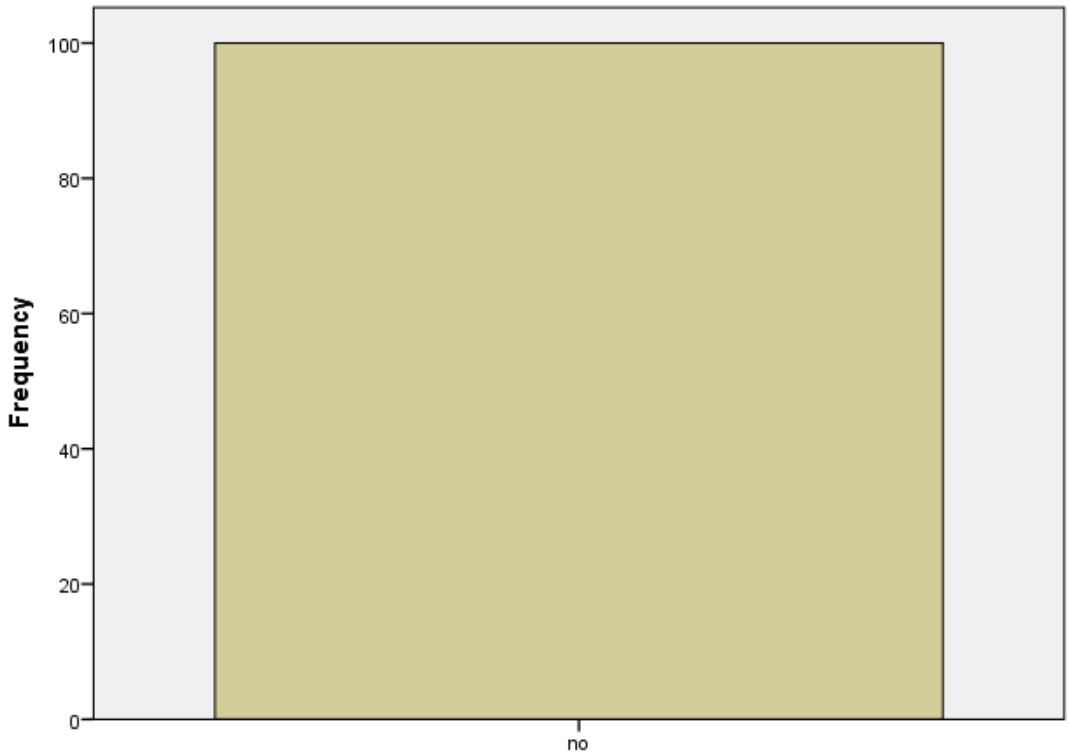


Figure IV-34:Do you have high blood pressure?

Table IV-35:Do you have an irregular heartbeat?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	100	100.0	100.0	100.0

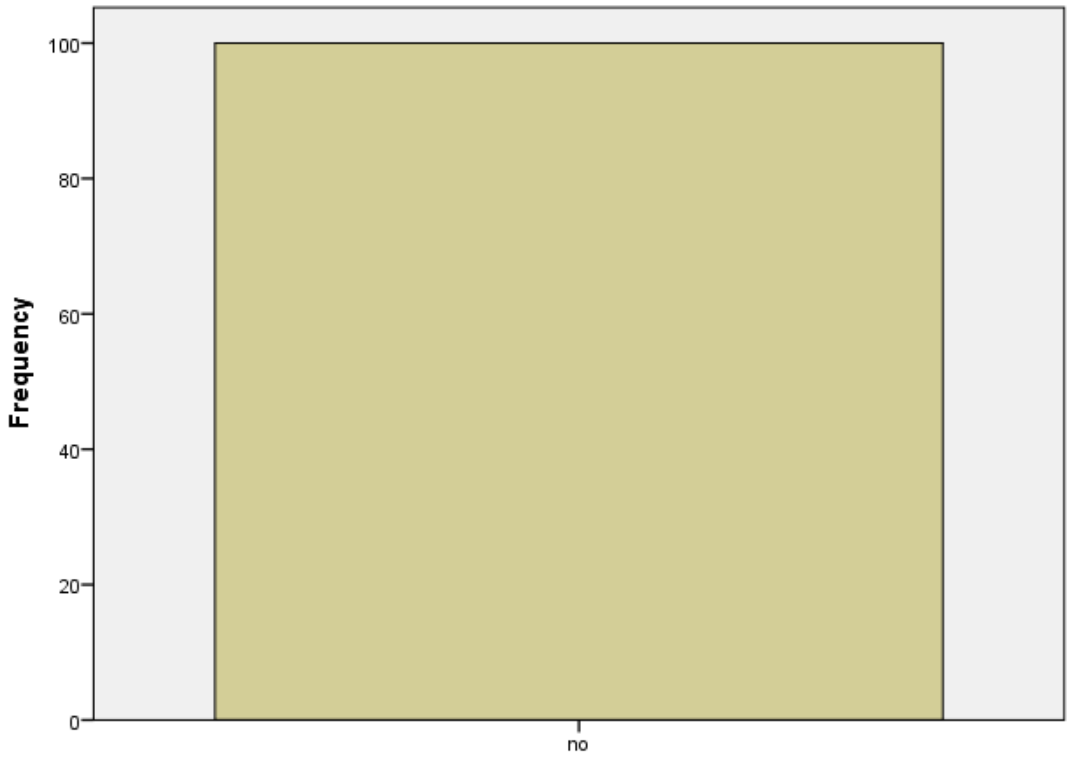


Figure IV-35:Do you have an irregular heartbeat?

Table IV-36:Do you need SBE prophylaxis for your heart?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	100	100.0	100.0	100.0

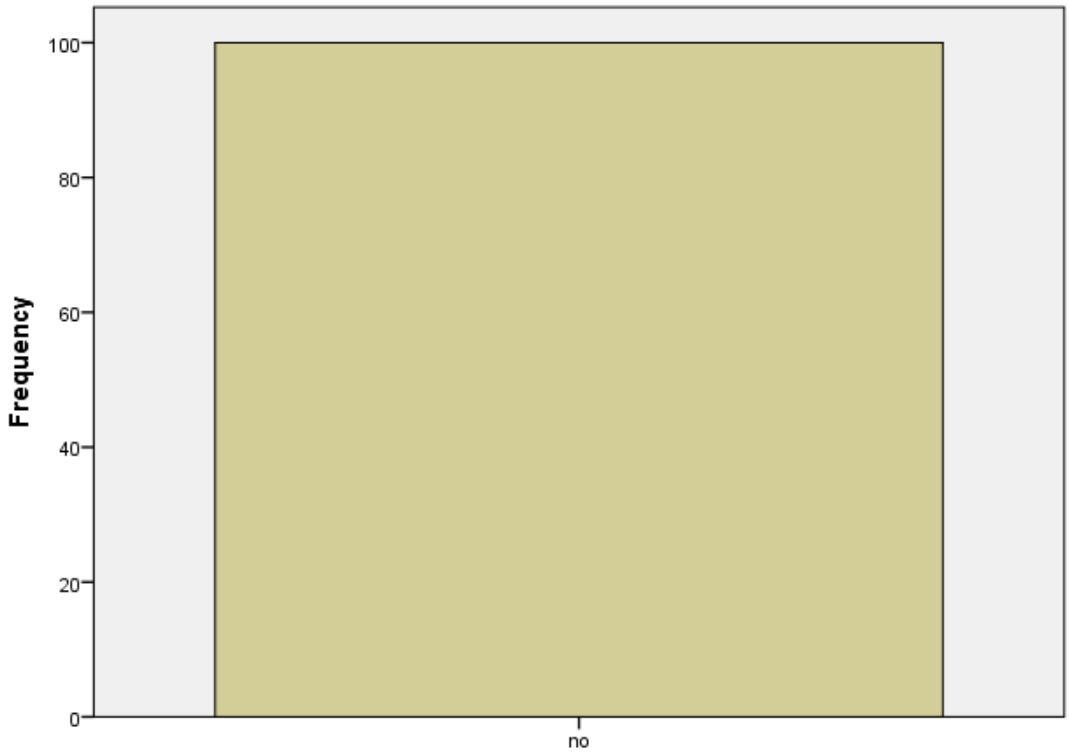


Figure IV-36: Do you need SBE prophylaxis for your heart?

Table IV-37: Do you have any neurological disease?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	100	100.0	100.0	100.0

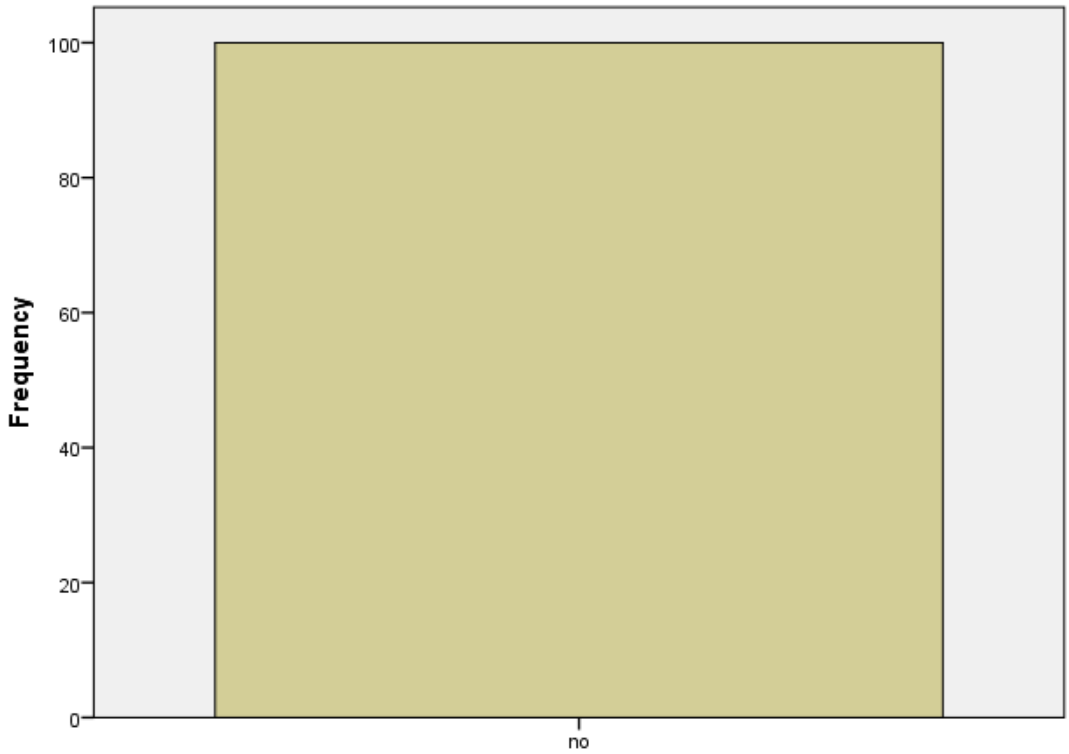


Figure IV-37: Do you have any neurological disease?

Table I-38: Do you have diabetes or thyroid disease?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	100	100.0	100.0	100.0

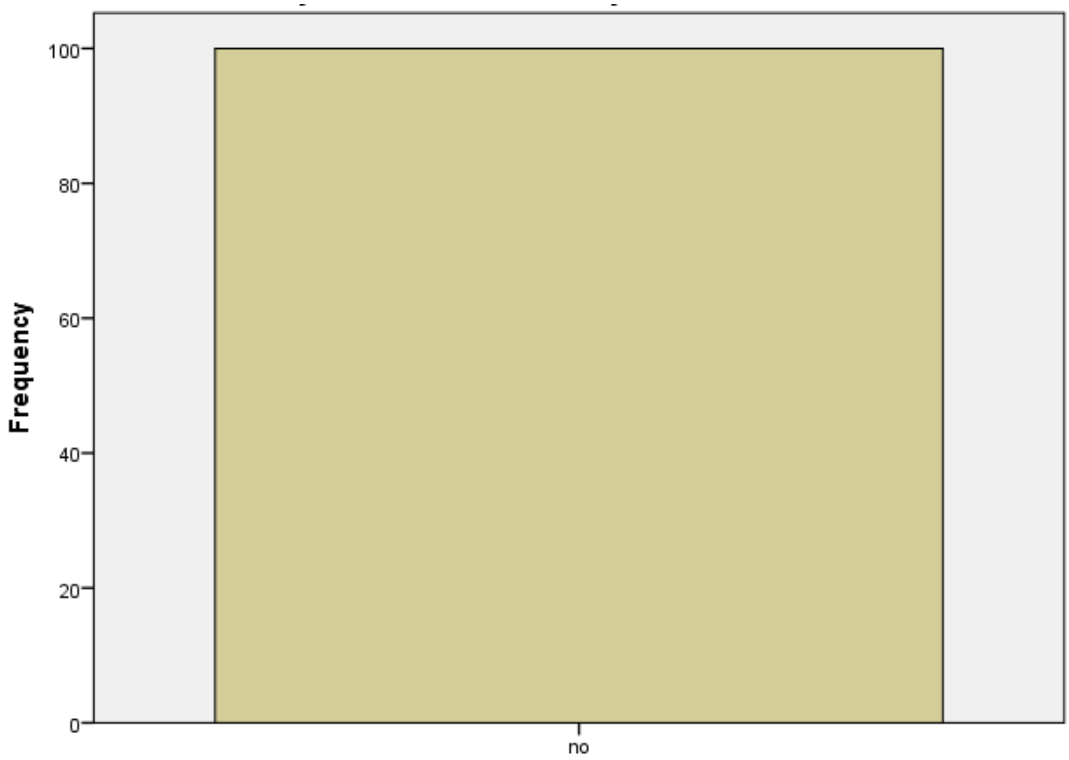


Figure IV-38: Do you have diabetes or thyroid disease?

Table IV-39: Does anyone else in your family snore or have a sleep problem

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	53	53.0	53.0	53.0
	no	47	47.0	47.0	100.0
	Total	100	100.0	100.0	

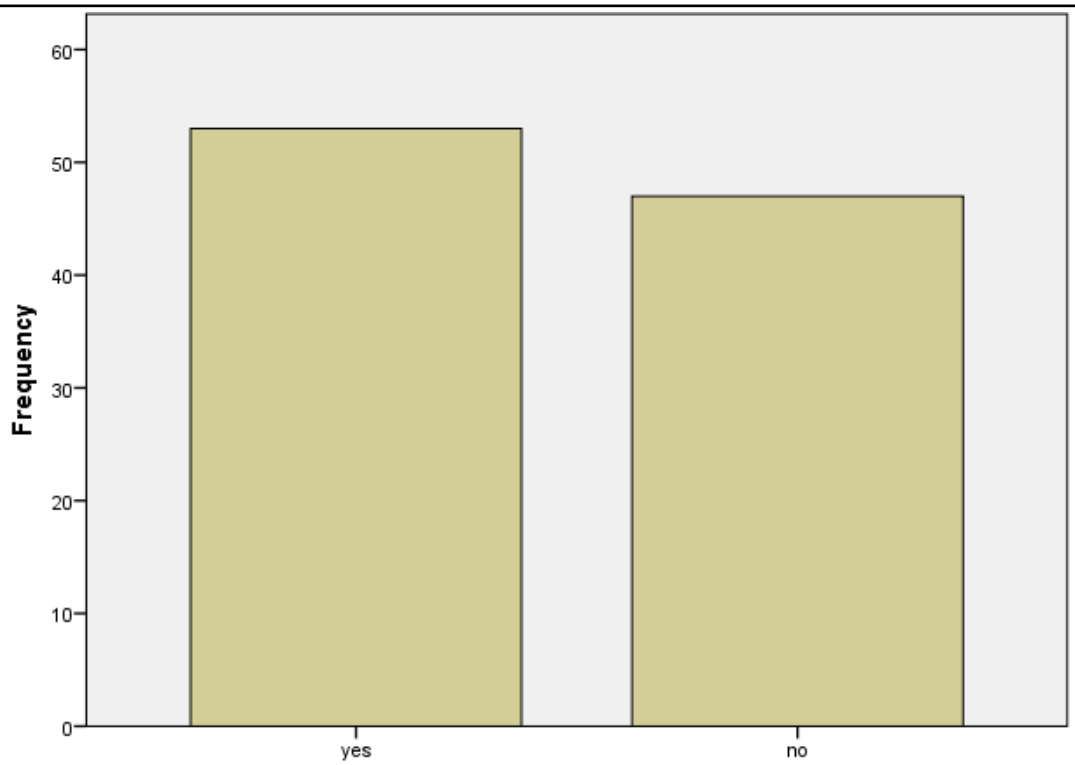


Figure IV-39: Does anyone else in your family snore or have a sleep problem?

Table IV-40: Are you on anticoagulant therapy? (Medications to prevent blood clotting)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	100	100.0	100.0	100.0

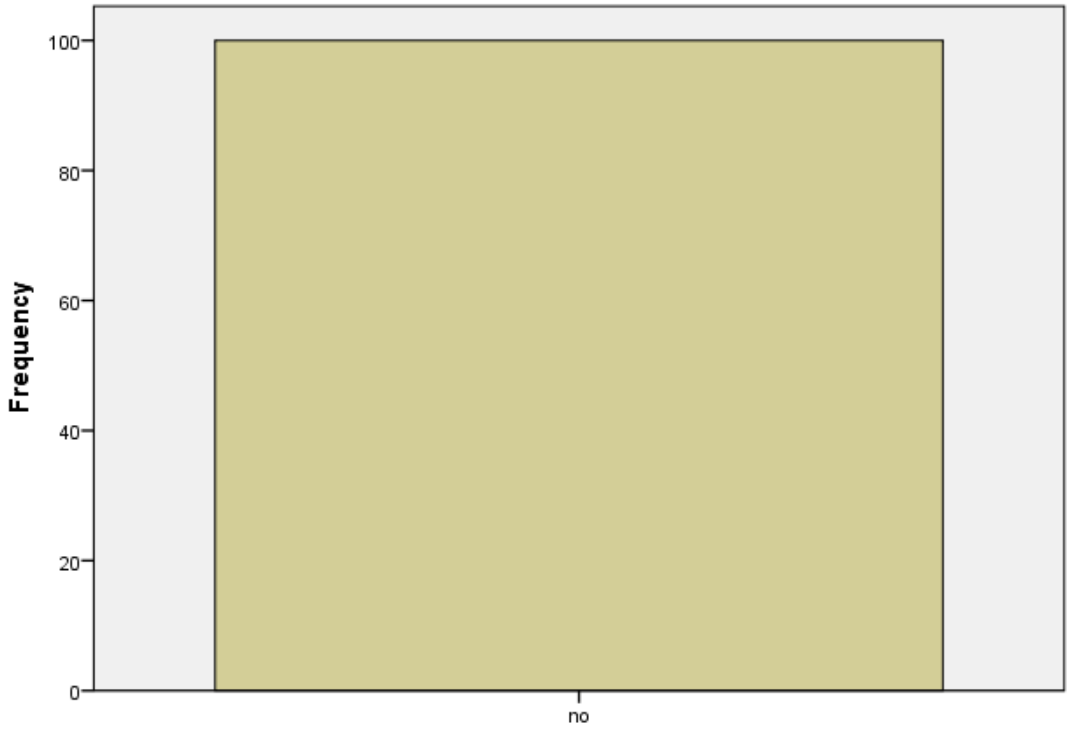


Figure IV-40:Are you on anticoagulant therapy? (Medications to prevent blood clotting)

CHAPTER V
DISCUSSION

This study is conducted to determine the prevalence of habitual snoring and its association with sleep related disorders and school performance of high school children. The study included a sample size of 100 high school children who responded back the questionnaire. The overall prevalence of snoring was 24.04% in females and 67.32% in males. The prevalence rate in males is higher than the females. The same study was conducted in senior high school students in Korea by Chol Shin, SoonJaeJoo, JinKwan Kim, and Tak Kim. This study contains sample size of 4,781 students.

This study includes questions in two sections 1) demographic data and 2) other questions related to snoring, patterns of sleep and sleep related problems.

In this study 17.0%) participants was awakens during sleep while in other study 34(34.0%) participants was awakens during their sleep.

In this study the 44(44.0%) children said that they are the habitual snorers, while in other study conducted by Chol Shin, SoonJaeJoo, JinKwan Kim, and Tak Kim in senior high school students in Korea, 33(33.0%) children said that they are the habitual snorers.

In this study the 1(1.0%) participants said that they diagnosed with sleep apnea, while in other study the 22(22.0%) participants said that they diagnosed with sleep apnea.

In this study 100(100.0%) are non smokers, while in other study 17(17.0%) are the smokers.

In this study 11(11.0%) participants have daytime sleepiness while in other study 9(9.8%) patients have daytime sleepiness.

In this study 14(14.0%) participants has restless disturbed sleep, while in other study 34(34.1%) participants has restless disturbed sleep.

The same study was conducted by KwangIkYanga, Jee Hyun Kimb Young Hwangboc, Dae Lim KoodDaeyoungKimeKyoung Jin Hwang Seung Bong Hong in the district of South Korea. Their sample size is 12,672 students. This study includes questions related to snoring, daytime sleepiness and sleep related problems.

In this study the 44(44.0%) children said that they snoring, while in other study conducted in South Korea high school 722 (25.0%)children said that they snoring.
In this study 4(4.0%) participants has daytime sleepiness, while is other study conducted in South Korea high school 62(62.0%) participants has daytime sleepiness.
In this study 1(1.0%) participants diagnosed with sleep apnea, while in other study 372 (32.1) participants diagnosed with sleep apnea.

CHAPTER VI
CONCLUSION

Habitual snoring in children may be associated with sleep related problems and also with daytime sleepiness and tiredness. This study shown that sleep related disorders are not common in the children. However, there is no correlation between habitual snoring and sleep related disorders. There is also no any relation of habitual snoring and the school performance of the children.

CHAPTER VII
RECOMMENDATIONS

Snoring is a noisy breathing while you sleep; it's a common condition that can affect anyone. Snoring tends to get worse with the age so it is necessary to evaluate this before it get worse.
In this study the sample size is 100 in the single school, but it should be more than 100 and more than one school.
Primary school children should include in this study so that they also evaluated for symptoms which are related to sleep disorders.
Snoring habits of children should monitor at night in this study so that you can assess the sleeping habits and irregularity of the breathing.

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