

Muhammad Jamal HAMZA II
2007464
(BMHP5003_BIRM) Introduction to Physiology
Rachael Rivers
A health Case Study

Table of Contents

1. Introduction.....	3
2. Bob’s Health Assessment Report.....	3
2.1 Overweight and Obesity.....	4
2.2 Diabetes Mellitus.....	5
2.3 Obstructive Sleep Apnoea.....	6
3. Recommendation.....	7
4. Conclusions.....	9
5. References.....	10

1. | Introduction

The aims and goals of Bob's health evaluation report include assessing his lifestyle as a truck driver and provide efficacy of his health and wellness. One of the most frequent and dangerous jobs for males is truck driving (Ng, Yousuf, Bigelow, and Van Eerd, 2014). There are very few possibilities for lorry drivers to live healthy lifestyles in their workplaces (Ng, Yousuf, Bigelow, and Van Eerd, 2014). Impoverished air quality, an absence of options for healthy diet, and limited space for physical exercise are common aspects of the trucking work environment, which pose significant obstacles for truck drivers trying to reject unhealthy lives (Apostolopoulos, Sönmez, Shattell, and Belzer, 2010). Tight schedules, lengthy and unpredictable lengthy driving hours, and unfavorable work surroundings all contribute to weariness, psychological stress, and sleep deprivation (Krueger et al., 2007). In addition to affecting driver safety, sleep derangements and sleep deprivation also raise the risk of obesity, pre-diabetic conditions, and immune system impairment (Apostolopoulos, Sönmez, Shattell, and Belzer, 2010). Since truck drivers only get an average of 3.8 to 5.2 hours of sleep each day, this is a serious problem (Apostolopoulos, Sönmez, Shattell, and Belzer, 2010). One of the main factors contributing to traffic accidents is excessive daytime sleepiness, and drivers who have obstructive sleep apnoea, a sleep disease that is widespread in truck drivers, are more likely to have this problem (Dagan, Doljansky, Green, and Weiner, 2006). The first section of the next chapter describes Bob's current health.

2. | Bob's Health Assessment Report

According to Lalla-Edward et al. (2019), truck drivers' lifestyles and working environments predispose them to possibility factors for both communicable and non-communicable illnesses. Bob is no exception. Table 1 revealed Bob's current health status which indicate his deteriorating health condition.

Bob's Lifestyle

Smoke – 20-39 cigarette per day

Blood Pressure – Yes

Body Max Index – 32

Physical Exercise – Seldom

Diet – Mainly snacks

Alcohol – Between 1 to 2 units per day

Table 1

According to Bob's health examination report (Table 1), he is more likely to develop a number of constant illnesses and medical disorders, including obesity, diabetes mellitus, and obstructive sleep apnoea.

2.1 | Overweight and Obesity

Firstly, one of the ailments mentioned in Bob's health report is being overweight or obese. A complicated multifactorial chronic condition called obesity is created when a person's genes and environment interact (NIH Report, 1998). Both globally and in the UK, obesity is a serious public health issue and an increased risk of various prevalent diseases, such as diabetes, cardiovascular disease, and some malignancies, is linked to being overweight or obese (Nuffield Trust, 2022). Particularly among professional drivers, there has been evidence of a significant prevalence of overweight and obesity (Moreno et al., 2006; Anderson et al., 2012). According to Moreno et al. (2006), variables like sedentary behaviour, insufficient sleep time, and poor diet may contribute to the high obesity prevalence rates among truck drivers. The hours spent in cabs and poor food choices are the main causes of this (Bigert et al., 2003), but a number of other factors have also been linked to overweight and obesity among professional drivers such

as lack of physical activity, varying driving shifts, etc. Heart disease, diabetes mellitus, hypertension, high cholesterol, and sleep apnea are only a few of the health issues that obesity has been linked to (NIH, 1998; Thompson, Heinberg, Altabe, and Tantleff-Dunn, 1999).

The negative health effects that overweight or obese people are more likely to experience are one of the risks associated with obesity (Kan, and Tsai, 2004). The recent obesity pandemic is receiving more and more attention as a potential cause of poor sleep. In Western countries, the prevalence of obesity has increased over the past 50 years, and sleep duration has significantly decreased at the same time (Patel, 2009). According to physiological research, insufficient sleep may affect the hormones that control eating. According to prospective research, self-reported shorter sleep duration is a risk factor on its own for a higher likelihood of weight gain and incident obesity (Patel, 2009).

2.2 | Diabetes Mellitus

Secondly, diabetes mellitus is another illness identified in Bob's health report. There is a link between insomnia and diabetes and anxiety (Sugano, et al., 2022). Diabetes is an acclaimed autonomous risk cause for cerebrovascular illness (Sugano et al., 2022) and diabetics patients are more likely to have symptoms of nocturia and neuralgia, which increase their chance of developing sleep problems including insomnia (Surani, 2015; Taylor et al., 2007). Furthermore, due to impaired insulin sensitivity (Knutson, et al. 2011) and unchecked cortisol production (Spiegel, Leproult and Van Cauter, 1999), sleep disruptions can produce both acute and long-term elevations in glycemic levels. These elements may result in stimulation of the hypothalamic-pituitary-adrenal axis (Balbo, 2010), which consequently interferes with sleep. By reducing leptin synthesis and boosting ghrelin, sleep deprivation also increases appetite and the likelihood of developing diabetes (Tasker, Treanor, Paxton, and Wallace, 1999). In Bob's case as a truck driver may be more susceptible to anxiety, which is closely related to sleeplessness, due to such irregular shift work, as well as the psychological strains brought on by the weather,

road situations, time restrictions, lack of social support, and social isolation (Shattell et al., 2012). Another major risk factors for insomnia in truck drivers may be their working environment (Sugano et al., 2022) . The metabolic disease called diabetes mellitus (DM) is produced by a problem with insulin secretion, action, or both (Bastaki, 2005). Chronic hyperglycemia produced by an insulin deficiency also causes issues with protein, lipid, and carbohydrate metabolism. It is the most widespread endocrine illness; it is forecasted that by the year 2010, more than 200 million people globally would have DM, and that number will multiply to 300 million by the year 2025 (Bastaki, 2005).

Public Health England, (2018) suggested Obesogenic environments and related lifestyle risk factors are among the diabetes risk factors and is more easier for people to adopt bad lifestyle habits because of the environment they live in, which is becoming more obesogenic. The difficulty in preventing Type 2 diabetes can be attributed to the obesogenic environment. Another risk factor is social implications and mental health. A Type 2 diabetes diagnosis can also have a detrimental influence on social interaction and quality of life, both of which can be harmful to mental health. People with Type 2 diabetes are more likely to experience depression than people without the condition (Public Health England, 2018) .

2.3 | Obstructive Sleep Apnoea

Thirdly, Bob has obstructive sleep apnea, according to his health assessment. Obstructive sleep apnea (OSA) is the obesity-related health issue of Bob's, and that has been most strongly linked to an increased risk of traffic accidents (Kay, and McLaughlin, 2014). Obstructive sleep apnoea (OSA) is a common disorder that frequently goes undetected and is known as obstructive sleep apnoea syndrome (OSAS) when it is coupled with the primary symptom of drowsiness (OSA Partnership Group, 2022). The airway is blocked during sleep in this somewhat common disease, this blockage of the airway causes fragmented sleep as well as apneic and hypopneic episodes and the disorder affects "nearly all obese people with a BMI over 40 and a neck

circumference of at least 17 inches" (Tilton, F., 2014). According to reports, 17% to 28% of commercial vehicle drivers have OSA (Olszewski, K., and Wolf, D., 2013). In actuality, OSA is the medical condition that contributes to disproportionate daytime sleepiness the most frequently (Findley, et al., 2000). Untreated people with OSA have a 3.71-fold higher relative risk of being in a car accident, according to one meta-analysis (Vaa, 2003). In contrast, diabetes had a 1.12-1.19 relative risk increase for auto accidents (Cox, Singh, Lorber, and Hermayer, 2013).

This ailment of Bob is serious because it causes drivers with OSA to crash either because they fall asleep at the wheel or because it impairs vital driving-related qualities like attentiveness. On driving simulators, drivers with OSA execute worse than matched controls, according to numerous studies (George, 2003). Attentional lapses (measured by EEG) while driving have been linked to poor driving in OSA patients who are not receiving treatment (Risser and Ware, 1999). According to Kay and McLaughlin (2014), baseline apnea severity (i.e., number of apnea / hypopnea events per hour), degree of oxygen desaturation (i.e., minimum O2 saturation), and mean oxygen saturation are all linked with driving impairment in people with OSA (Risser and Ware, 1999). Measures of lane position variability, including the standard deviation of lateral position, are the most sensitive indicators of how OSA affects driving-related abilities (Kay and McLaughlin, 2014)

3. | Recommendation

With the launch of Public Health England's "Better Health" campaign and the government's Tackling Obesity policy, the Department of Health and Social Care has laid out the steps the government would take to assist people in losing weight (Obesity Empowerment Network, 2020). The following initiatives have been published by the government to alter the UK's eating environment in light of the fact that it can be difficult or simple to gain and maintain a healthy weight: the elimination of high fat, sugar, or salt product promotions in stores and online, as well

as the prohibition of high fat, sugar, or salt product advertisements on TV and online before 9 p.m (Obesity Empowerment Network, 2020). As a recommendation, Bob should drink a green drink every day, stay hydrated, eat more fruits and vegetables, avoid stimulants, and eat less junk food. In addition, Bob should engage himself in physical activities at work and his leisure times.

Numerous behavioural interventions that address lifestyle decisions that put people at a high risk of acquiring Type 2 diabetes are part of the national response to diabetes prevention (Public Health England, 2018) . The NHS Diabetes Prevention Programme (NHS DPP) was launched with the goals of preventing type 2 diabetes and encouraging a healthier way of life (NHS, England, 2022). The most prevalent form of the condition, type 2 diabetes, can be prevented by suggesting to Bob some lifestyle modifications. Losing weight lowers the chance of developing diabetes and improves insulin sensitivity, which helps maintain normal blood sugar levels. Foods heavy in sugar and low in fibre or nutrients should be avoided by Bob, such as fruit juices, prepared foods laced with sugar or high-fructose corn syrup, white bread and pastries, and pasta made from white flour. Bob should engage in physical activities.

For drivers who suffer from obstructive sleep apnea (OSA), the Driver and Vehicle Licensing Agency (DVLA) offers some suggestions under their driving and medical situations (DVLA, 2022). The DVLA made it mandatory for drivers with OSA to notify them of the following illnesses: verified bearable or acute obstructive sleep apnoea disorder, with disproportionate sleepiness, any of narcolepsy or cataplexy, or both, and some other sleep condition that has caused disproportionate sleepiness for partially three months - including assumed or verified assertive obstructive sleep apnoea disorder (DVLA, 2022).

The NICE, (2014) obesity guideline includes the following recommendations for clinical management of obesity: detection, evaluation, and management. Additionally, NICE has issued

recommendations on weight management and lifestyle interventions for overweight or obese individuals. For people with diabetes, NICE, (2014) offers standard coverage for care and treatment. Type 2 diabetes prevention, diabetes management, diabetes-related foot care, and diabetes learning programmes are all included. It speaks about top-notch treatment in key areas for development. The British Lung Foundation (BLF), the Sleep Apnoea Trust (SATA), and other patient organisations and individuals who are interested in spreading awareness of OSA make up the Obstructive Sleep Apnoea (OSA) Partnership Group, one of the reputable organizations. These organisations offer a lot of assistance to persons with Bob's health condition. The OSA Partnership Group has promoted UK-wide fast tracking of treatment for this group of professional drivers as part of other attempts to increase awareness of OSA, particularly with HGV drivers (OSA Partnership Group, 2022).

4. | Conclusions

In conclusion, in the life of Bob with obesity, diabetes and obstructive sleep apnoea when management of these disorders is very demanding, arranged health system drives to further admittance and practice of such medications to discuss the illness comorbidities may have a distinctly positive impact. In addition to the previously mentioned suggestions, Bob is advised to increase his intake of plant-based foods like fruits, vegetables, and whole grains; to cut back on certain food groups like high-carbohydrate or high-fat foods; to engage in at least 150 minutes per week of moderate-intensity physical exercise; and to join a support group.

5. | References

- Anderson, J., E., Govada, M., Steffen, T.K., Thorne, C., P., et al. (2012). Obesity is associated with the future risk of heavy truck crashes among newly recruited commercial drivers. *Accident Analysis & Prevention*, 49(49), pp.378–384. doi:10.1016/j.aap.2012.02.018.
- Apostolopoulos, Y., Sönmez, S., Shattell, M., M., and Belzer, M., (2010). Worksite-Induced Morbidities among Truck Drivers in the United States. *AAOHN Journal*, 58(7), pp.285–296. Doi:10.1177/216507991005800703.
- Bastaki S., S. (2005). Diabetes mellitus and its treatment. *International Journal of Diabetes and Metabolism*, 13(3), pp.111–134. doi:10.1159/000497580.
- Bigert, C., Gustavsson, P., Hallqvist, J., Hogstedt, C., et al. (2003). Myocardial Infarction Among Professional Drivers. *Epidemiology*, 14(3), pp.333–339. doi:10.1097/01.ede.0000057141.91012.80.
- Cox, D.J., Singh, H., Lorber, D. and Hermayer, K. (2013). Diabetes and Driving Safety: Science, Ethics, Legality and Practice. *The American Journal of the Medical Sciences*, 345(4), pp.263–265. doi:10.1097/maj.0b013e31828bf8d7.
- Dagan, Y., Doljansky, J., T., Green, A., and Weiner, A., (2006). Body Mass Index (BMI) as a First-Line Screening Criterion for Detection of Excessive Daytime Sleepiness Among Professional Drivers. *Traffic Injury Prevention*, 7(1), pp.44–48. Doi:10.1080/15389580500412994.
- Findley, L., Smith, C., Hooper, J., Dineen, M., et al. (2000). Treatment with Nasal CPAP Decreases Automobile Accidents in Patients with Sleep Apnea. *American Journal of Respiratory and Critical Care Medicine*, 161(3), pp.857–859. doi:10.1164/ajrccm.161.3.9812154.
- George, C.F.P. (2003). Driving simulators in clinical practice. *Sleep Medicine Reviews*, 7(4), pp.311–320. doi:10.1053/smr.2001.0233.
- Kan, K., and Tsai, W.-D., (2004). Obesity and risk knowledge. *Journal of Health Economics*, 23(5), pp.907–934. doi:10.1016/j.jhealeco.2003.12.006.
- Kay, G., G. and McLaughlin, D., (2014). Relationship Between Obesity and Driving. *Current Obesity Reports*, 3(3), pp.336–340. doi:10.1007/s13679-014-0109-8.
- Knutson, K.L., Van Cauter, E., Zee, P., Liu, K., et al. (2011). Cross-Sectional Associations Between Measures of Sleep and Markers of Glucose Metabolism Among Subjects With and Without Diabetes: The Coronary Artery Risk Development in Young Adults (CARDIA) Sleep Study. *Diabetes Care*, 34(5), pp.1171–1176. doi:10.2337/dc10-1962.
- Krueger, R., F., Markon, K., E., Patrick, C., J., and Benning, S., D. et al. (2007). Linking antisocial behavior, substance use, and personality: An integrative quantitative model of the adult externalizing spectrum. *Journal of Abnormal Psychology*, 116(4), pp.645–666. doi:10.1037/0021-843x.116.4.645.

Moreno, C., R., C., Louzada, F., M., Teixeira, L., R., Borges, F., et al. (2006). Short Sleep Is Associated with Obesity among Truck Drivers. *Chronobiology International*, 23(6), pp.1295–1303. Doi:10.1080/07420520601089521.

National Institute for Health and Care Excellence, (2014). Weight management: lifestyle services for overweight or obese adults Available at: <https://www.nice.org.uk/guidance/ph53> (Accessed: 15 November 2022).

Ng, M.,K., Yousuf, B., Bigelow, P.L. and Van Eerd, D., (2014). Effectiveness of health promotion programmes for truck drivers: A systematic review. *Health Education Journal*, 74(3), pp.270–286. Doi:10.1177/0017896914533953.

NHS, England, (2022). NHS Diabetes Prevention Programme (NHS DPP). Available at: <https://www.england.nhs.uk/diabetes/diabetes-prevention/> (Accessed 15 November 2022).

NIH Report. (1998). 'Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report'. *NIH publication number 94-4083. Bethesda, Md: U.S. DHHS, NIH, NHLBI* Available at: http://www.nhlbi.nih.gov/guidelines/obesity/ob_gdlns.pdf (Accessed 15 November 2022)

Nuffield Trust (2022). 'Evidence for better healthcare', *Obesity, We look at how the proportion of the population who are overweight and obese has changed over time*. Available at: <https://www.nuffieldtrust.org.uk/resource/obesity> (Accessed 15 November 2022).

Obesity Empowerment Network (2020). *A Summary of the UK Government's 'Tackling Obesity' Strategy*. [online] Obesity Empowerment Network. Available at: <https://oen.org.uk/2020/08/21/a-summary-of-the-uk-governments-tackling-obesity-strategy/> (Accessed 15 Nov. 2022).

Olszewski, K., and Wolf, D., (2013). Obstructive Sleep Apnea among Commercial Motor Vehicle Drivers. *Workplace Health & Safety*, 61(11), pp.479–484. Doi:10.1177/216507991306101104.

OSA Partnership Group, (2022). Four-Week Wait Campaign. *For the treatment of obstructive sleep apnoea syndrome (OSAS)* Available at: <https://www.respiratoryfutures.org.uk/media/69864/four-week-wait-for-osas-treatment-final-march-2015.pdf> (Accessed 15 November 2022).

Patel, S., R. (2009). Reduced sleep as an obesity risk factor. *Obesity Reviews*, 10(s2), pp.61–68. doi:10.1111/j.1467-789x.2009.00664.x.

Public Health England, (2018). 'Guidance', Health matters: preventing Type 2 Diabetes Available at: <https://www.gov.uk/government/publications/health-matters-preventing-type-2-diabetes/health-matters-preventing-type-2-diabetes> (Accessed 15 November 2022).

Risser, M., R. and Ware, J., C. (1999). Driving Simulation with EEG Monitoring in Normals and Obstructive Sleep Apnea Patients. *Annual Proceedings / Association for the Advancement of Automotive Medicine*, [online] 43(43), pp.317–328. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3400226/>(Accessed 11 November 2022).

Shattell, M., Apostolopoulos, Y., Collins, C., Sönmez, S. et al. (2012). Trucking organization and mental health disorders of truck drivers. *Issues in Mental Health Nursing*, [online] 33(7), pp.436–444. Doi:10.3109/01612840.2012.665156.

Sleep Apnoea Trust, (2022). THE MOST COMPREHENSIVE GUIDE TO SLEEP APNOEA IN THE UK. *Detailed DVLA Guidance for UK Drivers with Sleep Apnoea – Updated July 2022* <https://sleep-apnoea-trust.org/driving-and-sleep-apnoea/detailed-guidance-to-uk-drivers-with-sleep-apnoea/> (Accessed 15 November 2022).

Spiegel, K., Leproult, R. and Van Cauter, E. (1999). Impact of sleep debt on metabolic and endocrine function. *Lancet (London, England)*, [online] 354(9188), pp.1435–9. doi:10.1016/S0140-6736(99)01376-8.

Sugano, Y., Miyachi, T., Ando, T., Iwata, T., et al. (2022). Diabetes and anxiety were associated with insomnia among Japanese male truck drivers. *Sleep Medicine*, 90, pp.102–108. doi:10.1016/j.sleep.2022.01.014.

Surani, S. (2015). Effect of diabetes mellitus on sleep quality. *World Journal of Diabetes*, 6(6), p.868. doi:10.4239/wjd.v6.i6.868.

Tasker, S., A., Treanor, J., J., Paxton, W., B. and Wallace, M., R. (1999). Efficacy of Influenza Vaccination in HIV-Infected Persons. *Annals of Internal Medicine*, 131(6), p.430. Doi:10.7326/0003-4819-131-6-199909210-00006.

Taylor, D., J., Mallory, L., J., Lichstein, K.L., Durrence, H.H., et al. (2007). Comorbidity of Chronic Insomnia With Medical Problems. *Sleep*, 30(2), pp.213–218. doi:10.1093/sleep/30.2.213.

Tilton, F., (2014). New obstructive sleep apnea policy. *Fed Air Surg Med Bull*. 51(4), p.2.

Thompson, J., K., Heinberg, L., J., Altabe, M., and Tantleff-Dunn, S. (1999). *Exacting beauty: Theory, assessment, and treatment of body image disturbance*. Washington: American Psychological Association. Doi:10.1037/10312-000.

Vaa, T., (2003). 'Impairments, diseases, age and their relative risks of accident involvement:', *Results from meta-analysis* (Vol. 690). Oslo, Norway: Institute of Transport Economics.