

**PREVALENCE OF ALCOHOL USE DISORDERS, DEPRESSION AND
ANXIETY AMONG MEDICAL DOCTORS IN KENYA**

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FULFILMENT FOR THE DEGREE OF MASTERS OF MEDICINE
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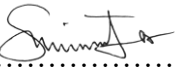
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DECLARATION

I hereby declare that this dissertation is my original work and has not been presented for a degree in any other University.

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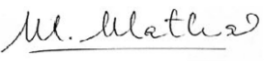
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DEDICATION

I dedicate this work to my daughters, Sheila Obegi and Selina Obegi, for being my inspiration to always strive to be better.

LIST OF ABBREVIATIONS

| | |
|----------|--|
| AUDIT: | Alcohol Use Disorders Identification Test |
| BAI: | Beck-Anxiety-Inventory |
| BDI: | Beck-Depression-Inventory |
| DALYs: | Disability-Adjusted Life Years |
| ERC: | Ethics Review Committee |
| GBD: | Global Burden of Disease |
| KMPDC: | Kenya Medical Practitioners and Dentists Council |
| KNH: | Kenyatta National Hospital |
| NACOSTI: | National Commission for Science, Technology and Innovation |
| OR: | Odds Ratio |
| SAMHSA: | Substance Abuse and Mental Health Services Administration |
| SPSS: | Statistical Package for Social Scientists |
| WHO: | World Health Organisation |

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OPERATIONAL DEFINITIONS

Alcohol use disorder: A pattern of addiction to alcohol or dependency that involves a loss of control of drinking even when it is causing a problem. People with alcohol use disorders have to continue drinking more to get the desired effect and often have a hard time withdrawing.

ABSTRACT

Introduction and Background

Worldwide, alcohol use is ranked the seventh most common risk factor for Disability Adjusted Life Years (DALYs), morbidity and mortality and is a leading cause of loss of productivity. Alcohol use disorders also commonly occur co-morbid with other psychiatric episodes like anxiety and depression limiting not only productivity but also the quality of life of a population. Even though doctors are labelled a high-risk group due to work pressure, data on the prevalence of alcohol use disorders and associated comorbidities is lacking in this population group in Kenya. This study sought to evaluate the prevalence of alcohol use disorders, depression and anxiety among registered Medical doctors in Kenya.

Study Objectives and Setting

This study sought to evaluate the prevalence of alcohol use disorders, depression and anxiety among registered medical doctors in Kenyan.

Methodology

A cross-sectional study was conducted among 418 registered medical doctors in Kenya, recruited digitally between 8th February 2021 and 29th March 2021. Alcohol Use Disorder Identification Test (AUDIT) was used to measure Levels of Alcohol use disorders. Depression and anxiety were measured using the Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI) respectively. Bivariate and multivariate analysis were conducted to evaluate the sociodemographic correlates of alcohol use disorders, depression and anxiety among medical doctors as well as association between alcohol use disorders, depression and anxiety. Statistical significance was set at $p < 0.05$.

Results

A total of 148 (35.4%) doctors were abstainers from alcohol. 17.0% had harmful alcohol use and dependence, comprising harmful / hazardous alcohol use (11.7%) and moderate-severe AUD/ possible dependence (5.3%). The prevalence of low risk alcohol use was 47.6%. 5.7% of the doctors had mild depression, 7.4% had moderate depression, while 1.0% had severe depression. Similarly, 81.1% of the doctors had mild anxiety, 15.8% had mild to moderate anxiety, 2.2% had moderate anxiety and 1.0% had severe anxiety. Alcohol use was independently associated with male gender ($p=0.001$) and being depressed ($p=0.001$). Depression was independently associated with low level of education (MChB/BDS, $p=0.030$, Masters ($p=0.036$), alcohol use ($p=0.001$) and anxiety ($p=0.001$). Anxiety was independently associated with high depression ($p=0.001$). Significant positive correlations were found between alcohol use, depression and anxiety.

Conclusion

Hazardous alcohol use & dependence is common among medical doctors in Kenya. Also, a significant number of doctors are likely to experience moderate to severe depression and anxiety. Structural changes that support early detection of problematic alcohol use, depression and anxiety among medical doctors, followed by treatment where present are warranted.

CHAPTER ONE

1.1 INTRODUCTION AND BACKGROUND

Worldwide, alcohol use is ranked the seventh most common risk factor for DALYs, morbidity, and mortality. In 2017 alone, alcohol use disorders were responsible for approximately 185,000 adult deaths globally (Ritchie & Roser, 2018), with alcohol-induced liver cirrhosis constituting a large chunk of the deaths (Schwartz & Reinus, 2012). Alcohol abuse is also a leading cause of loss of productivity at work, as was reported in a cross-sectional study of the Meteorological Department of Kenya (Kaithuru & Asatsa, 2014). In the study, 49% of respondents strongly agreed that alcoholism lowered the work rate and therefore productivity of people in the workplace. About 47% linked alcoholism with workplace absenteeism, while the relationship between alcoholism and lateness was ascertained by 50% of respondents. Such data point to a neglected yet serious health problem with far reaching economic consequences. Moreover, because anxiety and psychiatric episodes such as depression go hand in hand with hazardous alcohol use, interventions that lower use can boost the quality of life of a population.

1.2 Alcohol Use Statistics

Wine making has been in practice for centuries, with chemical analysis of 7000 BC jars from China confirming residues of a mixed or fermented beverage (McGovern et al., 2004). In 6000 BC, vinification was reported in Georgia, and later on in Iran (5000 BC) and the Hellenic Peninsula (ancient Greece) in 2000 BC (Retsas, 2008). Nowadays, alcohol plays an essential role in bonding, engagement, and social spheres, with United States (U.S) 2015 National Survey on Drug Use and Health (NSDUH) report indicating the prevalence of alcohol use among adults (18+ years old) to be 86.4% (SAMHSA, 2015). About 26.9% reported binge drinking, while about 7.0% were alcohol dependent (SAMHSA, 2015) – a common alcohol use disorder that is rated the seventh risk factor for mortality (2.2% females and 6.8% men) and Disability Adjusted Life Years (DALY) in 2016 (2.3% female attributable and 8.9% men)

(Griswold et al., 2018). Moreover, because no level of alcohol use has been reported to minimise health loss, GBD 2016 Alcohol Collaborators (Griswold, et al., 2018) suggest formulation of policies that discourage consumption of alcohol. Such policies can be designed only if prevalence and predictor for dependence are well known.

1.3 Alcohol use Disorders

Within the World Health Organisation's (WHO) International Classification of Diseases (ICD-10), alcohol use disorders depict harmful alcohol use (or alcohol dependency) which can lead to morbidity or mortality (Schuckit, 2009). Even though the standards for diagnosis of alcohol use disorders vary between jurisdictions, the definitive diagnosis of alcohol dependence is made if a patient presents with three or more of the following psychological problems after a year of drinking (Ritchie & Roser, 2018):

- a) A sense of compulsion or strong desire to drink alcohol
- b) Difficulty in controlling or managing alcohol consumption in terms of level of use, onset of use, and termination of use
- c) Having a compromised psychological state upon withdrawal or cessation of alcohol consumption (withdrawal symptoms)
- d) The need for increased dose of alcohol to achieve the effects that an originally lower dose could induce
- e) Neglect (progressive) of alternative interests and pleasures because of alcohol consumption
- f) Persisting with alcohol consumption when overtly harmful consequences of alcohol consumption such as fatty liver disease or liver cirrhosis are evident

Many tools for diagnosing alcohol use disorders have been developed, with the WHO's Alcohol Use Disorder Identification Test (AUDIT) being the commonest. Confirmatory factor

analyses have shown an acceptable construct validity of its factors (Noorbakhsh S et al., 2018), even though its adaptation to national or cultural drinking habits is warranted (Babor & Robaina, 2016), as is the case for the 14 gram USAUDIT tool (Higgins-Biddle & Babor, 2018). The prevalence of alcohol use disorders has been studied widely in different groups of people. (Lasebikan et al., 2018) in a study of outdoor drinkers in Nigeria reported the prevalence of alcohol dependency to be around 44.4%, in rural residence and additionally cigarette smoking was found to increase its prevalence in the drinking population. In the US, a 12-month prevalence of DSM-IV alcohol use disorder was 49.4% (Grant et al., 2017), while data from Composite International Diagnostic Interviews from Northern Ireland reported a prevalence of 50% (Bunting & Bharat, 2019). However, while doctors are ranked high among the at-risk groups for alcohol use disorders (Obadeji, Oluwole, Dada, & Adegoke, 2015a), few studies have evaluated this cohort, especially in the developing world. In Kenya, for instance, where the annual alcohol use per person is estimated to be two to four litres (Ritchie & Roser, 2018), it is unclear whether the prevalence of alcohol use among doctors varies significantly from that of the general population. (Obadeji, Oluwole, Dada, & Adegoke, 2015b), postulates that their hectic workload might be a driver for alcohol use, but reiterates the need for sound scientific data. Furthermore, mental illnesses such as depression and anxiety are thought to confound the problem, with doctors found to be a high-risk group (Kendagor et al., 2018). Understating the patterns of heavy drinking among doctors can inform strategies for curbing this menace.

1.4 Problem statement

The prevalence of alcohol-related disorders worldwide is reported to be around 12% with 16% of alcohol users exhibiting symptoms of hazardous drinking and 8% dependence or misuse (Lasebikan et al., 2018; Obadeji, Oluwole, Dada, & Adegoke, 2015b). Such behaviours can lead to loss of productivity of workforce, as was the case in a 2014 cross-sectional study of the Meteorological Department in Kenya (Kaithuru & Asatsa, 2014) that found a strong

relationship between alcoholism and work attendance, safety risks, and the loss of productivity. Obadeji, *et al* (2015), identified doctors as a high-risk group whose indulgence in alcohol not only predisposes them to many health risks, but also compromises the safety of their family members and their patients. The doctor-to-population ratio in Kenya is estimated to be around 1:16,000 (Ong'ayo et al, 2019), which is 16 times lower the recommendation of the WHO of one doctor per 1000 population. The heavy workload puts undue pressure on doctors, which increases the risk of alcohol dependence and drug use.

In Kenya, data on the prevalence of alcohol use disorders among medical doctors is limited, as it is only anecdotal information available. The prevalence of psychiatric episodes such as depression and anxiety among doctors and the link between such psychiatric episodes and alcohol use disorders are also poorly described in Kenya (anecdotal information). This study intended to fill these gaps, by providing scientific evidence on the prevalence of alcohol use disorders, depression and anxiety in a sample of practicing medical doctors in Kenya.

CHAPTER TWO

2 LITERATURE REVIEW

The negative effect alcohol has on the health and the productivity of people has made it a public health concern in both the developed and the developing world. A review of literature identifies doctors as a high-risk group, whose drinking habits not only affect their lives or their families', but also those of patients (Belfrage et al., 2018). In Europe, alcohol abuse in the workplace, especially in the medical profession, has remained a long-standing public health issue since the 1960s. In a retrospective review of alcoholism and professional competence in Scotland from 1963-1987, Harrison & Chick (1994) reported a high rate of alcoholism among medical doctors than other professionals, especially in a cohort of heavy drinking medical doctors over the age of 45 years. This, according to Bennett & O'Donovan, (2001), not only influences the mental and physical health of doctors negatively, but also impedes their ability to provide adequate patients' care while discharging their duties. In a longitudinal study of an urban population of doctors in Stockholm Sweden, Romelsjo *et al* associated such high-risk habits with the stressful working conditions that most doctors endure, even though their results were inconclusive (Romelsjo et al., 1992). In West Africa, hazardous drinking among junior doctors with a high workload has also been reported (Issa et al., 2012), though its prevalence was significantly lower than the general population (Gureje et al., 2007). Such reports call for population-specific cross-sectional studies, which can guide policy formulation on alcohol use.

2.1 Factors that Influence Alcohol Use Disorders

2.1.1 Genetic Factors

Plentiful data from studies conducted all over the globe have put into perspective the genetic influence on alcohol dependence. In 1998, Beirut *et al* demonstrated a familial linkage to cocaine, marijuana, and alcohol dependence in a comparison study of 217 probands and their siblings, with independent causative factors linked to different substance dependence. In the

study, the siblings of 49.3%-50.1% alcohol-dependent probands were alcohol dependent with elderly subjects reported to have a higher risk of dependence than their peers did. A similar finding was reported in a retrospective review of data of male-male twin pairs from the Virginia Twin Registry (Kendler et al., 2003). The study demonstrated a strong relationship between the genetic factor and abuse/dependence/illicit use of six substance classes, including alcohol. Developing interventions that target such groups of people can lower use and thus its burden.

2.1.2 Social Factors

Cultural and social factors have been found to influence alcohol use among men and women with health complications such as stress and anxiety reported to contribute a high incidence of alcohol consumption. In a 2005 review by Dawson *et al* evaluating the association between stress and drinking, stress was reported to induce physiological responses such as high blood pressure - which have deleterious lifelong effects on health. In addition, self-reported alcohol consumption was linked with stress, and supported the coping framework previously described by Pascoe and Smart (2009). In a meta-analysis, they provided a comprehensive account of the negative relationship between physical and mental health and physiological and psychological stress, with the odds of developing alcohol use disorders found to be high among stressed people. Moreover, apart from gender differences in alcohol dependency described in literature, the link between social norms and changes in drinking habits has been described in different contexts. In a 4-year multi-level modelling study by O'Grady *et al* (2011) among college students, an increase in social anxiety among male students correlated with a slight increase in alcohol consumption. When social anxiety was stable, as was reported among female students, drinking habits stabilised. Even though doctors are an at-risk group for alcohol use disorders, social factors that predispose them to such at risk habits have been poorly explored in Kenya.

2.1.3 Depression and Anxiety

The pooled prevalence of depression and depressive symptoms has been estimated to be around 27.0% (Wang et al., 2017), with its incidence in resident physicians estimated to be higher at 28.8% (Mata et al., 2015). However, the WHO report 2017 estimates the overall prevalence of depression in general population to be 4.4%. Even though the predictors for indulgence in alcohol are diverse, a prospective relationship between heavy alcohol use and depression has been described previously in a cross-sectional study of 2725 18-80-year-olds by Rodgers *et al* (2000). The odds of depressive and anxiety episodes were 89%-134% higher in heavy drinkers, especially among men and the elderly. Hamalainen *et al* (2001) corroborated these results in 2001 in a national cross-sectional study at the University of Michigan in which alcohol use increased the risk of depressive episodes by 199% (OR=2.9). According to Hamalainen, cigarette smoking had an even greater effect on the development of depressive episodes with its attributable proportion on the development of depressive episodes reported to be 0.15 (0.04 for alcohol). Similar trends have been found in adolescents (Wang & Patten, 2001) and women (Crum et al., 2001), but are poorly described among doctors in Africa.

The prevalence of depression and anxiety among medical doctors is thought to be higher than among the general population (Joules et al., 2014; Mata et al., 2015), where it was observed that stressful work, career development challenges, and long working hours are risk factors.

Different studies have found out that gender does not seem to affect the prevalence of depression among doctors, whereas those married had lower depression scores compared to those single/staying alone (Ain et al., 2020; Earle & Kelly, 2005; Monsef et al., 2015) and (Cheung & Yip, 2015; Lloyd et al., 1994).

The association between depression and level of education among doctors has been reported (Tyssen & Vaglum, 2002), this study found a strong correlation between depression and the

level of education among the sampled doctors. Where doctors with lower level of education reported significantly higher levels of depression as compared to those with higher education.

A cross-sectional study of 140 medical doctors working in emergency departments of seven Malaysian general hospitals (Yahaya et al., 2018) reported a male predilection for development of anxiety symptoms compared to female doctors. However, when stress and depression levels were compared by the gender of medical doctors, prevalence were not significantly different.

Depressive disorders are among the most reported psychiatric disorders in AUD patients (Bridget F Grant et al., 2004). When there is a co-occurrence of AUD and psychiatric disorders, patients develop severe symptoms and experience worse disease prognosis, compared to when a patient have either disorder alone, (Greenfield et al., 1998; Hasin et al., 2002), which includes a significantly higher incidence of suicidal thoughts and behaviour (Conner et al., 2014).

2.2 Theoretical framework

The Cognitive processing theory on substance abuse by Tiffany (1999) will guide this study. Commonly known as the cognitive processing model, the theory combines two concepts - working memory and attentional bias. Unlike the affective process model (van Lier et al., 2018) that stresses the negative effect of psychology on alcoholism, the cognitive process does not factor the negative effect as a cue for alcoholism. Instead, according to this theory, drivers for alcoholism and substance abuse evolve from the emotional deficits of individuals brought forth by stressors of life such as work and economics to name a few. The theory accounts for attention bias and factors stress as a cue for relapse, especially among individuals with an unstable emotional network. Furthermore, according to Tiffany (1999), psychological deficits such as depression and anxiety automate drinking by upregulating craving, which increases the odds of compulsive drinking and therefore negative outcomes such as non-productivity at work

and a higher incidence of medical and or psychological complications. However, the atomicity of this model remains debatable (Field & Cox, 2008; Schoenmakers et al., 2010).

2.3 Study Justification

Heavy or hazardous alcohol drinking is a global menace that increase the risk of serious health problems such as liver disease, neuropsychiatric diseases, and pancreatitis, and cardiovascular diseases (Rehm, 2011). Extrapolated to health settings, heavy drinking by doctors has been identified as a predictor for poor service delivery, which puts the health and well-being of patients at risk (Aderson, O'Donnell, & Kaner, 2017). Many studies (Obadeji et al., 2015; Harrison & Chick, 1994; Issa et al., 2012, Mata et al., 2015) have identified provider factors predisposing medical doctors to hazardous drinking. These have not been studied extensively in Kenya. Understanding the patterns of heavy episodic drinking among medical practitioners can inform strategies on how to curb this menace and improve service provision. This study generated this data. Patterns of heavy alcohol use, depression and anxiety were elucidated among practicing medical doctors and factors that predisposed them to such outcomes. An evaluation of predictors for alcohol use disorders was also done to aid in policy formulation on alcohol use in the Country. The results obtained would also help the Government and other employers to formulate supportive, preventive and management protocols for medical doctors.

2.4 Research Questions

- What is the prevalence of alcohol use disorders among medical doctors?
- What is the prevalence of depression among medical doctors?
- What is the prevalence of anxiety among medical doctors?
- What are the predictors for alcohol use disorders, depression and anxiety?
- What is the association between Alcohol use disorders and depression and anxiety?

2.5 Objectives

2.6 Main Objective

To evaluate the prevalence of alcohol use disorders, depression and anxiety among medical doctors in Kenya.

2.7 Hypothesis

2.7.1 Null hypothesis

H₀: The prevalence of alcohol use disorders, depression, and anxiety among medical doctors in Kenya does not differ statistically from the general population.

2.7.2 Alternative hypothesis

H₁: The prevalence of alcohol use disorders, depression, and anxiety among medical doctors in Kenya is statistically higher than the general population.

2.8 Specific Objectives

1. To determine the prevalence of alcohol use disorders among medical doctors
2. To determine the prevalence of depression among medical doctors
3. To determine the prevalence of anxiety among medical doctors
4. To determine the sociodemographic factors associated with alcohol use disorders, depression and anxiety among medical doctors
5. To determine the association between Alcohol use disorders and depression and anxiety

CHAPTER THREE

3 METHODOLOGY

3.1 Study Design

This study used a cross-sectional analytical design, where the prevalence of alcohol use disorders, depression and anxiety among medical doctors in Kenya were evaluated.

3.2 Study area description

This study site was the whole of Kenya, in which only registered medical doctors participated. The Kenyan health system is in six levels – referral hospitals (level VI), large private hospitals and county referral hospitals (level V), mid-sized private hospitals and sub-county hospitals (level IV), maternity hospitals and health centres (level III), dispensaries and clinics (level II), and community services (level I). Even though the bulk of health services are under the government, Non-Governmental Organisations (NGOs), Faith Based Organisations (FBOs), and privately operated or owned hospitals offer 30-40% of Kenya’s hospital bed capacity (WHO, 2017)

3.3 Population characteristics

Doctors who were in practice at the time of study and whose contacts were in the retention register of the Kenya Medical Practitioners and Dentists Council (KMPDC) were targeted. Data from the Kenya Medical Practitioners and Dentists Council (KMPDC) indicated that about 8,727 doctors were registered and in practice as at June 2020, 2591 of whom were specialists in various specialities like Psychiatry, Surgery, Paediatrics, and the rest were General Practitioners. However, according to the Health Sector Human Resource Strategy 2014-2018 report by the Ministry of Health, Government doctors were about 1080 in 2012, while 653 were in Non-Governmental Organisations (NGOs) and Faith Based Organisations (FBOs). Most government doctors were concentrated in Rift valley, Central, and Nairobi provinces, with the Kenyatta National Hospital (KNH) having the largest number of doctors at

around 155. Both men and women of all age groups and medical specialities, were invited to fill an online questionnaire.

3.3.1 Inclusion criteria

- a) Medical doctors authorised to practice in Kenya
- b) Practicing in the public or private sector in Kenya
- c) Present in the doctor's retention register of the KMPDC
- d) Willing to offer written informed consent for participation
- e) In a position to complete a digitised self-administered questionnaire

3.3.2 Exclusion criteria

- Declining to consent for participation
- Unable to operate a computer or a smart phone
- Expunged from the KMPDC doctor's retention register of 2020
- Practicing outside of Kenya

3.4 Sample size determination

In a cross-sectional study evaluating the hazardous use of alcohol by doctors in a tertiary health centre in Nigeria, Obadeji *et al.* (2015) reported the prevalence of alcohol use among doctors to be 30.3%. This parameter was used to calculate my sample size, n , using the statistical formula by Fisher (1981) , Obadeji *et al.* (2015) and a desired precision of 5% (0.05).

Statistical formula:

$$N = \frac{Z^2xp(1 - p)}{d^2}$$

Parameters:

N: required sample size

P: expected proportion of alcohol use (30.3% from a study by Obedeji *et al* 2015

Z²: normal variate for 95% confidence interval (1.96)

d: desired precision or absolute error (5%)

$$N = \frac{1.96^2 \times 0.303(1 - 0.303)}{0.05^2} = 325$$

To get a sufficiently powered sample, we required 325 participants. However, to get a representative sample, we assumed a non-response rate of 20% and adjusted the needed sample size N, following guidelines of (Palta *et al.*, 1979). We needed 390 participants.

3.5 Recruitment and Sampling procedure

Simple random sampling without replacement was used to recruit participants. Clustering or stratification was not done during the recruitment process. Briefly, a list of all practicing medical doctors was retrieved from the Doctors' 2020 Retention Register of the KMPDC as an excel file and a number from 1-n allotted to each doctor. The random number generator was used to select 390 numbers (from 1-n) randomly, contact details retrieved, digital consent administered via emails, and all doctors who consented proceeded to fill the questionnaire. The required sample size was not reached in the first round of selection; the process was repeated until the recommended sample size of 390 was reached and surpassed by 28, giving a total number of 418 participants. This way, each doctor whose details were in the retention register had an equal chance of being recruited in the study.

3.6 Conceptual Framework

The outcome of this study is the prevalence of alcohol use disorders and the psychiatric episodes (depression and anxiety) among Kenyan medical doctors who are currently in practice. From literature, several demographic and environmental attributes have been found to influence such occurrences with a busy work environment, low age, being married, and inexperience reported to be significant predisposing factors. The profession and gender of

doctors also play a significant role, with women found to be most at risk. To understand the situation in Kenya, the prevalence of alcohol use disorders was evaluated in four levels – abstinence, low risk status, hazardous use of alcohol, and dependence using WHO AUDIT tool, while the prevalence of depression and anxiety was evaluated using BDI and BAI. The potential sociodemographic and environmental moderators of alcohol use, depression, and anxiety were also evaluated to identify the risk factors in the population studied.

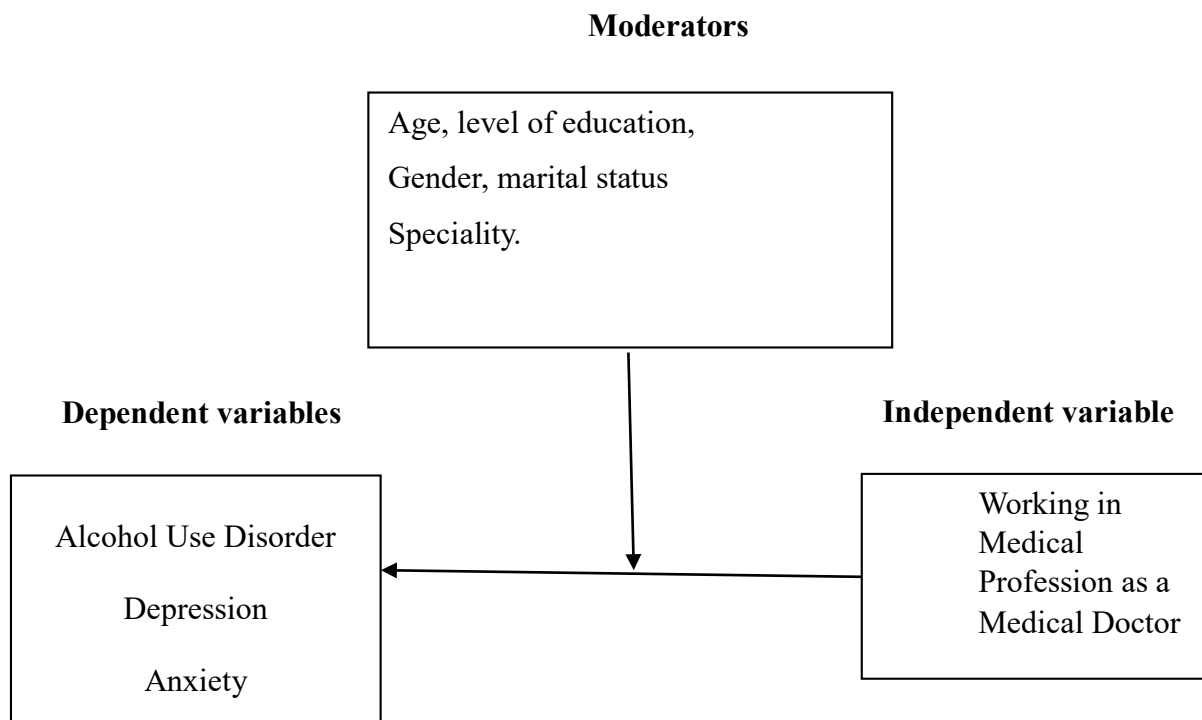


Figure 3.1. Conceptual framework. Source: Researcher 2020

3.7 Data collection procedure

3.7.1 Data collection

Data was collected using the study questionnaire. A digital version of the questionnaire was uploaded to Google Forms and an anonymous and sharable link generated following the guidelines of Google. To ensure anonymity, the requirement to sign up to fill the form was disabled from within the Google form. Participants were also able to fill it anonymously without sharing email addresses. The option to collect email addresses was also disabled from

within the Google form and participants identified using a unique study generated ID number instead of their names, national ID numbers, and other personal identifiers. The link was shared on email addresses, attached to digital consent forms. To avoid duplication of data, each participant was allowed a single response.

3.7.2 Data collections Tools

Primary data was collected using a study questionnaire. The study questionnaire was organised into four sections – each capturing a unique set of information, and digitised.

a) Section one

Section one of the questionnaire captured the demographic data such as age, gender, marital status, level of education and medical specialisation. Personal identifiers such as identity numbers and names were not captured to respect the privacy of the participants.

b) Section two

The second section comprised the Alcohol Use Disorder Identification Test (AUDIT) – a self-appraised questionnaire for evaluating alcohol-use disorders. Developed as a collaborative project between the World Health Organisation (WHO) and Saunders *et al.* (1993), the tool rates alcohol-related disorders on a scale that depicts alcohol dependency, harmful consumption of alcohol, and being a consumer at risk of dependence or harmful consumption. Many versions of the AUDIT have been developed and used in studies (Akvardar Y *et al* 2004). However, for the study, the validated 10-item version from the WHO (Gray JD *et al* 1998) with scores ranging from 0-40. The scoring system for AUDIT previously defined by WHO was used. Total AUDIT scores of 0 (abstainer/no risk), 1-7 (low risk), 8-14 (harmful/hazardous use), 15 and above (moderate-severe AUD/possible dependence).

c) Section three

The third section entailed the Beck's Depression Inventory (BDI), a self-reported multi-choice questionnaire for evaluating depression in three subscales – cognitive, affective, and somatic scales. The BDI's 21 questions are easy to score. It is also a reliable research tool, whose Cronbach's alpha score for internal consistency is about 0.78 for the cognitive subscale, 0.77 for the somatic subscale, and 0.70 for the affective subscale for depression (Garcia-Batista et al., 2018). The scores range from 0-63. The BDI cut-offs from previous local studies were used (Ndeti et al., 2009). A total score of 1-13 is considered normal. Other scores of 14-17 (mild depression), 18-27 (moderate depression), 28-63 (severe depression).

d) Section Four

Section four entailed Beck Anxiety Inventory (BAI) tool for measuring anxiety. This self-report tool has 21 questions scored using a four-point Likert scale. It is easy to administer and is considered a reliable and valid tool for evaluation of anxiety among adults. Its Cronbach's alpha score for internal consistency is 0.92, while its 1-week test-retest reliability is 0.75 (Beck, Epstein, Brown, & Steer, 1988). Scores range from 0-63. The BAI cut-offs from previous local studies were used. Mild anxiety (0-9), mild to moderate anxiety (10-25), moderate anxiety (26-35) severe anxiety (36-63).

3.8 Data quality assurance

The following was done to streamline data collection and ensure quality:

- Three reliable, validated, and globally accepted tools for data collection on alcohol-related disorders (AUDIT) and psychiatric morbidity (BAI and BDI) were used. These self-administered tools require a short time and little effort to use. Therefore, this enabled us to collect credible data in a short time, while upholding confidentiality.

- The researcher – used the Statistical Package for Social Scientists (SPSS) software for data analysis.
- A homogenous sample of participants from all regions of Kenya were recruited, where all doctors had an equal chance of inclusion into the study. Emails were sent to doctors in the KMPDC doctor's retention register detailing the objectives of the study.

3.9 Data Management and analysis

Data cleaning and validation was done using Microsoft Excel where errors detected, were corrected so that the data could be analysed without losing its integrity and robustness. A clean dataset was stored in a password protected computer hard disk ready for analysis, this was later exported into SPSS for data analysis. Statistical analyses were done using version 23 of the Statistical Package for Social Scientists software (SPSS). Summary statistics were explored and visualised on charts and tables. Mean scores for AUDIT, BDI and BAI were computed and transformed into risk levels which were reported in form of frequency tables and charts with their corresponding 95% C.I. The crude association between AUDIT, BDI and BAI and the sociodemographic characteristics (i.e., gender, age, level of education, marital status and speciality) were assessed using independent samples t-test and Analysis of Variance (ANOVA). The association between AUDIT, BAI and BDI was assessed using Pearson's correlation coefficients. A p-value was reported in all of the bivariate association. The results of the bivariate analysis informed the multivariate analysis. All variables that were found to be associated with the outcome variable at $p < 0.05$ were entered into the multivariate analysis using generalized linear regression models in order to get the independent predictors of the outcome variables (AUDIT, BDI and BAI). All the models were adjusted for AUDIT, BDI and BAI depending on which model was specified (depression and anxiety were adjusted in the alcohol use model; anxiety and alcohol use was adjusted for in the depression model and alcohol and depression were adjusted for in the anxiety model). A p-value of < 0.05 was used

as the criterion for statistical significance, Beta-Coefficients with 95% confidence interval were used to indicate the strength of association.

3.10 Ethical considerations

3.10.1 ERC approval

1. Approval to carry out the study was requested and granted from the University of Nairobi/ Kenyatta National Hospital ethics research committee.
2. Participants were informed of voluntary participation and that the information obtained would be used only for the purpose of the study.
3. Proper explanation of the study process and objectives and purpose of the study was given to all doctors who were legible and were offered a chance to participate without coercion.
4. Confidentiality was observed. All information collected in this study was confidential. Serial numbers were used instead of name.

3.10.2 Consent

Informed voluntary consent was sought digitally from all participants before proceeding with the survey. Digital consent was administered using the KNH/UoN form.

3.10.3 Confidentiality

The confidentiality of participants was upheld. Personal identifiers of subjects were not recorded on data collection tools. Moreover, because a self-administered digital questionnaire was used to collect data, study participants could fill it confidentially at home or in offices. Data inputted into computer was protected with a password that only the researcher is privy to.

CHAPTER FOUR

4 DATA PRESENTATION AND FINDINGS

4.1 Introduction

This study's findings are presented in this chapter. The study evaluated the prevalence of alcohol use disorders, depression and anxiety among medical doctors in Kenya. A total of 418 doctors from the whole of Kenya were recruited and participated in this study through filling of digital questionnaire (google forms) which was shared through their personal emails. The data was collected between 8th February 2021 and 29th March 2021.

4.2 Socio-demographic Characteristics of Respondents

The socio-demographic data of the respondents are presented in table 4.1. Slightly more than half (51.9%) were males. The mean age was 35.0 years, median 33 and it ranged from 26-77 years, with the mode being between 31-34 years. Majority (63.6%) had MBChB/BDS only, 22.7% had completed their masters, while the rest (13.6%) had additional PhD or Post-doc. In terms of marital status majority of the participants were married (63.4%), 33.5% were single, 2.6% were either divorced/ separated, and 0.5% were widowed. In terms of their specialty most (52.2%) were general practitioners, followed by others (non-clinical) (25.4%), Surgery (5.0%), psychiatrists (4.3%), Paediatrics (4.1%), Obstetricians/ gynaecologists (4.1%), Physicians (3.8%) and the least were anaesthesiologists (1.2%) (See Table 4.1).

Table 4.1. Socio-Demographic Characteristics of the Respondents

| Variable | Category | Frequency (N=418) | Percentage (%) |
|--------------------|-----------------------------|----------------------|-------------------|
| Gender | Female | 201 | 48.1 |
| | Male | 217 | 51.9 |
| Age Years | Mean; Median; SD; Range | 35.0; 33; 7.5; 26-77 | |
| Age | 30 and Below | 71 | 17.6 |
| | 31-34 Years | 193 | 47.8 |
| | 35-39 Years | 91 | 22.5 |
| | 40 and Above | 49 | 12.1 |
| | <i>Non-Response</i> | <i>14</i> | |
| Level of Education | MBCHB/BDS | 266 | 63.6 |
| | Masters | 95 | 22.7 |
| | PhD | 7 | 1.7 |
| | Post Doc | 50 | 12.0 |
| Marital Status | Divorced/ separated | 11 | 2.6 |
| | Married | 265 | 63.4 |
| | Single | 140 | 33.5 |
| | Widowed | 2 | 0.5 |
| Specialty | General practitioner | 218 | 52.2 |
| | Obstetrician/ gynaecologist | 17 | 4.1 |
| | Others (non-clinical) | 106 | 25.4 |
| | Paediatrics | 17 | 4.1 |
| | Physician | 16 | 3.8 |
| | Psychiatry | 18 | 4.3 |
| | Surgery | 21 | 5.0 |
| | Anaesthesiology | 5 | 1.2 |

4.3 Prevalence of Alcohol use disorders

Alcohol use disorders were measured using Alcohol Use Disorder Identification Test (AUDIT). The prevalence of abstainers/ no risk (0) of alcohol was 35.4% 95% C.I. 31.1% to 40.0%; Low risk of alcohol use (1-7) was 47.6% 95% C.I. 42.8% to 52.6%; Harmful/ Hazardous alcohol use (8-14) was 11.7% 95% C.I. 8.9% to 15.1% and moderate-severe Alcohol Use Disorder (AUD)/ possible dependence (15 or more) was 5.3% 95% C.I. 3.3 % to 7.4%. The Mean, Median, SD, Min. Max and interquartile range was 3.6; 1.5; 5.3; 0-30; 5.0, respectively. See Table 4.2 and Figure 4.1).

Table 4.2. Prevalence of Alcohol Use Disorders

| Alcohol Use | Frequency (N=418) | Percentage (%) | 95% C.I. | |
|--|----------------------|--------------------------|----------|-------|
| | | | Lower | Upper |
| • Abstainer/ No Risk (0) | 148 | 35.4 | 31.1 | 40.0 |
| • Low Risk (1-7) | 199 | 47.6 | 42.8 | 52.6 |
| • Harmful/ Hazardous Use (8-14) | 49 | 11.7 | 8.9 | 15.1 |
| • Moderate -Severe Alcohol use Disorder/ Possible dependence (15 and Above) | 22 | 5.3 | 3.3 | 7.4 |
| Mean; Median; SD; Range; IQR | | 3.6; 1.5; 5.3; 0-30; 5.0 | | |

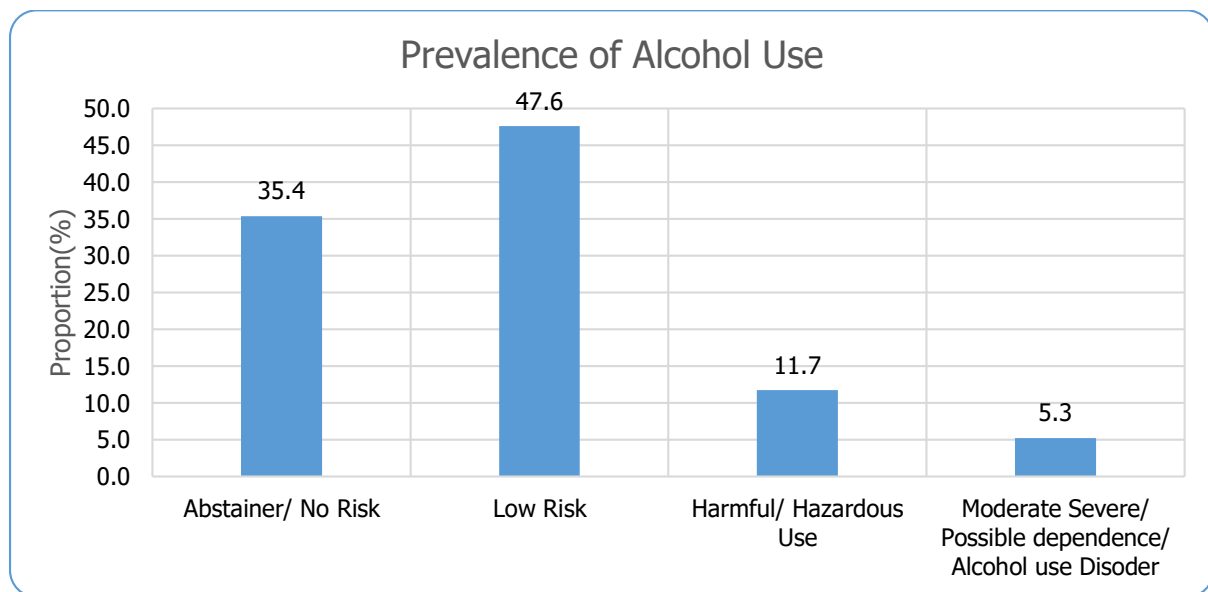


Figure 4.1. Prevalence of Alcohol Use Disorders

4.4 Prevalence of Depression

The prevalence of depression was measured using Becks Depression Inventory (BDI). As shown in Table 4.3 and figure 4.2, the percentage of participants with normal BDI scores, (0-13), was 85.9% 95% C.I. 82.3% to 89.2%; mild depression (14-17) was 5.7% 95% C.I. 3.6% to 8.1%; moderate depression (18-27) 7.4% 95% C.I. 4.8% to 10.0% and those with severe depression (28-63) was 1.0% 95% C.I. 0.2% to 1.9%. The Mean Median, SD, Min. Max and interquartile range was 5.6; 3; 7.1; 0-49; 9 respectively.

Table 4.3. Prevalence of Depression

| Depression Levels | Frequency (N=418) | Percentage (%) | 95% C.I. | |
|------------------------------|----------------------|----------------------|----------|-------|
| | | | Lower | Upper |
| • Normal (0-13) | 359 | 85.9 | 82.3 | 89.2 |
| • Mild (14-17) | 24 | 5.7 | 3.6 | 8.1 |
| • Moderate (18-27) | 31 | 7.4 | 4.8 | 10.0 |
| • Severe (28-63) | 4 | 1.0 | 0.2 | 1.9 |
| Mean; Median; SD; Range; IQR | | 5.6; 3; 7.1; 0-49; 9 | | |

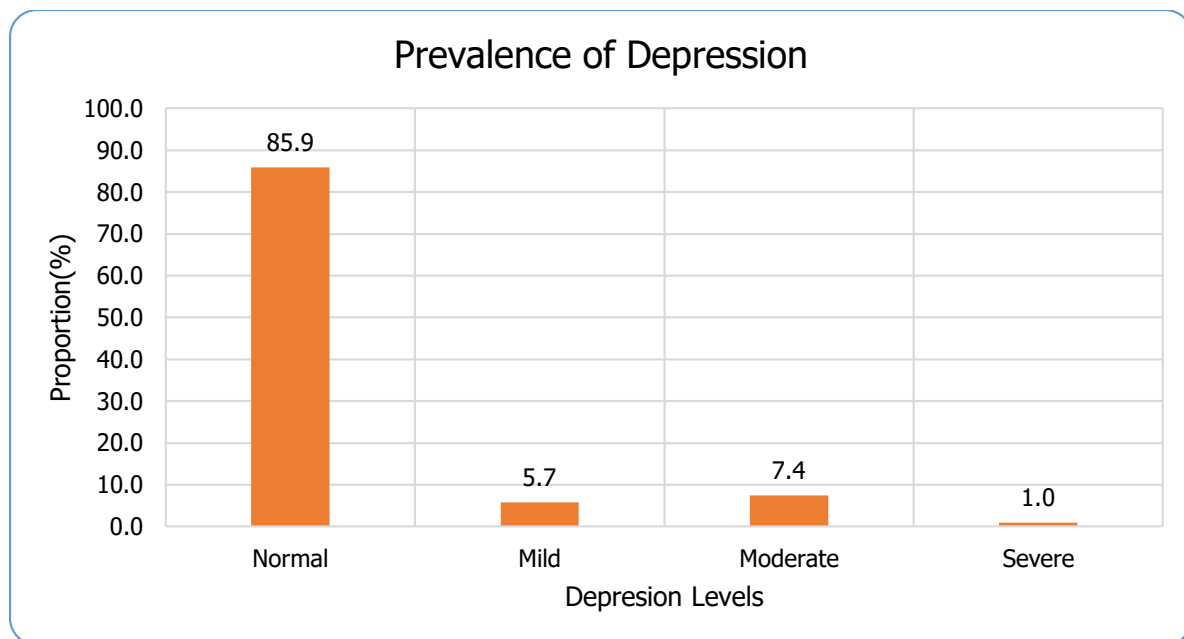


Figure 4.2. Prevalence of Depression

4.5 Prevalence of Anxiety

The prevalence of Anxiety was measured using Becks Anxiety Inventory (BAI). As shown in Table 4.4 and figure 4.3, the prevalence of mild anxiety (0-9) was 81.1% 95% C.I. 77.3% to 84.7%; mild to moderate anxiety (10-25) 15.8% 95% C.I. 12.4% to 19.6%; moderate anxiety (26-35) 2.2% 95% C.I. 1.0% to 3.6% and severe anxiety (36-63) 1.0% 95% C.I. 0.2% to 1.9%. The Mean Median, SD, Min. Max and interquartile range was 4.9; 2; 7.3; 0-37; 6 respectively.

Table 4.4. Prevalence of Anxiety

| Anxiety Levels | Frequency (N=418) | Percentage (%) | 95% C.I. | |
|------------------------------|----------------------|----------------------|----------|-------|
| | | | Lower | Upper |
| • Mild (0-9) | 339 | 81.1 | 77.3 | 84.7 |
| • Mild to Moderate (10-25) | 66 | 15.8 | 12.4 | 19.6 |
| • Moderate (26-35) | 9 | 2.2 | 1.0 | 3.6 |
| • Severe (36-63) | 4 | 1.0 | 0.2 | 1.9 |
| Mean; Median; SD; Range; IQR | | 4.9; 2; 7.3; 0-37; 6 | | |

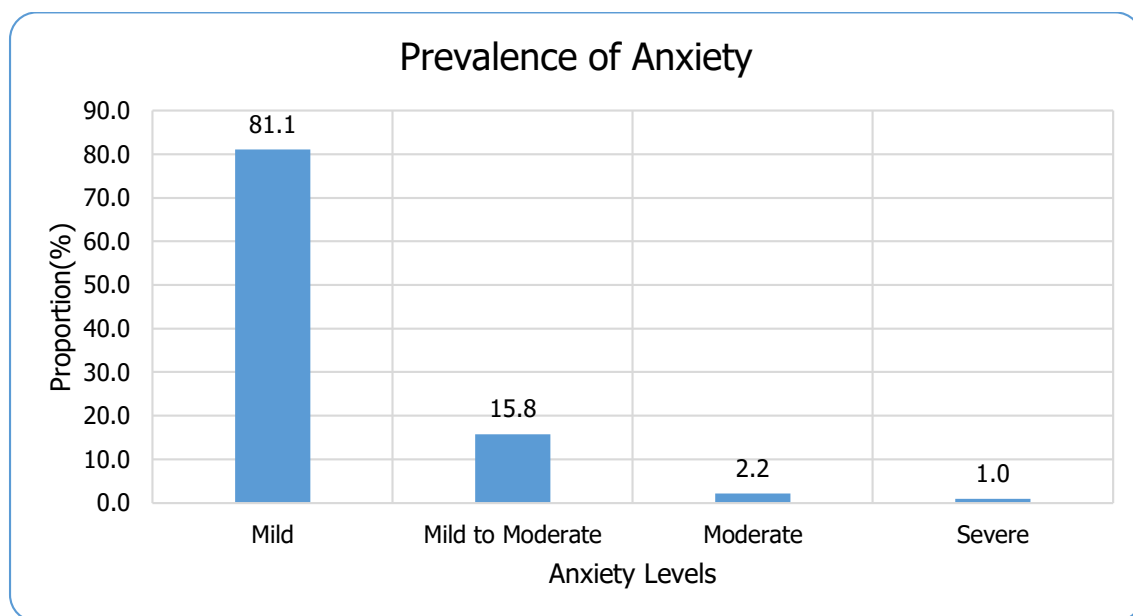


Figure 4.3. Prevalence of Anxiety

4.6 Correlation between AUD, Depression and Anxiety

Table 4.5 presents the Correlation between AUD, Depression, and Anxiety. There were positive and statistically significant correlations between AUD, Depression, and Anxiety. The Correlation between AUD and Depression scores was $r=0.258$; $p<0.001$ (i.e. participants who were consuming alcohol had significantly higher depression scores); AUD and Anxiety scores was $r=0.200$; $p<0.001$ (i.e. participants who were consuming alcohol had significantly higher anxiety scores), Anxiety and Depression scores was $r=0.691$ (i.e. participants who had higher depression scores had significantly higher anxiety scores); $p<0.001$.

Table 4.5. Correlation between AUD, Depression and Anxiety.

| Pearson's Correlation | 1 | 2 | 3 | 4 |
|-----------------------|----------------|----------------|--------|---|
| 1. AUDIT Scores | 1 | | | |
| 2. Depression Scores | 0.258** | 1 | | |
| 3. Anxiety Scores | 0.200** | 0.691** | 1 | |
| 4. Age in Years | -0.057 | -0.072 | -0.069 | 1 |

Note: **Correlation is significant at the $p < 0.001$ level (2-tailed).

4.7 Socio-demographic factors associated with AUD (Bivariate analysis).

Table 4.6 presents the socio-demographic factors associated with AUD (Bivariate analysis). Male participants had significant higher AUDIT scores as compared to females ($p=0.015$). Age, education level, marital status and speciality were not statistically significant.

Table 4.6. Socio-demographic Factors Associated with AUDIT scores

| Variable | Category | N | Mean±SD | p-Value |
|------------------------------|------------------------------|-----|---------|--------------|
| Gender [†] | Female | 201 | 3.0±4.6 | 0.015 |
| | Male | 217 | 4.2±5.8 | |
| Age [‡] | 30 and Below | 71 | 3.1±4.3 | 0.447 |
| | 31-34 Years | 193 | 3.8±5.2 | |
| | 35-39 Years | 91 | 4.2±6.4 | |
| | 40 and Above | 49 | 3.0±4.6 | |
| Education Level [‡] | MBCHB/BDS | 266 | 4.1±5.5 | 0.086 |
| | Masters | 95 | 2.8±4.7 | |
| | PhD and Above | 57 | 3.0±4.7 | |
| Marital Status [‡] | Married | 265 | 3.2±5.0 | 0.114 |
| | Single | 140 | 4.4±5.7 | |
| | Divorced/ Widowed/ Separated | 13 | 3.9±4.0 | |
| Specialty [‡] | General practitioner | 218 | 3.6±5.2 | 0.235 |
| | Obstetrician/ gynaecologist | 17 | 4.6±8.6 | |
| | Others (non-clinical) | 106 | 4.4±5.6 | |
| | Paediatrics | 17 | 0.9±1.5 | |
| | Physician | 16 | 3.2±5.5 | |
| | Psychiatry | 18 | 2.7±4.1 | |
| | Surgery | 21 | 3.2±3.8 | |
| | Anaesthesiology | 5 | 1.2±1.6 | |

Note: †-Independent samples t-test; ‡-One-way analysis of variance-ANOVA

4.8 Socio-demographic factors associated with depression

Table 4.7 presents the socio-demographic factors associated with depression (Bivariate analysis). Female participants had significant higher depression scores as compared to males ($p=0.004$). Participants who had MBChB/BDS only had higher depression scores as compared to those who had masters, PhD degree and above ($p=0.050$). Participants who were single had higher depression scores as compared to those who were married ($p=0.050$).

Table 4.7. Socio-demographic Factors Associated with BDI scores

| Variable | Category | N | Mean±SD | p-Value |
|------------------------------|------------------------------|-----|----------|--------------|
| Gender [†] | Female | 201 | 6.6±7.4 | 0.004 |
| | Male | 217 | 4.7±6.7 | |
| Age [‡] | 30 and Below | 71 | 5.9±6.6 | 0.477 |
| | 31-34 Years | 193 | 5.7±7.1 | |
| | 35-39 Years | 91 | 6.1±8.4 | |
| | 40 and Above | 49 | 4.2±5.4 | |
| Education Level [‡] | MBChB/BDS | 266 | 6.1±7.5 | 0.050 |
| | Masters | 95 | 5.6±6.5 | |
| | PhD and Above | 57 | 3.6±5.7 | |
| Marital Status [‡] | Married | 265 | 5.0±6.9 | 0.050 |
| | Single | 140 | 6.8±7.6 | |
| | Divorced/ Widowed/ Separated | 13 | 5.1±4.6 | |
| Specialty [‡] | General practitioner | 218 | 6.2±7.6 | 0.514 |
| | Obstetrician/ gynaecologist | 17 | 5.1±5.8 | |
| | Others | 106 | 5.0±6.8 | |
| | Paediatrics | 17 | 6.3±8.5 | |
| | Physician | 16 | 4.1±4.3 | |
| | Psychiatry | 18 | 3.2±4.5 | |
| | Surgery | 21 | 5.4±6.5 | |
| | Anaesthesiology | 5 | 8.8±10.6 | |

Note: †-Independent samples t-test; ‡-One-way analysis of variance-ANOVA

4.9 Socio-demographic factors associated with anxiety (Bivariate analysis)

Table 4.8 presents the socio-demographic factors associated with anxiety (Bivariate analysis). Female participants had significant higher anxiety scores as compared to males ($p=0.004$). Participants who were single had higher anxiety scores as compared to those who were married and those who were either separated, divorced or widowed. ($p=0.051$).

Table 4.8. Socio-demographic Factors Associated with BAI scores

| Variable | Category | N | Mean±SD | p-Value |
|------------------------------|------------------------------|-----|----------|--------------|
| Gender [†] | Female | 201 | 6.0±7.7 | 0.004 |
| | Male | 217 | 3.9±6.9 | |
| Age [‡] | 30 and Below | 71 | 6.2±8.0 | 0.372 |
| | 31-34 Years | 193 | 4.9±7.8 | |
| | 35-39 Years | 91 | 4.7±6.9 | |
| | 40 and Above | 49 | 3.8±5.7 | |
| Education Level [‡] | MBCHB/BDS | 266 | 5.3±7.6 | 0.433 |
| | Masters | 95 | 4.4±6.8 | |
| | PhD and Above | 57 | 4.2±7.1 | |
| Marital Status [‡] | Married | 265 | 4.3±6.8 | 0.051 |
| | Single | 140 | 6.2±8.3 | |
| | Divorced/ Widowed/ Separated | 13 | 3.8±4.1 | |
| Specialty [‡] | General practitioner | 218 | 5.4±7.2 | 0.382 |
| | Obstetrician/ gynaecologist | 17 | 4.2±5.4 | |
| | Others | 106 | 4.6±8.5 | |
| | Paediatrics | 17 | 2.9±2.9 | |
| | Physician | 16 | 4.7±8.6 | |
| | Psychiatry | 18 | 3.8±5.6 | |
| | Surgery | 21 | 3.7±5.7 | |
| | Anaesthesiology | 5 | 11.4±9.2 | |

Note: †-Independent samples t-test; ‡-One-way analysis of variance-ANOVA

4.10 Independent predictors of AUD

Table 4.9 presents the independent predictors of AUD after adjusting for all other variables that were associated with anxiety at the bivariate level ($p < 0.10$). Male participants had significant higher AUDIT scores as compared to females ($\beta = 1.59$; 95% C.I. 0.61 to 2.57; $p = 0.001$). Participants who had higher scores of depressions had significantly higher AUDIT scores ($\beta = -0.18$; 95% C.I. 0.08 to 0.27; $p < 0.001$).

Table 4.9. Independent Predictors of AUDIT scores (multivariate analysis)

| Variable | Category | β | S.E. | 95% Confidence Interval | | Sig. |
|-------------------|---------------|---------|------|-------------------------|-------|------------------|
| | | | | Lower | Upper | |
| Gender | Male | 1.59 | 0.50 | 0.61 | 2.57 | 0.001 |
| | Female | Ref. | | | | |
| Education Level | PhD and Above | -0.56 | 0.74 | -2.00 | 0.88 | 0.448 |
| | MSc | -0.89 | 0.60 | -2.07 | 0.30 | 0.143 |
| | MBCHB/BDS | Ref. | | | | |
| Depression scores | | 0.18 | 0.05 | 0.08 | 0.27 | <0.001 |
| Anxiety scores | | 0.04 | 0.05 | -0.05 | 0.13 | 0.422 |

4.11 Independent predictors of Depression

Table 4.10 presents the independent predictors of depression after adjusting for all other variables that were associated with depression at the bivariate level ($p < 0.10$). Participants who had bachelor's degree and master's degree only had significantly higher depression scores as compared to those who had additional PhD degree and post-doc ($\beta = 1.60$; 95% C.I. 0.16 to 3.05; $p = 0.030$) and ($\beta = 1.77$; 95% C.I. 0.11 to 3.43; $p = 0.036$) respectively. Participants who had higher scores of AUDIT and anxiety had significantly higher depression scores ($\beta = -0.18$; 95% C.I. 0.08 to 0.27; $p < 0.001$) and ($\beta = -0.63$; 95% C.I. 0.57 to 0.70; $p < 0.001$) respectively.

Table 4.10. Independent Predictors of BDI scores (multivariate analysis)

| Variable | Category | β | S.E. | 95% Confidence Interval | | Sig. |
|-----------------|------------------------------|---------|------|-------------------------|-------|------------------|
| | | | | Lower | Upper | |
| Gender | Female | 0.82 | 0.52 | -0.19 | 1.83 | 0.113 |
| | Male | Ref. | | | | |
| Education Level | MBCHB/BDS | 1.60 | 0.74 | 0.16 | 3.05 | 0.030 |
| | Masters | 1.77 | 0.85 | 0.11 | 3.43 | 0.036 |
| | PhD and Above | Ref. | | | | |
| Marital Status | Married | -0.39 | 1.43 | -3.20 | 2.42 | 0.785 |
| | Single | -0.16 | 1.46 | -3.03 | 2.71 | 0.911 |
| | Divorced/ Widowed/ Separated | Ref. | | | | |
| Audit Scores | | 0.18 | 0.05 | 0.08 | 0.27 | <0.001 |
| Anxiety Scores | | 0.63 | 0.03 | 0.57 | 0.70 | <0.001 |

4.12 Independent predictors of Anxiety

Table 4.11 presents the independent predictors of anxiety after adjusting for all other variables that were associated with anxiety at the bivariate level ($p < 0.10$). Participants who had higher scores of depression had significantly higher anxiety scores ($\beta = -0.69$; 95% C.I. 0.62 to 0.77; $p < 0.001$).

Table 4.11. Independent Predictors of BAI scores (multivariate analysis)

| Variable | Category | β | S.E. | 95% Confidence Interval | | Sig. |
|-------------------|------------------------------|---------|------|-------------------------|-------|------------------|
| | | | | Lower | Upper | |
| Gender | Female | 0.67 | 0.54 | -0.39 | 1.72 | 0.216 |
| | Male | Ref. | | | | |
| Marital Status | Married | 0.78 | 1.50 | -2.17 | 3.73 | 0.604 |
| | Single | 1.16 | 1.53 | -1.84 | 4.16 | 0.450 |
| | Divorced/ Widowed/ Separated | Ref | | | | |
| Audit Scores | | 0.04 | 0.05 | -0.06 | 0.14 | 0.430 |
| Depression Scores | | 0.69 | 0.04 | 0.62 | 0.77 | <0.001 |

CHAPTER FIVE

5 DISCUSSION, LIMITATIONS, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

This study sought to evaluate the prevalence of alcohol use disorders, depression and anxiety, with assessment of severity of disorders and allied contributory factors among medical doctors in Kenya.

5.1.1 Prevalence and factors associated with Alcohol Use Disorders

Findings indicate that the scores of 17.0% on the Alcohol Use Disorder Identification Test were consistent with harmful alcohol use and dependence. This is similar to what was found in previous studies (Oreskovich et al., 2015; Rosta, 2008 & Ndetei et al., 2009) 15.4% ,19.8% and 25.1% respectively. In this study, 35.4% were abstainers, while 47.6% were using alcohol at low risk level. This finding is different from what was earlier reported by Issa *et al.* and Obadeji *et al.* in Nigeria (Issa et al., 2012; Obadeji, Oluwole, Dada, & Adegoke, 2015) and Akvardar *et al.* in Istanbul (Akvardar et al., 2003). Issa *et al.* (Issa et al., 2012) reported that 71.8% of doctors in their study were abstainers with only about 4.1% constituting hazardous and harmful drinkers. Obadeji *et al.* 2015 found 69.7% of respondents to be abstainers, while 67% reported never having used alcohol in Akvardar *et al.*'s study. This could be explained by the different study settings, where the three studies were localised/institutional as compared to this study whose setting was whole Kenya. The prevalence in the current study is lower than what has been reported by other studies, done in Kenya (JAGUGA et al., 2021) who reported prevalence of harmful alcohol use among health care workers to be 43.9%. The lower rate of alcohol use found among doctors might be related to their knowledge of the adverse effects of alcohol use. Several factors have been reported to influence hazardous drinking among doctors. In general, gender has been a recurrent factor influencing hazardous alcohol use generally (JAGUGA et al., 2021; Mokaya et al., 2016; Nolen-Hoeksema, 2004; Rosenfield et al., 2000).

In this study, a statistically significant relationship between alcohol use disorder and gender was reported, where male doctors had higher AUDIT scores with a p value of **0.015**. Similarly, other studies have reported a lower rate of hazardous/harmful drinking among female doctors (Issa et al., 2012; Joos et al., 2013; Rosta, 2008; Sebo et al., 2007) and other population (Atwoli et al., 2011; Obadeji, Oluwole, Dada, & Ajiboye, 2015). The lower number of female doctors with alcohol use disorder can be explained by the lower susceptibility to peer pressure compared to males, greater social sanctions for alcohol use and increased susceptibility to negative alcohol and substance use effects compared to males (Nolen-Hoeksema, 2004). This might also be influenced by culture and religion. In Kenyan culture, where this study was carried out, it is largely permissive of men to drink alcohol rather than women. Again, Kenyan societies have some prejudice against women who drink alcohol especially those who consume it in excess. This may also affect the degree with which women report their alcohol use.

Single, divorced, separated or widowed doctors were more likely to report harmful alcohol use than married doctors. This is comparable to the findings of other studies from Africa and the West, which have reported a higher prevalence of alcohol use among divorced and single doctors/persons (JAGUGA et al., 2021; Power et al., 1999). Being unmarried may lead to social isolation, a predisposing factor for hazardous alcohol and substance use (Day & Rosenthal, 2019; McKay et al., 2017). Marriage and family support can effectively protect against hazardous alcohol use among doctors. The single doctors may be having poor coping mechanisms with the daily challenges of the work environment, thus turning to alcohol. Other factors such as age, specialty of the doctor and education level did not have significant association with alcohol use disorder in this study. The high prevalence in this study could imply abscondment of duty leading to reduced productivity.

5.1.2 Prevalence and factors associated with depression and Anxiety

The overall prevalence of depression and anxiety among medical doctors was considerably higher (19.4% and 22.0% respectively) than among the general population (depression: 4.4%; anxiety: 3.6%; World Health Organization 2017). However, in this study, moderate & severe depression was 8.4% and moderate & severe anxiety was 3.2%. Similar findings were reported by (Joules et al., 2014; Mata et al., 2015), where it was observed that doctors struggle with stressors such as slow or no career development and work conditions such as heavy workload. The findings in this study could also be attributed to the considerable psychological impact of the pandemic (COVID-19) on health care workers, including medical doctors.

Gender had significant association with depression among doctors, where female doctors were more likely to experience depression, with $p=0.004$. This finding is similar to other studies ((Joules et al., 2014; Monsef et al., 2015). Female hormonal fluctuations could be a trigger for depression. Women are also more susceptible to adverse forms of depression-related illnesses such as postpartum depression, premenstrual dysphoric disorder, and postmenopausal anxiety and depression, which can cause changes in the production of ovarian hormones, et cetera.

This study found insignificant association between depression and other factors like the level of education, marital status, speciality and age among the sampled doctors.

In terms of anxiety, anxiety symptoms were more common among female doctors compared to males. The finding was inconsistent with other studies that have evaluated gender as a correlate for anxiety (Earle & Kelly, 2005; Monsef et al., 2015). Another study (Yahaya et al., 2018) showed that male medical doctors are more likely to develop anxiety symptoms. The study's finding supports the general agreement that anxiety has a female predilection because of different thought/metacognitive control strategies and biological factors to males (Bahrami & Yousefi, 2011). The higher prevalence of depression and anxiety among doctors in this study could be an indication that medical doctors in Kenya lack adequate coping mechanisms to ever

challenging work environment. It could also imply that employers have not put in place adequate policies on debriefing of medical doctors at the time of need. This could lead to reduced productivity at places of work and to some existent, increased disease burden.

5.1.3 Association between Alcohol use disorder, depression and Anxiety

Significant positive association between alcohol use and depression was observed. This is similar to findings in other studies in both general and doctors' population (B F Grant & Harford, 1995; Kuria et al., 2012; Martinez et al., 2015; Oreskovich et al., 2015; Strid et al., 2018). Regardless of the complex casual relationship, alcohol abuse predisposes people to relational, occupational and other health problems that often lead to the development of adverse mental health problems (Lucas et al., 2010). On the other hand, some people with certain psychological distress are likely to adopt alcohol consumption as a coping strategy.

There was a strong correlation between anxiety and depression; more anxious doctors were more depressed and vice versa. This is similar to other studies (Erdur et al., 2006). This could be due the co-morbid nature of depression and anxiety. Also observed was the link between alcohol use and depression and anxiety. This is because the development of psychiatric disorders such as mood and anxiety disorders seems to be correlated with alcohol use disorder (AUD). From published data, people with AUD are more susceptible to depressive disorders (Bridget F Grant et al., 2004). When disorders coexist, patients present with a severe symptoms and have worse prognosis than when either disorder exists alone (Greenfield et al., 1998; Hasin et al., 2002). Adverse effects include a higher risk of suicidal behaviour (Conner et al., 2014).

5.2 Limitations

1. The study was conducted using digital google forms. Those doctors who had changed their contact details, from those captured at KMPDC register, may have missed the opportunity to participate.

2. Given that the google forms were sent out digitally, participants took long time to respond thus prolonging the data collection period beyond time schedule.
3. This study was more likely to recruit younger doctors given that the questionnaire was shared digitally.

5.3 Conclusion

Hazardous alcohol use & dependence is a significant problem among medical doctors in Kenya. Also, a significant number of doctors are likely to experience moderate to severe depression and anxiety. Structural approaches for the early identification of problematic alcohol consumption, depression and anxiety among medical doctors, followed by intervention and treatment where indicated should be strongly supported.

5.4 Recommendations

1. Establish fitness and wellness committees in all health institutions and KMPDC, to conduct routine screening of alcohol use disorders, depression and anxiety among medical doctors and a safe referral system established to provide care to those who need it.
2. All doctors should be offered psychological support and good counselling sessions when they screen positive for any mental condition.
3. Doctors should not only concentrate on treating patients. They should also focus on their wellbeing and be encouraged to seek help especially for mental illnesses.
4. A mixed qualitative and quantitative longitudinal study evaluating the different aspect of working environment that predispose medical doctors to hazardous alcohol use can provide insight on the work challenges of doctors that predispose them to psychological problems.

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APPENDICES

Appendix I. Verbal consent form

KNH-UoN/ERC/FORM/IC04



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Verbal Consent Information Form (A Verbal consent is only taken)

Hello, my name is Dr. Samuel Oroko, a postgraduate student from the University of Nairobi department of psychiatry. You have been chosen at random to be in a study about the prevalence of alcohol use disorders, depression and anxiety among medical doctors in Kenya. This study involves research whose purpose is to determine the prevalence of hazardous alcohol drinking, depression and anxiety among medial doctors and identify risk factors. This will take 15 minutes of your time. If you choose to be in the study, I will send you a digital questionnaire, which you will be expected to fill truthfully in your free time.

There are no foreseeable risks or benefits to you for participating in this study. No anticipated physical injuries during this study. If you feel stressed or anxious through this process, you will have access to counselling services throughout the study for free. There is no cost or payment to you. If you have questions while taking part, please stop and ask. I will do my best to keep your information confidential but I cannot guarantee absolute anonymity. I will link your answers to you initially through consent but this link will be removed later in order to protect

you. If you have questions about this research study you may contact Dr. Samuel Oroko at 0724799588 in the event of a research related injury. If you feel as if you were not treated well during this study, or have questions concerning your rights as a research participant call The Secretary/Chairperson KNH-UoN ERC on Tel. No. 2726300 Ext 44102. Your participation in this research is voluntary, and you will not be penalized or lose benefits if you refuse to participate or decide to stop. May I continue? If you agree, reply this email with the word YES.

I certify that I have consented the participant (code no.) _____

Researcher's name: _____

Signature: _____

Date: _____

Appendix II. Questionnaire

PREVALENCE OF ANXIETY, ALCOHOL USE DISORDERS, AND DEPRESSION AMONG MEDICAL DOCTORS IN KENYA

Questionnaire: Fill all sections

Section one: Demographics

Age in years.....

Gender

Male

Female

Education level

MBCHB/BDS

PhD

Masters

Post Doc

Marital status

Married

Single

Divorced/separated

Widowed

Specialty

Obs-gyn

Psychiatry

Surgery

Paediatrics

General practitioner

Physician

Others.....

Appendix III. AUDIT

The Alcohol Use Disorders Identification Test: Self-Report Version

PATIENT: Because alcohol use can affect your health and can interfere with certain medications and treatments, it is important that we ask some questions about your use of alcohol. Your answers will remain confidential so please be honest.

Place an X in one box that best describes your answer to each question.

| Questions | 0 | 1 | 2 | 3 | 4 | |
|--|--------|-------------------|-------------------------------|------------------|---------------------------|--|
| 1. How often do you have a drink containing alcohol? | Never | Monthly or less | 2-4 times a month | 2-3 times a week | 4 or more times a week | |
| 2. How many drinks containing alcohol do you have on a typical day when you are drinking? | 1 or 2 | 3 or 4 | 5 or 6 | 7 to 9 | 10 or more | |
| 3. How often do you have six or more drinks on one occasion? | Never | Less than monthly | Monthly | Weekly | Daily or almost daily | |
| 4. How often during the last year have you found that you were not able to stop drinking once you had started? | Never | Less than monthly | Monthly | Weekly | Daily or almost daily | |
| 5. How often during the last year have you failed to do what was normally expected of you because of drinking? | Never | Less than monthly | Monthly | Weekly | Daily or almost daily | |
| 6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session? | Never | Less than monthly | Monthly | Weekly | Daily or almost daily | |
| 7. How often during the last year have you had a feeling of guilt or remorse after drinking? | Never | Less than monthly | Monthly | Weekly | Daily or almost daily | |
| 8. How often during the last year have you been unable to remember what happened the night before because of your drinking? | Never | Less than monthly | Monthly | Weekly | Daily or almost daily | |
| 9. Have you or someone else been injured because of your drinking? | No | | Yes, but not in the last year | | Yes, during the last year | |
| 10. Has a relative, friend, doctor, or other health care worker been concerned about your drinking or suggested you cut down? | No | | Yes, but not in the last year | | Yes, during the last year | |
| | | | | | Total | |

Appendix IV. Beck's Depression Inventory

Please fill all questions truthfully and to the best of your knowledge

Beck's Depression Inventory

1.

0 I do not feel sad.

1 I feel sad

2 I am sad all the time and I can't snap out of it.

3 I am so sad and unhappy that I can't stand it.

2.

0 I am not particularly discouraged about the future.

1 I feel discouraged about the future.

2 I feel I have nothing to look forward to.

3 I feel the future is hopeless and that things cannot improve.

3.

0 I do not feel like a failure.

1 I feel I have failed more than the average person.

2 As I look back on my life, all I can see is a lot of failures.

3 I feel I am a complete failure as a person.

4.

0 I get as much satisfaction out of things as I used to.

1 I don't enjoy things the way I used to.

2 I don't get real satisfaction out of anything anymore.

3 I am dissatisfied or bored with everything.

5.

0 I don't feel particularly guilty

1 I feel guilty a good part of the time.

2 I feel quite guilty most of the time.

3 I feel guilty all of the time.

6.

0 I don't feel I am being punished.

1 I feel I may be punished.

2 I expect to be punished.

3 I feel I am being punished.

7.

0 I don't feel disappointed in myself.

- 1 I am disappointed in myself.
 - 2 I am disgusted with myself.
 - 3 I hate myself.
- 8.

- 0 I don't feel I am any worse than anybody else.
- 1 I am critical of myself for my weaknesses or mistakes.
- 2 I blame myself all the time for my faults.
- 3 I blame myself for everything bad that happens.

9.

- 0 I don't have any thoughts of killing myself.
- 1 I have thoughts of killing myself, but I would not carry them out.
- 2 I would like to kill myself.
- 3 I would kill myself if I had the chance.

10.

- 0 I don't cry any more than usual.
- 1 I cry more now than I used to.
- 2 I cry all the time now.
- 3 I used to be able to cry, but now I can't cry even though I want to.

11.

- 0 I am no more irritated by things than I ever was.
- 1 I am slightly more irritated now than usual.
- 2 I am quite annoyed or irritated a good deal of the time.
- 3 I feel irritated all the time.

12.

- 0 I have not lost interest in other people.
- 1 I am less interested in other people than I used to be.
- 2 I have lost most of my interest in other people.
- 3 I have lost all of my interest in other people.

13.

- 0 I make decisions about as well as I ever could.
- 1 I put off making decisions more than I used to.
- 2 I have greater difficulty in making decisions more than I used to.
- 3 I can't make decisions at all anymore.

14.

- 0 I don't feel that I look any worse than I used to.
- 1 I am worried that I am looking old or unattractive.
- 2 I feel there are permanent changes in my appearance that make me look unattractive
- 3 I believe that I look ugly.

15.

- 0 I can work about as well as before.
- 1 It takes an extra effort to get started at doing something.
- 2 I have to push myself very hard to do anything.
- 3 I can't do any work at all.

16.

- 0 I can sleep as well as usual.
- 1 I don't sleep as well as I used to.
- 2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
- 3 I wake up several hours earlier than I used to and cannot get back to sleep.

17.

- 0 I don't get more tired than usual.
- 1 I get tired more easily than I used to.
- 2 I get tired from doing almost anything.
- 3 I am too tired to do anything.

18.

- 0 My appetite is no worse than usual.
- 1 My appetite is not as good as it used to be.
- 2 My appetite is much worse now.
- 3 I have no appetite at all anymore.

19.

- 0 I haven't lost much weight, if any, lately.
- 1 I have lost more than five pounds.
- 2 I have lost more than ten pounds.
- 3 I have lost more than fifteen pounds.

20.

- 0 I am no more worried about my health than usual.
- 1 I am worried about physical problems like aches, pains, upset stomach, or constipation.
- 2 I am very worried about physical problems and it's hard to think of much else.
- 3 I am so worried about my physical problems that I cannot think of anything else.

21.

- 0 I have not noticed any recent change in my interest in sex.
- 1 I am less interested in sex than I used to be.
- 2 I have almost no interest in sex.
- 3 I have lost interest in sex completely.

Appendix V. Beck Anxiety Inventory (BAI)

Beck Anxiety Inventory (BAI)

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by that symptom during the past month, including today, by circling the number in the corresponding space in the column next to each symptom.

| | Not at all | Mildly, but it didn't bother me much | Moderately – it wasn't pleasant at times | Severely – it bothered me a lot |
|-------------------------|------------|--------------------------------------|--|---------------------------------|
| Numbness or tingling | 0 | 1 | 2 | 3 |
| Feeling hot | 0 | 1 | 2 | 3 |
| Wobbliness in legs | 0 | 1 | 2 | 3 |
| Unable to relax | 0 | 1 | 2 | 3 |
| Fear of worst happening | 0 | 1 | 2 | 3 |
| Dizzy or lightheaded | 0 | 1 | 2 | 3 |
| Heart pounding / racing | 0 | 1 | 2 | 3 |
| Unsteady | 0 | 1 | 2 | 3 |
| Terrified or afraid | 0 | 1 | 2 | 3 |
| Nervous | 0 | 1 | 2 | 3 |
| Feeling of choking | 0 | 1 | 2 | 3 |
| Hands trembling | 0 | 1 | 2 | 3 |
| Shaky / unsteady | 0 | 1 | 2 | 3 |
| Fear of losing control | 0 | 1 | 2 | 3 |
| Difficulty in breathing | 0 | 1 | 2 | 3 |
| Fear of dying | 0 | 1 | 2 | 3 |
| Scared | 0 | 1 | 2 | 3 |
| Indigestion | 0 | 1 | 2 | 3 |
| Faint / lightheaded | 0 | 1 | 2 | 3 |
| Face flushed | 0 | 1 | 2 | 3 |
| Hot / cold sweats | 0 | 1 | 2 | 3 |

Appendix VI. Reliability of AUDIT

| AUDIT Items | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|----------------------------|--------------------------------|----------------------------------|----------------------------------|
| 1. How often do you have a drink containing alcohol | 3.88 | 26.48 | 0.57 | 0.855 |
| 2. How many drinks containing alcohol do you have on a typical day when you are drinking | 5.22 | 30.30 | 0.31 | 0.871 |
| 3. How often do you have six or more drinks on one occasion | 4.93 | 24.72 | 0.71 | 0.843 |
| 4. How often during the last year have you found that you were not able to stop drinking once you had started | 5.38 | 25.67 | 0.77 | 0.840 |
| 5. How often during the last year have you failed to do what was normally expected from you because of drinking | 5.51 | 28.97 | 0.55 | 0.859 |
| 6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session | 5.60 | 29.71 | 0.55 | 0.862 |
| 7. How often during the last year have you had a feeling of guilt or remorse after drinking | 5.19 | 24.95 | 0.72 | 0.841 |
| 8. How often during the last year have you been unable to remember what happened the night before because you had been drinking | 5.34 | 26.39 | 0.70 | 0.845 |
| 9. Have you or someone else been injured as a result of your drinking | 5.36 | 27.37 | 0.47 | 0.863 |
| 10. Has a relative or friend or a doctor or another health worker been concerned about your drinking or suggested you cut down | 5.05 | 22.23 | 0.66 | 0.855 |
| Cronbach's Alpha | | | | 0.867 |

Appendix VII. Reliability of BDI

| BDI Items | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|------------------------------|----------------------------------|--------------------------------------|--|--|
| 1. Sadness | 5.30 | 45.64 | 0.69 | 0.926 |
| 2. Pessimism | 5.39 | 46.63 | 0.53 | 0.929 |
| 3. Past Failure | 5.40 | 46.27 | 0.60 | 0.928 |
| 4. Loss of Pleasure | 5.28 | 45.52 | 0.70 | 0.926 |
| 5. Guilty Feelings | 5.42 | 46.45 | 0.65 | 0.927 |
| 6. Punishment Feelings | 5.43 | 47.19 | 0.60 | 0.928 |
| 7. Self -Dislike | 5.42 | 46.37 | 0.68 | 0.927 |
| 8. Self-Criticalness | 5.17 | 45.16 | 0.68 | 0.927 |
| 9. Suicidal Thoughts | 5.51 | 47.74 | 0.59 | 0.929 |
| 10. Crying | 5.45 | 46.52 | 0.52 | 0.930 |
| 11. Agitation | 5.33 | 45.51 | 0.69 | 0.926 |
| 12. loss of interest | 5.21 | 44.58 | 0.71 | 0.926 |
| 13. Indecisiveness | 5.33 | 45.26 | 0.69 | 0.926 |
| 14. Worthlessness | 5.43 | 46.50 | 0.66 | 0.927 |
| 15. Loss of Energy | 5.29 | 45.60 | 0.68 | 0.927 |
| 16. Changes in sleep pattern | 5.23 | 44.81 | 0.60 | 0.929 |
| 17. Irritability | 5.25 | 45.35 | 0.70 | 0.926 |
| 18. Changes in Appetite | 5.41 | 46.57 | 0.57 | 0.929 |
| 19. Weight Change | 5.50 | 49.09 | 0.22 | 0.934 |
| 20. Tiredness or Fatigue | 5.34 | 46.88 | 0.53 | 0.929 |
| 21. Loss of Interest in Sex | 5.30 | 46.73 | 0.47 | 0.931 |
| Cronbach's Alpha | | | | 0.931 |

Appendix VIII. Reliability of BAI

| BAI Items | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|-----------------------------|----------------------------------|--------------------------------------|--|--|
| 1. Numbness/ tingling | 4.78 | 51.01 | 0.41 | 0.931 |
| 2. Feeling hot | 4.70 | 49.22 | 0.62 | 0.928 |
| 3. Wobbliness in legs | 4.85 | 51.63 | 0.51 | 0.931 |
| 4. Unable to relax | 4.59 | 47.33 | 0.72 | 0.926 |
| 5. Fear of worst happening | 4.38 | 45.52 | 0.70 | 0.928 |
| 6. Dizzy/ lightheaded | 4.77 | 50.71 | 0.49 | 0.930 |
| 7. Heart pounding/ racing | 4.62 | 47.05 | 0.75 | 0.925 |
| 8. Unsteady | 4.80 | 49.76 | 0.65 | 0.928 |
| 9. Terrified/ afraid | 4.57 | 45.83 | 0.82 | 0.924 |
| 10. Nervous | 4.47 | 46.03 | 0.78 | 0.925 |
| 11. Feeling of choking | 4.82 | 50.80 | 0.50 | 0.930 |
| 12. Hands trembling | 4.77 | 49.58 | 0.64 | 0.928 |
| 13. Shaky/ unsteady | 4.81 | 50.22 | 0.62 | 0.929 |
| 14. Fear of losing control | 4.57 | 46.18 | 0.75 | 0.925 |
| 15. Difficulty in breathing | 4.84 | 50.88 | 0.54 | 0.930 |
| 16. Fear of dying | 4.62 | 49.61 | 0.43 | 0.932 |
| 17. Scared | 4.59 | 46.84 | 0.74 | 0.926 |
| 18. Indigestion | 4.56 | 48.64 | 0.52 | 0.930 |
| 19. Faint/ lightheaded | 4.80 | 51.29 | 0.48 | 0.931 |
| 20. Face flushed | 4.84 | 50.76 | 0.59 | 0.929 |
| 21. Hot/ cold sweats | 4.77 | 49.57 | 0.62 | 0.928 |
| Cronbach's Alpha | | | | 0.932 |

Appendix IX. ERC approval



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23rd November 2020

Dr.Samuel Obegi Oroko
Reg. No.H58/89028/2016
Dept. of Psychiatry
School of Medicine
College of Health Sciences
University of Nairobi

Dear Dr. Obegi

RESEARCH PROPOSAL – PREVALENCE OF ALCOHOL USE DISORDERS, DEPRESSION AND ANXIETY AMONG MEDICAL DOCTORS IN KENYA (P335/06/2020)

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and **approved** your above research proposal. The approval period is 23rd November 2020 – 22nd November 2021.

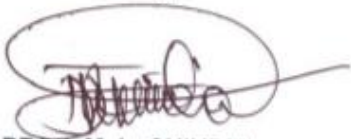
This approval is subject to compliance with the following requirements:

- a. Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
- b. All changes (amendments, deviations, violations etc.) are submitted for review and approval by KNH-UoN ERC before implementation.
- c. Death and life threatening problems and serious adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH-UoN ERC within 72 hours of notification.
- d. Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH- UoN ERC within 72 hours.
- e. Clearance for export of biological specimens must be obtained from KNH- UoN ERC for each batch of shipment.
- f. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
- g. Submission of an *executive summary* report within 90 days upon completion of the study. This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/ or plagiarism.

Protect to discover

For more details consult the KNH- UoN ERC website <http://www.erc.uonbi.ac.ke>

Yours sincerely,



PROF. M. L. CHINDIA
SECRETARY, KNH-UoN ERC

- c.c. The Principal, College of Health Sciences, UoN
The Senior Director, CS, KNH
The Chairperson, KNH- UoN ERC
The Assistant Director, Health Information Dept, KNH
The Dean, School of Medicine, UoN
The Chair, Dept. of Psychiatry, UoN
Supervisors: Prof. Muthoni Mathai, Dept. of Psychiatry, UoN
Prof. Anne Obondo, Dept. of Psychiatry, UoN

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