# Health habits and physical activity level of anaesthetists in an academic department

**Norah Mogolongwane Mampana**

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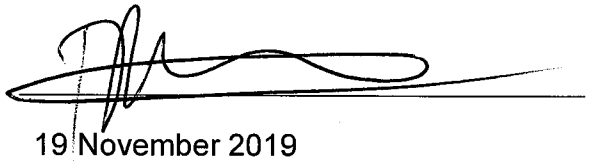
## Declaration

I, Norah Mogolongwane Norah declare that this research report is my own unaided work. It is being submitted for the Degree of Master of Medicine in the branch of Anaesthesiology at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



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# Abstract

## Background

Information of doctors' physical health is limited. The aim of this study is to describe the health habits and physical activity level of anaesthetists working in the Department of Anaesthesiology at the University of the Witwatersrand.

## Methods

A prospective, descriptive and contextual research design was followed. Using convenience sampling, a self-administered, anonymous, questionnaire consisting of three sections: demographics, health habits and physical activity was distributed. The physical activity section consisted of the World Health Organization's Global Physical Activity Questionnaire (GPAQ).

## Results

A total of 152 questionnaires were distributed and a148 (97.4%) were returned. Of the anaesthetists 82.4% rated their general health as good to excellent and 56.1% had taken sick leave in the previous year. Amongst anaesthetists, 30.8% were overweight and 12.6% were obese and 48% ate a healthy diet. Of anaesthetists, 82.4% have never smoked. In the previous two years 42.2% of female anaesthetists had had a clinical breast examination. An adequate level of physical activity as recommended by the GPAQ was obtained by 74.3% of anaesthetists.

## Conclusion

This study has shown that health habits of anaesthetists are variable and that three quarter of anaesthetists engaged in an adequate level of physical activity. There is room for improvement which may contribute to the personal and professional well-being of anaesthetists.

## Acknowledgements

To my supervisors Helen Perrie, Juan Scribante, Eduard Oosthuizen and Catherine Hosking, thank you so much for your continuous support, guidance and mentorship.

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# Table of contents

# List of figures

# List of tables

# Abbreviations

| | |
|---|---|
| BC | Before Christ |
| BMI | Body mass index |
| PAP | Papanicolau |
| PSA | Prostate specific antigen |
| AMP | Adenosine Monophosphate |
| $VO_2$ max | Maximum oxygen consumption |
| MET | Metabolic equivalent of task |
| IPAQ | International Physical Activity Questionnaire |
| GPAQ | Global Physical Activity Questionnaire |

## Statement

The Research Report consists of a literature review, draft article, study proposal and appendices. The study proposal is included for background reference and is not for examination.

The formatting of this Research Report complies with the University of the Witwatersrand's Style Guide for Theses, Dissertations and Research Reports. The formatting of the draft article may differ from the rest of the Research Report in order to comply with the author guidelines of the South African Journal of Anaesthesia and Analgesia, the journal to which it is intended to be submitted.

# Section 1: Literature review

## 1.1 Introduction

Doctors' health is a major problem for healthcare systems and information about doctors' health is limited (1). Doctors are health experts, however they only partially follow their own professional advice on maintaining a work-life balance. This does not imply that all doctors have similar behaviour but rather shows a trend observed amongst doctors (1).

Healthcare providers, including doctors, influence patients that they treat and society at large. Moreover, they act as role models in society and part of their job is to actively promote health and counsel their patients on a healthy lifestyle (2). The problem with doctors' health is that many doctors find it difficult to admit that they are in trouble, that their work is stressful, or that they need help (3).

Many doctors pay little attention to their own health in order to fulfil their professional obligations; they are generally high achievers and competitive, and are expected to take less sick days which make them vulnerable to unhealthy health habits (4). The physical wellbeing and health wellness of doctors is imperative to their productivity and effectiveness in dealing with patients (3). Lifestyle modifying factors such as diet, exercise, tobacco use, alcohol use, stress management, periodic medical examinations and vaccinations are important factors in health improvement for all including doctors (5).

Physical activity of humans is as old as their existence, and it is commonly acknowledged that the life of a primitive man (>10 000 BC) involved hunting for food for survival (6). However, the level of physical activity has been changing over the years. When agricultural developments started 10 000 – 8 000 BC, physical activity levels reduced, as hunting was no longer required for survival (6).

As civilisation spread and industrial developments began, technological inventions emerged which led to people predominantly relying on technology to do their daily tasks, therefore reducing physical activity of humans (7). Some of the activities

that previously required strenuous physical exertion can now be accomplished by just pushing a button (8).

The connection between physical health and exercise was reported in the 1950s by Morris et al (9) amongst London transport workers, with the objective to search for a relationship between the kind of work men do and the occurrence of coronary heart disease. It was noted that men of similar social class and occupation have markedly different rates of coronary heart disease, depending on their level of physical activity. Bus drivers had a higher incidence of coronary heart disease due to the nature of their occupation, while bus conductors had a lower incidence as they were forced to move continually (9).

In this chapter, the literature review on health habits and screening is presented with a focus on healthcare workers and specifically doctors. Furthermore, the health benefits of physical activity and its assessment is discussed.

## 1.2 Health habits

The health habits presented in this section include eating habits, cigarette smoking and alcohol use.

### 1.2.1 Unhealthy eating habits

Excess food intake and unhealthy eating habits have been supported as the primary factors that lead to obesity (10). Obesity and high body mass index (BMI) is a global concern (11). It is estimated that from 1980 – 2013, the prevalence of obesity and high BMI has increased worldwide, from 29.8% – 38.8% and from 28.8% – 36.9% in females and males respectively (12). Obesity is associated with an increased risk of developing diabetes, hyperlipidemia, obstructive sleep apnoea, hypertension and many other non-communicable diseases (13). BMI can be used to evaluate whether an individual is underweight, normal weight, overweight or obese, and it can be used to assess health habits, although widely criticised (14). The disadvantages of BMI is that it does not distinguish fat free mass like muscle and bone, resulting in overestimation of BMI in a muscular individual (15).

An increased BMI is also associated with musculoskeletal disorders and poor mental health, which are the leading causes of work related injuries, absenteeism and a decrease capacity of the healthcare workforce (16). Alshareef et al (17) assessed the lifestyle behaviour of doctors, including BMI in Saudi Arabia. The results revealed that 36.9% participants had a normal BMI, 36.9% were overweight and 26.3% were obese. Bogan et al (18), in Bahrain, found that 1.4% of the doctors in their study were underweight, 26.1% had a normal BMI, 39.4% were overweight and 33.1% were obese. The doctors with a normal BMI were more likely to be male and older. Kadri et al (19) found that 63% of Estonian family doctors had a normal BMI, 28% were overweight and 9% were obese, in a study of physical activity amongst participants. Frank and Segura (20) reported that 54% of the Canadian doctors had a normal BMI, 37% overweight and 8% obese.

A cross sectional quantitative study by Skaal and Pengpid (21) investigated levels of physical activity of healthcare workers at the University of Limpopo, which showed that an estimated 10% of male and 65% of female hospital staff were obese or severely obese. It was also noted that 55% of the older staff members were obese, compared to 32% of younger staff members (21).

Healthy eating habits help reduce the risk of non-communicable diseases (22). Regular eating pattern and eating events during the day have an influence on body weight (23). Kunene and Taukobong (24) studied dietary habits amongst healthcare workers in KwaZulu Natal, South Africa and found that 51% did not have breakfast daily, 20% skipped lunch and 11% skipped dinner during a regular week. In this study older healthcare workers had breakfast more frequently than the younger ones. Elbagari et al (25) studied the lifestyle of doctors, including eating habits and found that 59.3% of Sudanese doctors did not think they followed a healthy diet, with 55% not having three meals per day.

### 1.2.2 Cigarette smoking

Sotiropoulus et al (26) studying Greek doctors found that 38.6% of the participants smoked, and that surgeons, anaesthetists and registrars were more likely to

smoke. Furthermore, the study concluded that doctors who had never smoked were more likely to advise their patients who smoked to stop (26).

Moyvsusyan et al (27) looked at the smoking behaviour of Armenian doctors and nurses, and found that 31.2% of doctors compared with 6.6% nurses were smokers. Doctors who smoked did not perceive themselves as role models for their patients, although a large number of them were well aware of the health effects of smoking (27).

Doll et al (28) examined the mortality rate of British doctors in relation to smoking and the findings suggested that, in addition to the high risk of dying from smoking related diseases, doctors who smoke had a negative influence on health promotion. Some specific regions seem to have a lower percentage of doctors smoking (20, 29). Frank and Segura (20) found that only 8% of doctors in Canada were smokers, 6% smoked occasionally and 87% did not smoke. Guazzelli et al (29) established that 8.6% of Brazilian doctors were smokers, 27% former smokers and 64.5% non-smokers.

### 1.2.3 Alcohol use

Obadeji et al (30) studied the use of alcohol amongst doctors in Nigeria, and found that 69.7% were abstainers, 23% moderate drinkers and 7.3% heavy drinkers. There was no significant difference between the years of practice, field of speciality and heavy alcohol drinking (30).

Rosta (31) investigated alcohol use amongst German doctors and revealed that 9.5% of the participants were non-drinkers, 70.7% were moderate drinkers and 19.8% were heavy drinkers. Additionally, male doctors and consultants were found to be at most risk of heavy drinking (31).

Wada et al (32) found that 31.4% of male Japanese doctors were drinking alcohol everyday compared to 11.9% of their female counterparts, and the use of alcohol increased with age. Borgan et al (18) revealed that 98% of doctors in Bahrain were non-alcohol drinkers,1.3% previously used to drink alcohol and 0.7% currently

drank alcohol.

## 1.3 General and preventative health

General health, vaccination, sick leave and screening will be discussed in this section.

### 1.3.1 General health

Frank et al (33) studied the physical and general health status of doctors in British Columbia, showing that 69% were in excellent to very good health, 23% in good health and 8% in fair to poor health. Frank and Segura (20) investigated the health practices of Canadian doctors and found that 66% had excellent general health, 26% were in good health and 9% had fair to poor health. Elbagari et al (25) looked at the lifestyle of Sudanese doctors and the results showed that 6% were in excellent general health, 52% in good health and 41% in fair to poor health.

### 1.3.2 Vaccinations

Influenza and hepatitis vaccinations are briefly discussed.

#### Influenza vaccination

Influenza is a potentially serious respiratory illness with significant morbidity and mortality, especially in the hospital setting (34). Healthcare workers are often exposed to the virus, either during an encounter with an infected patient at work, or in the community, putting them at a higher risk for contracting this virus. It has been estimated that up to 23% of healthcare workers contract influenza during any given season, especially in the acute hospital setting (34).

Healthcare workers may transmit the virus to patients under their care, including those who are at high risk of developing serious complications from influenza, such as the elderly, young children and those with chronic underlying medical conditions (35). The tendency by healthcare workers of continuing to work despite being ill exacerbates the spread of this infection (36).

It is vital to prevent influenza transmission in hospitals through vaccination of healthcare workers, given the virus' virulence (34). Yearly immunisation of healthcare workers is regarded as an effective method of preventing influenza infection (37). It is also suggested that healthcare workers should be offered free vaccination, with an option to decline based on religious, medical or philosophical grounds (37).

The influenza vaccination is considered to be between 70 – 90% effective in healthy persons under 65 years of age (38). Ali et al (39) studied influenza awareness and vaccination amongst doctors in Peshawar, Pakistan and showed that 18% had been vaccinated in the past 6 – 12 months. Wodi et al (40) investigated influenza vaccination uptake rates among registrars and found it to be 38.3%.

**Hepatitis**

Healthcare workers are at risk of bloodborne infections, especially hepatitis due to the nature of their occupation (41). All healthcare workers are recommended to vaccinate against this virus. After vaccination serology testing is recommended every six months (41).

Fritzsche et al (42) studied hepatitis screening amongst healthcare workers and found that 23.6% were screened for hepatitis B virus, 16% screened for hepatitis C virus and 12.3% had received vaccine against hepatitis B virus. Screening was higher amongst doctors and laboratory technicians (42).

Bekeles and Tadesse (43) studied hepatitis B virus vaccination rate amongst surgeons working in Ethiopia, and found that only 23.5% had been vaccinated. Reasons given for not using the vaccine were lack of information about the availability of the vaccine and lack of time to get vaccinated (43).

Yasobant et al (44) investigated the knowledge and vaccination status of hepatitis B virus amongst doctors working in Gurajat, India and found that 46.4% were vaccinated against this virus, another 26.8% only received the initial dose and failed to finish the recommended dosages due to lack of time or lack of interest (44).

### 1.3.3 Sick leave

Sick leave is seen as a good measure of a workforces' wellbeing and it often reflects stress management, behaviour risks and the general health of employees (45). Doctors sometimes tend to deny their own illness and only seek help when they think their condition is serious (46). Rosvolt and Bjertness (47) showed that doctors take few sick days, report to work even when they have an infectious disease or serious illness (47). This is supported by Khalila et al (48) who showed that 37% of the doctors in their study in Israel reported to work with an illness.

## 1.4 Screening for lifestyle diseases

### 1.4.1 Screening in general

One of the benefits that can be attained through screening for lifestyle diseases is the reduction of morbidity and mortality in the population being screened (49). This ensures that detection of diseases can be early, providing a platform for participants to change unhealthy habits, seek counselling and/or early treatment which may result in a cure, thus improving overall health outcomes. In general, screening programs have faced criticism from a number of stakeholders who challenged the cost effectiveness. It is further stated that screening may produce false outcomes, resulting in overtreatment that may eventually not only increase short term but also long term health care costs (49).

Conducting screening tests amongst healthcare workers can be beneficial in preventing disease in this group, changing attitudes and behaviour that can positively influence their ability to participate in health promotion (3). Due to the nature of their work environment, it is assumed that doctors have easy access to screening and medical facilities, compared to the general population (50). However, the extent to which healthcare workers take part in screening tests in a personal capacity is unclear (51). Pelega et al (3) studied the use of screening tests amongst family doctors and found that although 59.4% believed that these tests were important, only 27.5% had previously performed screening tests.

The screening tests that will be discussed in this section include physical

examination, blood pressure, lipid disorder, breast examination, mammogram, cervical cancer screening and prostate cancer screening.

### 1.4.2 Physical screening

Frank et al's (33) study on physical and general health status of doctors in British Columbia showed that 65% had had a physical screening test in the previous two years. Another study by Frank and Segura (20) found that 61% of Canadian doctors had a physical screening in the past two years.

### 1.4.3 Blood pressure screening

Due to the nature of their work, health care providers may be exposed to severe physical and mental stress (52). This exposure may put them at risk of developing hypertension (53). The United States Preventative Service Task Force recommends blood pressure screening every 3 – 5 years for adults between the age of 18 – 39 years and annual screening for those aged 40 years and older or at increased risk for hypertension (54). Ramachandran et al (55) compared the cardiometabolic risk factors amongst doctors in India with the general population of similar age. The authors found that 35.6% of these doctors to have hypertension compared to 27% of participants of similar age in the general population (55).

According to the study performed by Ghosh et al (56), which investigated the prevalence of hypertension and prehypertension amongst doctors at a tertiary hospital in India, 14.8% of their participants had hypertension and 60.5% had prehypertension. Smoking, positive family history and high BMI were found to be associates with the development of hypertension amongst the participants (56).

Frank et al (57) studied health related behaviour, including blood pressure screening amongst female doctors and compared this to females in the United States of America general population. The results showed that more than 96.5% of doctors compared to 99.3% of the general population females had had their blood pressure screened in the previous two years. McCall and Piterman (58) studied

the preventative health behaviours of doctors in Victoria, Australia and found that 93% had blood pressure screening in the previous three years.

In Israel Pelega et al (3) found that in terms of blood pressure screening, doctors in the Negev region were compliant regarding monitoring their own blood pressure, with 61.6% of doctors having checked their blood pressure within the last year, and 82.6% having measured their blood pressure within the previous two years.

### 1.4.4 Lipid disorder screening

The United States Preventative Service Task Force recommends routine screening for lipid disorder every 3 – 5 years in men aged 35 years or older, and women 45 years or older. They additionally recommend lipid disorder screening from age 20 years in men and women with an increased risk for coronary heart disease (59).

McCall and Piterman (58) found that 64% of the doctors had lipid disorder screening in the previous three years. Frank et al (33) found that 74% of doctors in British Colombia had lipid disorder screening in the previous three years. Pelega et al (3) found that 81.2% of doctors in Israel had their cholesterol level measured in the previous year. Gupta et al (50), focusing on registrars' preventative health behaviour in India, noted that 68% had lipid disorder screening in the previous year.

### 1.4.5 Breast cancer screening

The 2018 predicted global incidence of breast cancer is 11.6% and approximately 2.1 million diagnoses is estimated globally for 2018 (60). Breast cancer diagnoses is increasing in the developing world, and amongst the many contributing factors are: increased life expectancy, urbanisation and westernisation (61). Screening tools that are used to detect early stages of breast cancer include breast self-examination, clinical breast examination and mammography. Breast self-examination, although controversial, is a cheap and non-invasive screening tool (62).

Kadivar et al (63) compared screening behaviour of female doctors and non-healthcare women in Iran. The results of this study showed that 37.6% of doctors compared to 26.1% of non-healthcare women perform breast self-examination. Amongst women above 40 years of age, 31.3% of doctors compared to 27.6% of non-healthcare women had had a clinician breast examination in the previous year. Furthermore, 18.8% of doctors compared to 17.2% of non-healthcare women underwent a mammogram (63).

### 1.4.6 Cervical cancer screening

Cervical cancer is the fourth most commonly diagnosed cancer amongst women worldwide (60). Screening is a crucial step in the management of this disease (64), therefore regular PAP smear testing is recommended in order to detect it in the early stages (65). Vaccination against human papilloma virus, is available, and is recommended for adolescent girls aged 10 – 26 years (66).

Ferdous et al (67) looked at the attitude and practice of cervical cancer screening amongst female doctors in Bangladesh. The results revealed that although 40.9% of the doctors had a good knowledge about cervical cancer and the screening methods, 80.8% had not been screened. Reasons given for not doing cervical cancer screening included that they were not asked by anyone to do it, fear of embarrassment and anxiety about the results. Amongst those who were screened, almost all were referred by another doctor (67).

Jagun et al (68) studied the uptake of cervical cancer screening amongst female doctors in Nigeria and found that 39.8% of participants had been screened, of which 30.1% had been screened in the past three years. Can et al (69) evaluated the awareness of cervical cancer amongst female primary healthcare midwives, nurses and doctors in two southern cities in Turkey and showed that 67% had never had PAP smear testing.

### 1.4.7 Prostate cancer screening

Prostate cancer is the second most common cancer in men worldwide (60).

However, it is noted that the challenge for most men is that they are unwilling to ask for help or acquire more information about prostate cancer and as a result detection may be delayed until the late stages of the disease (70). Mortality rates can be reduced through the use of two main screening tools, namely prostate specific antigen (PSA) testing and direct rectal examination (71). The male population likely to benefit from screening are men between the ages of 50 – 70 who are at average risk, and men older than 45 years of age who are at increased risk (72).

The question is whether the abovementioned challenge for example the reluctance to ask for help and acquire more information is similar amongst male doctors. A study performed by Chan et al (73) on male doctors own personal prostate cancer screening revealed that 87% of male doctors, 50 years and above, had previously been screened. Further, more urologists than non-urologists had undergone screening (73). Wallis et al (74) studied prostate screening amongst specialist doctors in Canada and noted that 61% of participants had had PSA screening and 82% were planning to do so in the future.

Bourne (70) looked at the knowledge, attitudes and practices towards prostate cancer screening amongst healthcare profesional in Jamaica. The study found that 71.2 % of the participants were aware of prostate cancer but only 27.1% had undergone screening (70).

## 1.5 Physical activity

As discussed in Section 2.1, healthcare workers influence the patients that they treat, and society at large (11). The healthcare worker is an important “instrument” in reducing the level of physical inactivity in the general population (75). Additionally, it is recommended that doctors give patients advice regarding the importance of physical activity. However, despite the benefits of physical activity, studies show decreased physical activity amongst healthcare workers, including doctors (21, 76, 77).

Wada (76) studied lifestyle habits of doctors in Japan and showed that 72.6% of female doctors and 59.9% of male doctors had reduced levels of physical activity when compared to the recommended guidelines. Borgan et al (18) reported that 29.6% of doctors engaged in physical activity for more than 30 minutes per week and 13% of the latter were engaging more than five days per week.

Williams et al (77) performed a study at the University of Missouri, Columbia, which explored physical activity amongst registrars and family doctors. Results showed that only 6.9% of registrars exercised for more than 150 minutes per week compared with 18.4% for family doctors. The study attributed this to registrars having insufficient time, variable schedules, lack of equipment and facilities that are far away from their working environment. Family doctors reported age related diseases and the sedentary nature of their work as barriers to engaging in physical activity (77).

Biernat et al (78), in Warsaw, demonstrated that 10.9% of males healthcare workers and 13.5% of females healthcare workers engaged in deliberate physical activity. This study identified not taking part in any sport activities, being overweight and working as a doctor as being independent risk factors for physical inactivity. In 2004 Gupta and Fan (75) demonstrated, in two United Kingdom hospitals, that only 21% junior doctors engaged in physical activity.

Findings of the abovementioned studies are comparable with studies performed in South Africa (21, 79). According to Skaal and Pengpid (21), 25% of healthcare workers engaged in planned physical activity, with the majority being males under 40 years of age. Kunene and Taukobong (79), in KwaZulu Natal, found that 31% of healthcare workers were participating in high levels of physical activity, 29% moderate and 40% low.

Physical activity barriers are grouped into intra-personal, inter-personal, environmental and organisational (80). Some of the intra-personal barriers were identified as lack of motivation, lack of self-efficacy, health and physical status (e.g. comorbid illness and movement limitation) and cultural issues (i.e.

conforming to cultural norms). Inter-personal barriers identified were lack of support at home, unsupportive employer, working over-time, loneliness and other extra-curricular activities. Environmental barriers include the weather, unsafe areas for exercise and lack of recreational parks. Organisational barriers identified were financial cost of memberships in fitness centres and location of the fitness centre (80).

### 1.5.1 Benefits of physical activity

The benefits of physical activity are grouped into cardiovascular, respiratory, central nervous system, endocrine, immunity, musculoskeletal, cancer and all-cause mortality, and will be discussed briefly.

Regular physical activity has been shown to increase cardiovascular capacity and decreases myocardial oxygen demand in healthy and unhealthy subjects (81). Physical activity reduces the sympathetic nervous system outflow, reducing the circulating catecholamines through a process that involves neurohumoral and structural adaptation (82).

During moderate intensity physical activity, total ventilation and oxygen consumption increases linearly with increase in work rate (83). Physical activity increases the diaphragm and skeletal muscle oxidative and antioxidant capacity, thus causing a reduction in muscle and diaphragmatic fatigue (84).

Research done in rats suggests that physical activity can increase neurones which are responsible for many functions in the central nervous system (85). Exercise is associated with improved neurogenesis, improved learning, increased brain function and promotes brain plasticity (86). Physical exercise improves memory (both long and short term) and cognition (87).

Moderate intensity physical activity and cardiovascular exercise have been shown to be protective against the development of type 2 diabetes mellitus (88). It is suggested that both aerobic and anaerobic exercise are associated with improved glycaemic control (89). Mustelin et al (90) demonstrated that individuals with a

genetic predisposition to obesity can benefit from physical exercise, as it can decrease body weight by increasing the energy expenditure, decreasing the loss of muscle bulk and increasing metabolic rate (90). Cells taking part in immunity namely, T-cells, natural killer cells and neutrophils were found to have increased during acute moderate to high intensity exercise (91). Following very high intensity exercise, a decrease in lymphocytes is associated with decreased inflammatory activity in patients with coronary artery disease (92). Bell et al (93) demonstrated, that physical activity is associated with an increased level of osteocalcin, serum 1,25 hydroxyvitamin D and urinary cyclic AMP; all associated with bone mass density.

Physically active people have a significant reduction in colon cancer compared to their sedentary counterparts, although the mechanism is not entirely clear but suggestions are that it changes gastrointestinal transit time, prostaglandins level and insulin like growth factor (94). There is a 6% reduction in mortality risk in physically active patients diagnosed with breast cancer (95). The dose-response relationship between physical activity and all-cause mortality revealed an inverse relationship between physical activity and all-cause mortality rate (96). The same study showed that adherence to current physical activity guidelines is associated with a significant reduction in risk of all-cause mortality. Leitzmann et al (97) showed that attaining moderate physical activity can lead to a 27% decrease in the all-cause risk of mortality.

### 1.5.2 Assessment of physical activity

There are various assessments instruments to measure physical activity of people. The measurements consist of active and passive assessments.

#### 1.5.2.1 Active assessment of physical activity

Active measures include $VO_2$ max, motion sensors, clinical exercise tests, and heart rate monitors. $VO_2$ max is the maximum oxygen that the body can consume during intense exercise, which is usually expressed in ml/kg/min (98). Direct

measurement of oxygen consumption is considered the gold standard for measuring aerobic exercise capacity and fitness (99).

Motion sensors are devices used to measure vibration or acceleration of a structure, and give information on real-time estimates of the frequency, intensity and duration of physical activity (100). There are various submaximal exercise tests such as the Queens College test, Young Men's Christian Association step test and Harvard step tests (101). These tests differ in terms of stepping platform height, test duration, number of stages and the scoring system, and are used to estimate the maximum oxygen uptake (101).

Heart rate monitors, such as polar monitors are instruments used to measure moment-to-moment heart rate (102). They are designed for measuring the heart rate during exercise and consists of a transmitter and a receiver. The transmitter is usually attached to the chest and the receiver to the wrist. The receiver receives information from the transmitter and stores the information that can be downloaded to a computer (102).

Technological innovations, such as smart phones and smart watches provides an opportunity to monitor physical activity through the incorporation of accelerometer sensors (103). In addition to accelometer in this devices, they have gyroscopes, magnetometer, barometer and altimeter to better estimate physical activity (103).

#### 1.5.2.2 Passive assessment of physical activity

Passive measures commonly used to asses physical activity include the International Physical Activity Questionnaire (IPAQ), the Trans-theoretical Model of Behavioural Change and the Global Physical Activity Questionnaire (GPAQ) (104), and will be briefly discussed .

**International Physical Activity Questionnaire**

The IPAQ was created between in 1999 by the International Consensus Group, with the aim of acquiring a self-report tool to measure the level of physical activity across countries (104). This questionnaire consists of four parts, covering physical

activity at work, during household tasks, sedentary time and during recreation and sport (105).

The IPAQ questionnaire has two different reference times, either the last seven days or recall of a normal week of physical activity (104). Furthermore, IPAQ was tested in both developing and developed countries and demonstrated acceptable reliability and validity across countries (105).

The long version and short version of IPAQ produced repeatable data. Comparing the long and the short IPAQ, the long version produces higher estimates of physical activity. The short IPAQ has been shown to be the more appropriate for use in large scale surveys (105).

**Trans-theoretical Model of Health Behavioural Change**

The Trans-theoretical Model of Health Behaviour Change has been commonly used in smoking cessation, originating from 300 theories of psychotherapy theories validated by Proschka et al (106). The Trans-theoretical Model involves graduating through five stages of motivational readiness, namely precontemplation, contemplation, preparation, action and maintenance (107).

**Global Physical Activity Questionnaire**

The GPAQ was developed by the World Health Organization as part of an approach to chronic disease risk factor surveillance, assessing physical activity, especially in developing countries (108). GPAQ requires information on physical activity and sedentary behaviour, using 16 questions and covering three domains, namely activity at work, transport and leisure time. The work and recreational domains assess the frequency and time spend at different physical activity levels, requiring moderate and vigorous intensity activity. The travel domain is assessed by questions studying the frequency and duration of walking and cycling as a means of transport. Sedentary time spent is also studied in this questionnaire (108).

GPAQ consist of two versions, the second version will be used in this study due to

concerns of length and the need for a trained interviewer when using the first version (109). A moderate level of agreement exists between the GPAQ and accelerometry regarding moderate to vigorous physical activity (110). GPAQ shows a moderate to strong positive correlation with IPAQ (109).

Metabolic equivalents of task (MET) defines the intensity of physical activity. One MET is the amount of oxygen utilised at rest, and is equivalent 3.5 ml/kg/minute (111). GPAQ data uses MET to analyse results, whereas total energy spent is estimated based on the time, frequency and intensity of specific physical activities in one week (112). When calculating physical activity for GPAQ analysis, moderate intensity physical activity is assigned a value of four METs and vigorous intensity physical activity is equivalent to eight METs. The MET scores are calculated separately for individual domains and added together as the total physical activity level. The latter is categorised into three criteria, namely low, moderate and high (112).

Hamrick et al (113) studied physical activity amongst the general population in the Czech Republic using GPAQ and the results showed that 32.3% had low level of physical activity, 21.3% had moderate level and 46.4% had a high level of physical activity according to MET-minutes per week. Men and younger participants were associated had higher levels of physical activity than women and older participants (113).

Wattanapist et al (114) investigated physical activity amongst medical student in southern Thailand using GPAQ and found that 49.5% were physical active. The preclinical medical students had a higher level of physical activity, with a mean of 720 MET-minutes per week compared with clinical students of 370 MET-minutes per week. Male participants had a higher physical activity level compared to females (114).

Kunene and Taukobong (79), in KwaZulu Natal, found that 31% of healthcare workers were participating in high levels of physical activity, with MET- minutes per week of ≥ 3000, 29% were moderate, with MET-minutes per week ≥ 600; and 40% were low, with MET-minutes per week < 600. The results further showed that

physiotherapist, paramedics had a high level of physical activity when compared with doctors, nurses and radiographers. Physical acivity decreased with increasing age (79).

Patra et al (115) studied physical activity amongst doctors in Trivandrum, South India and found that 36.7% of females doctors and 38.4% of male doctors had a moderate level of physical activity. The mean physical activity level of female doctors was 498 MET-minutes per week and for male doctors was 440, which falls under the low level of activity. The mean sedentary time was eight hours (115).

Banday et al (116) looked at physical activity amongst doctors in Saudi Arabia and results showed that 20.9% had high level of physical activity, 44.3% had moderate level, 25.4% had low levels and 9.4% were living a sedentary lifestyle. Kadri et al (19) studied physical activity and counselling practice of Estonian doctors and results showed that 34% had a high level of physical activity and 59% a moderate level.

## 1.6 Summary

In this chapter, the literature review on health habits and screening was presented with a focus on healthcare workers and specifically doctors. Furthermore, the health benefits of physical activity and its assessment was discussed.

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## Section 2: Author's guidelines

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All articles should include an abstract. The structured abstract for an Original Research article should be between 200 and 230 words and should consist of four paragraphs labeled Background, Methods, Results, and Conclusions. It should briefly describe the problem or issue being addressed in the study, how the study was performed, the major results, and what the authors conclude from these results. The abstracts for other types of articles should be no longer than 230 words and need not follow the structured abstract format.

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## Acknowledgements

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Cite references in numerical order in the text, in superscript format (Format> Font> Click superscript). Please do not use brackets or do not use the foot note function of MS Word.

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## The following are sample references:

1. Jun BC, Song SW, Park CS, Lee DH, Cho KJ, Cho JH. The analysis of maxillary sinus aeration according to aging process: volume assessment by 3-

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## Section 3: Draft article

# Health habits and physical activity level of anaesthetists in an academic department

Mampana Mogolongwane Norah, MBBCh, DA (SA)

Eduard Oosthuizen, MBChB, M Med (Anaes)

Helen Perrie, MSc

Juan Scibante, PhD

Department of Anaesthesiology, School of Clinical Medicine, Faculty of Health Sciences, University of the Witwatersrand

**Corresponding Author**

Dr M.N Mampana

Department of Anaesthesiology

Charlotte Maxeke Johannesburg Academic

6 Jubilee Rd, Parktown, Johannesburg

2196

eshler@yahoo.com

011 488 4911

**Keywords:** Health habits, physical activity, anaesthetists, screening, GPAQ

## Abstract

### Background

Information of doctors' physical health is limited. The aim of this study is to describe the health habits and physical activity level of anaesthetists working in the Department of Anaesthesiology at the University of the Witwatersrand.

### Methods

A prospective, descriptive and contextual research design was followed. Using convenience sampling, a self-administered, anonymous, questionnaire consisting of three sections: demographics, health habits and physical activity was distributed. The physical activity section consisted of the World Health Organization's Global Physical Activity Questionnaire (GPAQ).

### Results

A total of 152 questionnaires were distributed and a148 (97.4%) were returned. Of the anaesthetists 82.4% rated their general health as good to excellent and 56.1% had taken sick leave in the previous year. Amongst anaesthetists, 30.8% were overweight and 12.6% were obese and 48% ate a healthy diet. Of anaesthetists, 82.4% have never smoked. In the previous two years 42.2% of female anaesthetists had had a clinical breast examination. An adequate level of physical activity as recommended by the GPAQ was obtained by 74.3% of anaesthetists.

### Conclusion

This study has shown that health habits of anaesthetists are variable and that three quarter of anaesthetists engaged in an adequate level of physical activity. There is room for improvement which may contribute to the personal and professional well-being of anaesthetists.

## Introduction

Non-communicable diseases account for 38 million deaths each year worldwide (1). Almost three quarters of these deaths occur in low and middle-income countries (1). Bad health habits such as smoking, alcohol consumption, unhealthy diets and sedentary lifestyle have been well documented as risk factors for non-communicable diseases (1, 2). This is a concern especially in the South African population, as the majority of the population have at least one of the modifiable risk factor for non-communicable diseases (3). Physical inactivity increases the risk of non-communicable disease and decreases life expectancy (4).

Health professionals, by the nature of their work, are expected to have more knowledge than the lay population regarding the benefits of a healthy lifestyle and the risks associated with an unhealthy lifestyle (5). They are also considered as role models for society and are expected to lead by example (6). According to Markwell and Wainer (7), doctors are a subgroup of healthcare workers who may be at greater risk of poor health habits due to the high pressured nature of their work, some do not prioritise their own health and feel pressured not to miss work because of ill health. It is further said that doctors tend to be unwilling to admit being ill or that they are not coping with the demands of their own career. Doctors' health is a major problem for healthcare systems, and information about doctors' health is limited (8).

The major aspects of wellbeing are the physical,social and psychological components (9). There have been studies which focus on psycho-social well-being of anaesthetists within the Department of Anaesthesiology at the University of the Witwatersrand (Wits), one looked at burnout amongst anaesthetists (10), and another at the occupational stress and coping strategies of registrars working within the department (11). Physical well-being of anaesthetists in the Department of Anaesthesiology at Wits is unknown. The aim of this study is to describe the health habits and physical activity level of anaesthetists working in the department.

## Methods

The study was prospective, descriptive and contextual. Approval to conduct the study was obtained from the Wits Human Research Ethical Committee (Medical).

The population in this study consisted of anaesthetists working in the Department of Anaesthesiology at Wits.

The sample size was realised by the response rate. Questionnaires were distributed to the entire accessible population (N=208). A minimum response rate of 60% (n=130) was considered acceptable (12). Convenience sampling was used. All anaesthetists below the age of 65 and younger who were present at departmental academic meetings were invited to participate. Interns rotating through the department were excluded.

A self-administered, anonymous, questionnaire consisting of three section was used to collect data. Section 1 requested participants' demographics. Section 2 was based on a study by Frank et al (13) assessing 13 health habits of Canadian physicians. Section 3 consisted of Global Physical Activity Questionnaire, version 2 (GPAQ). This questionnaire was developed by the World Health Organisation (WHO) stepwise global surveillance system (14). It consists of 16 questions designed to evaluate physical activity in a typical week in the following domains: activity at work, travel to and from places and recreational activities. Sedentary behaviour was also documented. The questionnaire is freely available for download at WHO website (15) and was found to be valid and reliable (14). The GPAQ categorise physical activity as high, moderate and low and uses metabolic equivalent of task (METS) to express intensity of physical activity. Adequate level of physical activity in this study is regarded as 600 MET-minute per week or more.

One author (NM) was present during data collection to address any queries. Returned questionnaires implied consent. The anaesthetists folded completed questionnaires and placed them in a sealed box, to ensure anonymity and confidentiality.

Data were entered into a Microsoft Excel® spreadsheet and analysed using numbers and percentages. Data were cleaned for calculation of physical activity according to GPAQ quidelines (15). Fishers Exact and $Chi^2$ tests were used for comparison between categorical groups, with the level of statistically significance set at $\leq 0.05$.

## Results

There were 208 anaesthetists in the department at the time of the study. One hundred and fifty-two questionnaires were handed out, of which 4 were returned blank. The 148 completed questionnaires represented a 97.4% sample realisation and 71.2% of the anaesthetists in the department.

The demographics of the anaesthetists are shown in Table I

**Table I: Demographics of anaesthetists**

| Demographics | | Number (n) | Percentage (%) |
|---|---|---|---|
| **Age in years** | 20 – 29 | 25 | 16.9 |
| | 30 – 39 | 101 | 68.2 |
| | 40 – 49 | 10 | 6.8 |
| | 50 – 59 | 7 | 4.7 |
| | 60 – 65 | 5 | 3.4 |
| **Sex** | Male | 58 | 39.2 |
| | Female | 90 | 60.8 |
| **Professional designation** | Medical officer | 25 | 16.9 |
| | Registrar | 68 | 46.0 |
| | Consultant | 55 | 37.2 |

Of the anaesthetists, 122 (82.4%) rated their general health as good to excellent. The anaesthetists rating of their general health is shown in Figure 1.

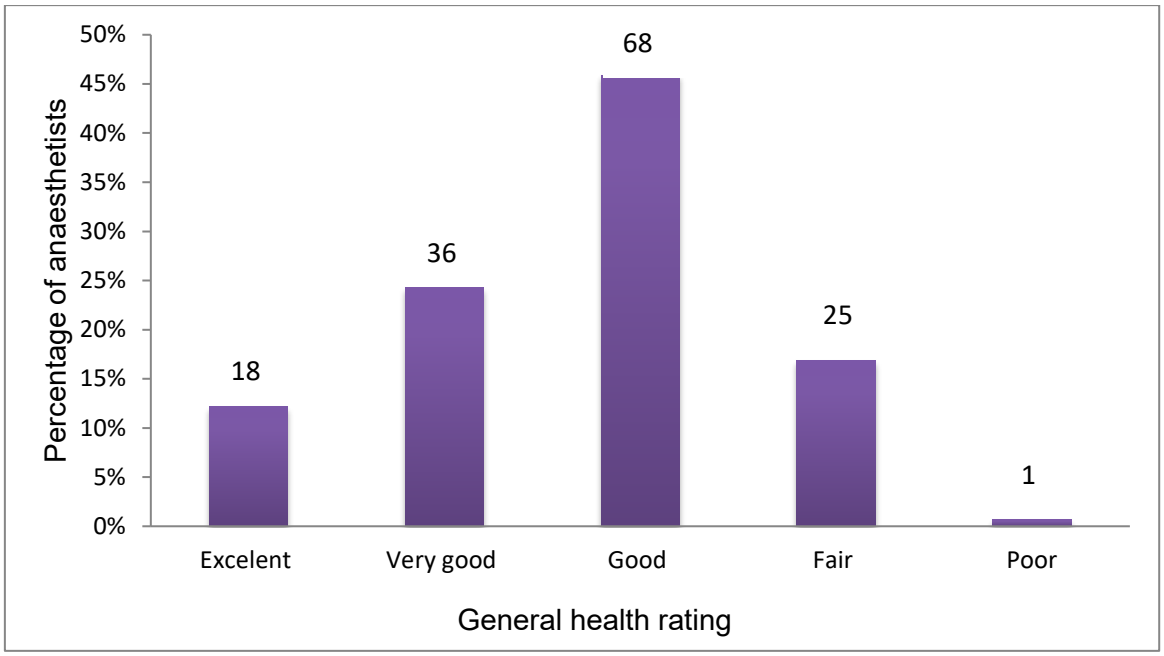


**Figure 1: Anaesthetists rating of their general health**

Sick leave had been taken by 83 (56.1%) anaesthetists in the previous year with 31 (20.9%) taking one day, 26 (17.6%) taking two days and a further 26 (17.6%) taking more than two days.

The BMIs of 143 (96.6%) anaesthetists were recorded. Of those, 81 (56.6%) had a BMI of less than 25, 44 (30.8%) had a BMI of between 25 – 30, and 18 (12.6%) anaesthetists had a BMI of more than 30. Regarding diet, 83 (56.5%) anaesthetists stated that they ate three meals a day. Seventy-one (48%) anaesthetists agreed that they ate a healthy diet, 52 (35.1%) were neutral, 25 (16.9%) disagreed.

The health habits of the anaesthetists are shown in Table II. The number of anaesthetists answering each question is shown and percentages are worked out accordingly.

**Table II: Health habits of anaesthetists**

| Health habits | | Anaesthetists | |
|---|---|---|---|
| | | Number (n) | Percentage (%) |
| **Smoking n = 148** | Daily | 6 | 4.1 |
| | Occasionally | 4 | 2.7 |
| | Not at all | 122 | 82.4 |
| | Previous smoker | 16 | 10.8 |
| **Alcohol intake n = 147** | Never | 37 | 25.2 |
| | Once a month | 47 | 32.0 |
| | Once a week | 35 | 23.8 |
| | 2 – 3 times/week | 21 | 14.3 |
| | 4 – 6 times/week | 7 | 4.8 |
| | Missing data | 1 | 0.7 |
| **Last physical check-up n = 148** | ≤ 2 year ago | 74 | 50.0 |
| | >2 year ago | 42 | 28.4 |
| | Never | 32 | 21.6 |
| **Last BP check-up n = 148** | ≤ 2 year ago | 122 | 82.4 |
| | >2 year ago | 21 | 14.2 |
| | Never | 5 | 3.4 |
| **Last cholesterol measurements n = 148** | ≤ 2 year ago | 103 | 69,6 |
| | >2 year ago | 19 | 12.8 |
| | Never | 26 | 17.6 |
| **Last influenza vaccine n = 148** | ≤ 2 year ago | 59 | 39.9 |
| | >2 year ago | 25 | 16.9 |
| | Never | 64 | 43.2 |
| **Last breast examination n = 90** | ≤ 2 year ago | 38 | 42.2 |
| | >2 year ago | 17 | 18.9 |
| | Never | 35 | 38.9 |
| **Last mammogram n = 12** | ≤ 2 year ago | 6 | 6.7 |
| | >2 year ago | 3 | 3.3 |
| | Never | 3 | 3.3 |
| | Missing data | 78 | 86.7 |
| **Last PAP Smear n = 90** | ≤ 2 year ago | 52 | 57.8 |
| | >2 year ago | 26 | 28.9 |
| | Never | 12 | 13.3 |
| **Last PSA level n = 10** | ≤ 2 year ago | 8 | 13.8 |
| | >2 year ago | 2 | 3.5 |
| | Never | 0 | 0 |
| | Missing data | 48 | 82.8 |

All 148 anaesthetists filled in the GPAQ. Of these 110 (74.3%) had an adequate level of physical activity being ≥ 600 MET-minute per week.

The physical activity level of anaesthetists is shown in Table III.

**Table III: Physical activity level of anaesthetists**

| Physical activity level | Anaesthetists | |
|---|---|---|
| | Number (n) | Percentage (%) |
| **High** | 82 | 55.4 |
| **Moderate** | 28 | 18.9 |
| **Low** | 38 | 25.7 |

The comparison of health habits to age and sex are shown in Table IV. The only statistically significant difference was for the physical check-up between males and females with more females having physical check-up within the last two years (0.0004).

**Table IV: Comparison of health habits to age and sex**

| Health Habits | Age | | | Sex | | |
|---|---|---|---|---|---|---|
| | < 40 years n (%) | ≥ 40years n (%) | P value | Male n (%) | Female n (%) | P value |
| Smoking | 9 (7.1) | 1 (4.5) | 1.000 | 6 (10.3) | 4 (4.4) | 0.1906 |
| Alcohol intake >1 week | 21 (16.8) | 7 (31.8) | 0.1370 | 9 (15.8) | 19 (21.1) | 0.5199 |
| Last physical check up (≤ 2 yrs) | 66 (52.4) | 8 (36.4) | 0.2476 | 18 (31.0) | 56 (62.2) | 0.0004 |
| Last blood pressure check-up (≤ 2 yrs) | 106 (84.1) | 16 (72.7) | 0.2249 | 45 (77.6) | 65 (72.2) | 0.5642 |
| Last cholesterol measurement (≤ 2 yrs) | 90 (71.4) | 13 (59.1) | 0.3148 | 37 (63.8) | 66 (73.3) | 0.2724 |
| Last influenza Vaccination (≤ 2 yrs) | 50 (39.7) | 9 (40.9) | 1.000 | 25 (43.1) | 34 (37.8) | 0.6064 |

The comparison of physical activity level to age and sex are shown in Table V. No statistically significant differences were found.

**Table V: Comparison of physical activity to age and sex**

| **Physical activity level** | Age in years | | | Sex | | |
|---|---|---|---|---|---|---|
| | < 40 n (%) | ≥ 40 n (%) | P value | Male n (%) | Female n (%) | P value |
| **High** | 74 (58.7) | 8 (36.4) | 0.1140 | 32 (55.2) | 50 (55.6) | 0.3024 |
| **Moderate** | 21 (16.2) | 7 (31.80) | | 8 (13.80) | 20 (22.2) | |
| **Low** | 31 (24.6) | 7 (31.8) | | 18 (31.0) | 20 (22.4) | |

**Discussion**

Of the anaesthetists in this study, 82.4% rated their general health as good to excellent. This is similar to Frank et al (16) in British Columbia and Frank and Segura (13) in Canada, where 92% of the doctors in both studies rated their general health as good to excellent. In contrast, in the study by Elbagari et al (17), only 58% of Sudanese doctors rated their general health as good to excellent.

In terms of BMI, in this study 30.8% of anaesthetists were overweight and 12.6% were obese, which is similar to Kadri et al (18) with 28% of Estonian doctors being overweight and 9% obese. Although similar to Alshareef et al's (19) study in Saudi Arabia, who found that 36.9% of the doctors were overweight, the incidence of obesity was higher (26.3%) in their study. Further, 56.5% of anaesthetists in this study stated that they ate three meals a day and 48% agreed that they ate a healthy diet. This is higher than Elbagari et al (17), where 44.4% of the doctors ate three meals per day and 40.7% saying that their diet was healthy. The prevalence of overweight and obesity in this study is concerning as it is associated with numerous non-communicable diseases such as diabetes and hypertension (20). Doctors are expected to promote healthy lifestyles including maintaining a normal weight, as they are regarded as "tools" for health promotion (19).

In this study 82.4% of anaesthetists had never smoked, which is similar to Frank and Segura (13), with 87% of the doctors being non-smokers. Guazzelli et al (21)

in Brazil, however found that only 64.5% of the doctors in their study were non-smokers. In this study 6.8% of anaesthetists still smoke, although it is a small percentage, the aim should be to decrease this number as smoking is associated with the high risk of mortality from smoking related diseases and doctors are expected to be role model for society (22).

The results showed that 50% of anaesthetists in this study had a physical check-up within the previous two years. This is lower than in a study by Frank et al (16), where 65% of doctors had had a physical check-up in the previous two years and Frank and Segura (13), where 61% had a physical check-up within this time frame. In this study, 85.1% of the anaesthetists were under the age of 40 years, compared to Frank et al (16) and Frank and Segura (13), with 29% and 43% respectively of their doctors younger than 45 years of age. Chronic diseases have been shown to be common amongst the over 40 years of age (23), which may be why this study has less anaesthetists who had a physical check-up.

The anaesthetists in this study were conscientious with blood pressure screening, as 82% had had their blood pressure screened in the past two years. This is similar to Frank and Segura (13), with 84% of their respondent having measured their blood pressure within the past two years. Pelega et al (24) in Israel also had similar results at 82.6%. Frank et al (16) had 97% of their doctors checking their blood pressure in the previous two years. The guidelines of the United States Preventative Service Task Force recommend blood pressure screening every 3 – 5 years for adults who are at low risk (25).

Amongst the female anaesthetists, 42.4% had a clinical breast examination in the previous two years, which is comparable to Kadivar et al (26) with 31.3% female doctors in Iran. In this study 38.9% of female anaesthetists had never had a clinical breast examination. The low screening rate is concerning in this study as breast cancer is regarded as the most commonly diagnosed cancer in women in 154 out of 185 countries (27). Anaesthetists, due to their medical background are expected to know the importance of a clinical breast examination. The mammogram screening rate in this study was low (6.7%), which was possibly because 61.9% of female anaesthetists in this study were below the age of 40 years. The Cancer Society of South Africa (28) recommends mammogram

screening in low risk women annually from the age of 40 – 54 years, every two years for women aged 55 and older and every year for high risk women from the age of 30 years. Mammogram screening is not recommended for low risk women below the age of 40 due to their dense glandular breast tissue as well as the ionizing radiation hazard (29) and this might be the reason why mammogram screening rate is low in this study.

In this study, 17.3% of the male anaesthetists had a PSA level done in the previous four years, which is lower than the 87% and 61%, of male doctors in the respective studies by Chan et al (30) and Wallis et al (31). Of male anaesthetists in this study, 82.8% were below the age of 40 years, in contrast to the Chan et al (30) and Wallis et al (31) studies where the majority of doctors were older than 50 years. The United States Prevantative Task Force recommends that men at average risk between the ages of 50 – 70 years must perform PSA testing every two years, and men older than 45 years who are at moderate risk and those above 40 years at high risk annually (32). The majority of male anaesthetists in this study were below the age at which PSA testing is recommended, which is 40 years and above(32).

Of anaesthetists in this study 39.7% had an influenza vaccination in the past two years which is lower than Frank and Segura (13) with 85% of the doctors having had an influenza vaccine. This number is low, as healthcare workers are at an increased risk of contracting the influenza virus, as their day to day practice involves management of airways and respiratory systems of patients who maybe infected with the virus (33). Increasing the rate of vaccination should be encouraged. The influenza vaccine is recommended every year and is freely available for healthcare workers in Gauteng hospitals.

In this study, 55.4% of anesthetists had a high level of physical activity, 18.9% a moderate level and 25.7% had a low level of physical activity, this implies that 74.3% of anaesthetists had an adequate level of physical activity. Anaesthetists in this study had a higher level of physical activity compared to healthcare worker in Kunene and Taukobong (5). This study and Kunene and Taukobong (5) are similar in that both were done in South Africa and used the GPAQ to quantify the level of physical activity. The anaesthetists in this study scored higher in terms of high

level of activity, with Kunene and Taukobong (5) at 31%. The moderate level of physical activity was similar, with Kunene and Taukobong (5) at 29%. Forty percent of healthcare workers in Kunene and Taukobong (5) compared to 25.4% of anaesthetists had low level of physical activity. In Kunene and Taukobong (5), 83% of the healthcare workers were females while in our study 60.8% of anaesthetists were female. Male gender has been shown to engage more in physical activity (34) which might be the explanation of the difference. The limitation of the study was that physical activity was reported using a questionnaire and not assessed physically.

## Conclusion

This study has shown that health habits of anaesthetists are variable and that three quarter of anaesthetists engaged in an adequate level of physical activity. There is room for improvement which may contribute to the personal and professional well-being of anaesthetists.

## Conflict of interest

The authors declare that we have no financial or personal relationships which may have inappropriately influenced us in writing this paper.

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## Section 4: Proposal

# Health habits and physical activity level of anaesthetists in an academic department

**Mogolongwane Norah Mampana**

**A0036864**

| | |
|---|---|
| Supervisor | Prof Eddie Oosthuizen<br>Department of Anaesthesiology |
| Co-supervisor | Dr Catherine Hosking<br>Department of Anaesthesiology |
| Co-supervisor | Ms Helen Perrie<br>Department of Anaesthesiology |

## 4.1 Introduction

Non-communicable diseases account for 38 million deaths each year worldwide. (1). Almost three quarters of these deaths occur in low and middle-income countries (1). Bad health habits such as smoking, alcohol consumption, unhealthy diets, sedentary lifestyle have been well documented as risk factors for non-communicable disease (1, 2). This is a concern especially in the South African population, as the majority of the population have at least one of the modifiable risk factor for non-communicable disease (3).

The major components of wellbeing are social, psychological and physical status (4). Physical wellbeing will be discussed with focus on health habits and physical activity. Addressing poor health habits such as smoking, alcohol consumption, unbalanced diet with resultant obesity, physical inactivity and taking part in preventative health strategies are important in maintaining a healthy work-life balance (5). A study by Borgan et al (6) in Bahrain showed that amongst their studied doctors 25.5% had a high cholesterol, 20.3% hypertension, 39% were overweight and 33% were obese. In contrast, Frank et al (5) showed that more than 90% of Canadian doctors in their study are living a healthy lifestyle.

According to World Health Organisation, the recommended level of physical activity for adults between the age of 18 to 64 years is a minimum of 150 minutes of moderate intensity activity, or 75 minutes of vigorous intensity aerobic physical activity per week or a combination of both moderate and vigorous intensity physical activity. The aerobic physical activity should be performed in sessions of at least 10 minutes. (7)

Physical inactivity increases the risk factor of non-communicable disease and decreases life expectancy (8). Ideal cardiovascular health is regarded as the presence of ideal health behaviours such as not smoking, body mass index within normal ranges, physical activity at recommended levels, and ideal health factors such as total cholesterol, blood glucose and blood pressure within the normal ranges (9). Physical activity has been considered to be beneficial in reducing the morbidity and mortality associated with non-communicable diseases and improving the health status of individuals (10).

Health professionals, by the nature of their work, are expected to have more knowledge than the lay population regarding the benefits of a healthy lifestyle and the risks associated with an unhealthy lifestyle (11). They are also considered as the role models to society and are expected to lead by example (12). According to Markwell and Wainer (13), doctors are a subgroup of healthcare workers who may be at greater risk of poor health habits due to the high pressured nature of their work, some do not prioritise their own health and feel pressured not to miss shifts because of ill health. It is further said that doctors tend to be unwilling to admit illness and accept that they are not coping with the demands of their own career.

Despite the benefits of physical activity, studies show that there is a decreased level of physical activity amongst healthcare workers (14, 15). Biernat et al (14) showed a decreased level of physical activity amongst healthcare workers in Warsaw including medical doctors, nurses, and other medical personnel. This was supported in a study by Gupta et al (15), determining the amount of exercise done by junior doctors in two hospital in the United Kingdom and discovered that only 21% met the Department of Health recommendation for physical activity. A study done in South Africa by Kunene et al (11) amongst healthcare workers using the Global Physical Activity Questionnaire (GPAQ) found that 40% of participants had low levels of physical activity. This study was supported by Skaal et al (12) at University of Limpopo, who found that only 25% of their healthcare workers engaged in physical activity, the majority of who were males and under 40 years of age.

The primary purpose of health screening is to reduce morbidity and mortality, by early detection and treatment of a disease (16). Regular testing and measuring of blood glucose, blood pressure, serum cholesterol, Papanicolaou (PAP) smear and prostate specific antigen (PSA) are some of the recommended screening tests (17). Factors such as occupation, education level and cultural background are associated with the degree of participation in regular screening tests, and a high level of participation in health screening is highly recommended (16).

There are various assessments tools which can be used to evaluate physical activity levels such as GPAQ questionnaire. This questionnaire consists of 16 self-reported questions designed to estimate an individual’s level of physical activity in

three domains and sedentary behaviour. The three domains are activity at work, transport and recreational (18).

## 4.2 Problem statement

Doctors' health is a major problem for healthcare systems, and information about doctors' health is limited (19). Despite all the benefits that one can get from physical activity, there are studies that show that there is a low level of physical activity amongst health care workers compared to general population (12, 14, 15).

It is recommended that doctors advise their patients regarding the importance of physical activity, and it is also important for them to practice what they advise their patients (15). They act as role models in the society and part of their responsibility is to actively promote health, and counsel their patients on a healthy lifestyle (20).

As mentioned, the major aspects of wellbeing are the physical, social, and psychological component. There have been studies which focus on psychological well-being of anaesthetist within Department of Anaesthesiology at the University of Witwatersrand (Wits), one looked at burnout amongst anaesthetist (21), and another one which is not published looked at the occupational stress and coping strategies of registrars working within the department (22). Physical wellbeing of anaesthetists in the Department of Anaesthesiology at Wits is unknown.

### 4.2.1 Aim

The aim of this study is to describe the health habits and physical activity level of anaesthetists working in an academic department.

### 4.2.2 Objectives

The primary objectives of this study are to describe:

- anaesthetists health habits
- physical activity levels anaesthetists.

The secondary objectives of this study are to compare demographic variables to:

- health habits
- physical activity level.

## 4.3 Research assumptions

The following definitions will be used in the study.

**Anaesthetist:** a qualified doctor working in the Department of Anaesthesiology including medical officers, registrars and consultants.

**Medical officer:** a qualified doctor working under specialist supervision in the Department of Anaesthesiology. Medical officers with more than 10 years' experience are career medical officers and are regarded as consultants.

**Registrar:** a qualified doctor who is registered with the Health Professionals Council of South Africa as a trainee anaesthetist.

**Consultant:** a qualified doctor who has met the criteria to become a specialist anaesthetist. Career medical officers are included in this group.

**Health habits:** behaviours that benefit one's physical health status. These will include body mass index, smoking, alcohol use, influenza vaccine, diet, screening tests such as cholesterol level, breast, mammogram, PAP smear and PSA level.

**Global Physical Activity Questionnaire**: was developed by the World Health Organisation for physical activity surveillance in different countries. It is used to gather information on physical activity in three domains namely; activity at work, travel to and from places and recreational activities as well as sedentary behaviour (23). The GPAQ was developed for face to face interviews but has been modified for use as a self-administered questionnaire in this study. The validated GPAQ version 2 will be used (24).

**Metabolic equivalent of task (MET):** is "the ratio of a person's working metabolic rate relative to the resting metabolic rate. One MET is defined as the energy cost of sitting quietly, and is equivalent to a caloric consumption of 1 kcal/kg/hour." (25). This can be calculated by weighting each type of activity by its energy requirement which then produces a score in MET-minutes. The formula used for scoring is:

> MET-minutes per week= MET value x minutes of activity per day x days of activity per week.

**Adequate level of physical activity**: is regarded as 600 MET-minutes per week (25).

## 4.4 Demarcation of study field

The study will be conducted in the Department of Anaesthesiology, affiliated to the Faculty of Health Science at Wits. The staff complement of the department is 74 consultants, 112 registrars and 22 medical officers. The following hospitals are affiliated to Wits:

- Charlotte Maxeke Johannesburg Academic Hospital: a 1 200 bed central hospital with 23 operating theatres doing approximately 23 000 theatre cases per year
- Chris Hani Baragwanath Academic Hospital: a 2 888 bed central hospital with 25 operating theatres doing approximately 65 000 theatre cases per year.
- Helen Joseph Hospital: a 500 bed tertiary hospital with seven operating theatres doing approximately 6 000 theatre cases per year
- Rahima Moosa Mother and Child Hospital: a 338 bed tertiary hospital with five operating theatres doing approximately 6 700 theatre cases per year

## 4.5 Ethical considerations

The proposal for this study will be submitted for approval to the Human Research Ethics Committee (Medical) and the Graduate Studies Committee at Wits.

The study will be explained to anaesthetists at departmental academic meetings and they will be invited to participate. Those who agree will be given a participant information letter (Appendix 1) and a self-administered questionnaire (Appendix 2). Return of the questionnaire will imply consent.

Anonymity and confidentiality will be maintained in the study. Data will be collected without any identifying information and will be returned into sealed boxes marked “returned questionnaires”. A study number will be allocated to each questionnaire in order to determine the response rate. Only the researcher and the supervisors will have access to the raw data, thereby ensuring confidentiality.

If there is any anaesthetist who is concerned about their physical wellness and screening, they can contact the Department of Anaesthesiology Wellness Committee. The phone numbers of the committee members are readily available in the department.

The raw data will be stored securely for six years after completion of the study.

The study will be conducted according to the principles of the Declaration of Helsinki (26) and the South African Guidelines for Good Clinical Practice (27).

## 4.6 Methodology

### 4.6.1 Research design

The study design is prospective, descriptive and contextual.

Prospective studies are described by Brink et al. (28) as those in which “data about a presumed cause are first collected, and then the effect or outcome is measured.” This study is prospective as data will be collected at the time the study takes place.

According to Brink et al. (28) a descriptive study is one that is designed to add more knowledge about characteristics within a particular field of study without trying to find a causal link. This study will describe the health habits and physical activity of anaesthetists working in the Department of Anaesthesiology.

De Vos et al. (29) describes context as “small scale worlds” which include “gangs, hospital wards, public drinking places, school classrooms” etc. This study is contextual as it will be conducted amongst anaesthetists working in the Department of Anaesthesiology.

### 4.6.2 Study population

The population in this study consists of anaesthetists working in the academic Department of Anaesthesiology.

### 4.6.3 Study sample

#### Sample size

The sample size will be realised by the response rate. Questionnaires will be administrated to the entire accessible population (N=208). A minimum response rate of 60% (n=130) will be considered acceptable (30).

#### Sampling method

In this study convenience sampling will be used. This sampling method uses the most readily accessible individuals (31). All anaesthetists working in the Department of Anaesthesiology will be invited to take part in the study.

### 4.6.4 Inclusion and exclusion criteria

The inclusion criteria for this study are:

- all anaesthetists present at departmental academic meetings
- complete questionnaires
- partially complete questionnaires
- blank questionnaires (to calculate the response rate).

The exclusion criteria in this study are:

- anaesthetists above the age of 65
- interns working in the department.

### 4.6.5 Collection of data

#### Questionnaire

A self-administered, anonymous, questionnaire was chosen for data collection as it is “inexpensive in terms of money and time”, allows collection of data from many people over a relatively short period of time and allows for anonymity which could encourage participants to provide honest answers (28).

The questionnaire for this study consists of three sections:

Section 1: Demographics.

The following data is requested from the participants:

- age group
- gender
- professional designation

Section 2: Health habits.

This part of the questionnaire is based on a study by Frank et al (5) assessing health practices of Canadian physicians (5). Information regarding body mass index, smoking, alcohol use, general health status, doctors check-up, blood pressure check-up, cholesterol level, influenza vaccine, breast examination by clinician, mammogram, PAP smear and PSA level, diet and number of days on sick leave taken in the last year is requested. In the original Canadian study, no overall score was given for health practices, each item was scored descriptively, using numbers and percentages. The same will be done in this study

Section 3: Global Physical Activity Questionnaire, version 2.

This questionnaire was developed by the World Health Organisation stepwise global surveillance system (32). It consists of 16 questions designed to evaluate physical activity over time in the following domains:

- activity at work
- travel to and from places
- recreational activities.

Sedentary behaviour is also documented. The questionnaire has been found to be valid and reliable (32). The GPAQ was developed for face to face interviews but has been modified for use as a self-administered questionnaire in this study. The questionnaire is freely available for download at WHO website (25).

**GPAQ scoring:** the questionnaire can be scored as a categorical or continuous indicator. As a categorical variable, physical activity is scored as high, moderate or low and as a continuous variable the score is reported in MET-minutes. The

scoring is shown in Table 3.1 (32). An analysis guide for this questionnaire is available on the WHO website (25).

**Table 3.1 GPAQ scoring (25)**

| Category | Criteria |
|---|---|
| High | Vigorous-intensity activity on ≥ 3 d·wk$^{-1}$ and accumulating at least 1,500 MET-min·wk$^{-1}$ |
| | Or ≥ 7 days of any combination of walking, moderate-intensity, or vigorous-intensity activities achieving ≥3,000 MET-min·wk$^{-1}$ |
| Moderate | ≥ 3 d·wk$^{-1}$ of vigorous-intensity activity totaling 60 minutes |
| | Or ≥ 5 d·wk$^{-1}$ of moderate-intensity activity of ≥ 150 minutes |
| | Or ≥ 5 d·wk$^{-1}$ of any combination of walking, moderate-intensity, or vigorous-intensity activities achieving ≥600 total MET-min·wk$^{-1}$ |
| Low | Does not meet the criteria for the moderate or high |

**METS** can be calculated by weighting each type of activity by its energy requirement which then produces a score in MET-minutes. To analyse the GPAQ "it is estimated that, compared to sitting quietly, a person's caloric consumption is four times as high when being moderately active, and eight times as high when being vigorously active." Moderate activity is therefore assigned 4.0 METs and vigorous activity, 8.0 METs (25).

### Data collection process

Permission will be obtained from the relevant authorities prior to commencing data collection. The researcher will request permission to address departmental academic meetings and invite anaesthetists to participate in the study. Those who volunteer to participate will be given an information letter (Appendix 1) and a questionnaire (Appendix 2) to complete. The researcher will be present during data collection to address any queries. Participants will return questionnaires to the sealed "returned questionnaires" box.

### 4.6.6 Data analysis

Data will be entered onto a Microsoft Excel® spreadsheet and analysed using STATISTICA, version 12, in consultation with a biostatistician. Descriptive and inferential statistics will be used. Categorical variables will be described using frequencies and percentages and continuous variables using means and standard deviations or medians and inter quartile ranges. Comparison between categorical variables will be made using Chi-square tests and continuous variables will be compared using independent t-tests or Mann-Whitney tests depending on the distribution of the data. A p value of $<0.05$ will be considered statistically significant.

## 4.7 Significance of the study

A healthy and balanced workforce is important as the employees may be less stressed, have better morale, better productivity and less absenteeism.

Doctors who practice healthy behaviour are more likely to monitor and modify patient health behaviour than the less healthy doctors (33). Therefore anaesthetists who are aware of their own health will more likely give health advice when doing anaesthetic visit. Regular participation in physical activity has many health benefits (34-36). The Department of Anaesthesiology may also benefit from this study as the anaesthetists will be better informed about their physical wellbeing and their health habits.

## 4.8 Validity and reliability of the study

Validity of a study is done to show whether the research conclusion is justified, this is based on the study design and interpretation. Reliability denotes the consistency of the measure achieved. Reliability and validity can enhance the rigour of a quantitative study. (37)

Validity and reliability in this study will be maintained by the following measures:

- using an appropriate study design

- using a questionnaire that consist of two validated questionnaire ( Frank et al al (5) and GPAQ (32)
- data will be collected by one researcher only
- every eighth data entry will be checked for accuracy
- data analysis will be done in consultation with a biostatistician.

## 4.9 Potential limitations

This study is contextual in nature, being done in the Department of Anaesthesiology at Wits, therefore results may not be generalisable to other departments of anaesthesiology (29).

Convenience sampling will be used in the study, which can result in bias as certain elements may be over or under represented (29).

Further bias is that people who are unfit may not want to take part in this study.

## 4.10 Project outline

### 4.10.1 Time frame

| Activity | July 2016 | Aug 2016 | Sep 2016 | Dec 2016 | Jan 2017 | Mar 2017 | May 2017 | June 2018 | July 2018 | Jan 2019 | Feb 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Proposal preparation | | | | | | | | | | | |
| Literature review | | | | | | | | | | | |
| Proposal submission | | | | | | | | | | | |
| Ethics approval | | | | | | | | | | | |
| Postgraduate approval | | | | | | | | | | | |
| Data collection | | | | | | | | | | | |
| Data analysis | | | | | | | | | | | |
| Draft article | | | | | | | | | | | |
| Submission | | | | | | | | | | | |

### 4.10.2 Budget

| | Item | Number | Price for each | Total Amount |
|---|---|---|---|---|
| **Paper and printing** | Proposal | 800 | R1.00 | R1 200.00 |
| | MMED | 400 | | |
| **Binding** | MMED | 3 | R200.00 | R600.00 |
| | | | | R1 800.00 |

The Wits Department of Anaesthesiology will incur the costs of paper and printing.

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## 4.12 Appendices

## Appendix 1 Participants' information sheet

Dear colleague,

Hello, my name is Norah and I am a registrar in the Department of Anaesthesiology at Wits. I would like to invite you to participate in my research study entitled "Health habits and physical activity level of anaesthetists in an academic department". This study will be submitted to the Faculty of Health Sciences at the University of the Witwatersrand in partial fulfilment of the requirements of my M Med degree.

Doctors' lifestyle habits not only affect their own health but have also been suggested as important markers of how a country perceives harmful lifestyle behaviours. The WHO stated that one of the leading critical risk factors globally for life-style related non-communicable diseases is physical inactivity. I would like to describe the health habits and level of physical activity of anaesthetists working at Wits using a self-administered questionnaire, which should not take you more than 15 minutes to complete.

Participation in this study is voluntary and consent will be implied completion of the questionnaire. Please do not complete this questionnaire if you are older than 65. There is no penalty for not participating and you may withdraw from the study at any time. Information will be anonymous and confidential as no identifying data will be requested and only the researcher and supervisors will have access to the raw data. The numbering on the questionnaires is simply to determine the response not and can in no way be linked back to the participant. Please will you return all questionnaires, whether completed or not, into the returned questionnaire box.

It is not anticipated that any of the questions asked will cause you distress, however, should you feel distressed after participating in this study please contact The Department of Anaesthesiology's Wellness.

Thank you for taking the time to read this information letter. If you have any questions regarding this study please ask me as I will be available during the academic meeting or you can phone me on 072 569 5558. Professor Cleaton-Jones, chairman of the HREC, can also be reached for ethical queries regarding this study on 011 717 1234.

Please ensure that you understand the above information before completing the questionnaire.

Yours sincerely,

Norah Mampana

## Appendix 2: Questionnaire

# Health habits and physical activity level of anaesthetists in an academic department

**Please tick the appropriate box.**

## Section 1: Demographics

### 1.1 Age

| | |
|---|---|
| 20 – 29 years | |
| 30 – 39 years | |
| 40 – 49 years | |
| 50 – 59 years | |
| 60 – 65 years | |

### 1.2 Sex

| | |
|---|---|
| Male | |
| Female | |

### 1.3 Professional designation

| | |
|---|---|
| Medical officer | |
| Registrar time of ≤ 2 years | |
| Registrar time of ≥ 3 years | |
| Consultant/career medical officer | |

## Section 2: Health habits

### 2.1 What is your BMI?

| |
|---|
| Kg/$m^2$ |

### 2.2 Smoking

How often do you smoke?

| | |
|---|---|
| Daily | |
| Occasionally | |
| Not at all | |

If you are an ex-smoker, when did you stop smoking?

| | |
|---|---|
| <1 year ago | |
| 1 < 2 years ago | |
| 2 < 3 years ago | |
| 3 < 4years ago | |
| 4 < 5 years ago | |
| ≥ 5 | |

### 2.3 Alcohol

How often do you drink alcohol?

| | |
|---|---|
| Never | |
| Less than once a month | |
| Once a month | |
| 2 – 3 times a month | |
| Once a week | |
| 2 – 3 times a week | |
| 4 – 6 times a week | |
| Everyday | |

### 2.4 General health

How do you rate your general health status?

| | |
|---|---|
| Excellent | |
| Very good | |
| Good | |
| Fair | |
| Poor | |

### 2.5 Health screening

When last did you see a doctor for a physical check-up?

| | |
|---|---|
| <1 year ago | |
| 1 < 2 years ago | |
| 2 < 3 years ago | |
| 3 < 4years ago | |
| 4 < 5 years ago | |
| ≥ 5 | |
| never | |

When last did you have the following:

Blood pressure check-up?

| | |
|---|---|
| <1 year ago | |
| 1 < 2 years ago | |
| 2 < 3 years ago | |
| 3 < 4years ago | |
| 4 < 5 years ago | |
| ≥ 5 | |

Cholesterol measurements?

| | |
|---|---|
| <1 year ago | |
| 1 < 2 years ago | |
| 2 < 3 years ago | |
| 3 < 4years ago | |
| 4 < 5 years ago | |
| ≥ 5 | |
| never | |

An influenza vaccine?

| | |
|---|---|
| <1 year ago | |
| 1 < 2 years ago | |
| 2 < 3 years ago | |
| 3 < 4years ago | |
| 4 < 5 years ago | |
| ≥ 5 | |
| never | |

Breast (female) by medical practitioner?

| | |
|---|---|
| <1 year ago | |
| 1 < 2 years ago | |
| 2 < 3 years ago | |
| 3 < 4years ago | |
| 4 < 5 years ago | |
| ≥ 5 | |
| never | |

A pap smear for females?

| | |
|---|---|
| <1 year ago | |
| 1 < 2 years ago | |
| 2 < 3 years ago | |
| 3 < 4years ago | |
| 4 < 5 years ago | |
| ≥ 5 | |
| never | |

A mammogram for females over 40?

| | |
|---|---|
| <1 year ago | |
| 1 < 2 years ago | |
| 2 < 3 years ago | |
| 3 < 4years ago | |
| 4 < 5 years ago | |
| ≥ 5 | |
| never | |

A PSA for males over 40?

| | |
|---|---|
| <1 year ago | |
| 1 < 2 years ago | |
| 2 < 3 years ago | |
| 3 < 4years ago | |
| 4 < 5 years ago | |
| ≥ 5 | |
| never | |

**2.6 Diet**

Do you eat three meals a day?

| | |
|---|---|
| Yes | |
| No | |

Do you eat a healthy diet?

| | |
|---|---|
| Strongly agree | |
| Agree | |
| Neutral | |
| Disagree | |
| Strongly disagree | |

**2.7 Sick leave**

How many days of sick leave have you taken in the last year?

| |
|---|
| Day/s |

## Section 3: Global **Physical Activity Questionnaire (Version 2)**

| | **Physical Activity** | |
|---|---|---|
| | I am going to ask you about the time you spend doing different types of physical activity in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person. Think first about the time you spend doing work. Think of work as the things that you have to do such as paid or unpaid work, study/training, pushing hospital beds eg. to get patient from ward to theater, going up and downs stairs from one ward to another, going to and from bloodbank or to get blood results.<br><br>In answering the following questions **'vigorous-intensity** activities' are activities that require hard physical effort and cause large increases in breathing or heart rate, **'moderate-intensity** activities' are activities that require moderate physical effort and cause small increases in breathing or heart rate. | |
| **Q** | **Question** | **Response** |
| | **Work** | |
| 1 | Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like [pushing hospital beds, adult cardiopullmonary rescuscitation, running upstairs from one floor to another] for at least 10 minutes continuously? | Yes<br>No<br>If No, go to Q4. |
| 2 | In a typical week, on how many days do you do **vigorous-intensity** activities as part of your work? | Number of days_____ |
| 3 | How much time do you spend doing **vigorous-intensity** activities at work on a typical day? | Hours:minutes _____:____ |
| 4 | Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate such as brisk walking, running to and from bloodbank, tracing blood for at least 10 minutes continuously? | Yes<br>No<br>If No, go to Q7. |
| 5 | In a typical week, on how many days do you do **moderate-intensity** activities as part of your work? | Number of days_____ |
| 6 | How much time do you spend doing **moderate-intensity** activities at work on a typical day? | Hours:minutes _____:____ |
| | **Travel to and from places** | |
| | The next questions exclude the physical activities at work that you have already mentioned. Now I would like to ask you about the usual way you travel to and from places. For example to work, for shopping, to market, to place of worship. | |
| 7 | Do you walk or use a bicycle (pedal cycle) for at least 10 | Yes |

| | | |
|---|---|---|
| | minutes continuously to get to and from places? | No<br>If No, go to Q10. |
| 8 | In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places? | Number of days_____ |
| 9 | How much time do you spend walking or bicycling for travel on a typical day? | Hours:minutes _____:____ |
| | **Physical Activity, Continued** | |
| | **Question** | **Response** |
| | **Recreational activities** | |
| | The next questions exclude the work and transport activities that you have already mentioned.<br>Now I would like to ask you about sports, fitness and recreational activities (leisure), | |
| 10 | Do you do any **vigorous-intensity** sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like [running or football] for at least 10 minutes continuously? | Yes<br>No<br>If No, go to Q13. |
| 11 | In a typical week, on how many days do you do **vigorous-intensity** sports, fitness or recreational (leisure) activities? | Number of days _____ |
| 12 | How much time do you spend doing **vigorous-intensity** sports, fitness or recreational activities on a typical day? | Hours:minutes _____:____ |
| 13 | Do you do any **moderate-intensity** sports, fitness or recreational (leisure) activities that cause a small increase in breathing or heart rate such as brisk walking, [cycling, swimming, volleyball] for at least 10 minutes continuously? | Yes<br>No<br>If No, go to Q16. |
| 14 | In a typical week, on how many days do you do **moderate-intensity** sports, fitness or recreational (leisure) activities? | Number of days _____ |
| 15 | How much time do you spend doing **moderate-intensity** sports, fitness or recreational (leisure) activities on a typical day? | Hours:minutes _____:____ |
| | **Sedentary behaviour** | |
| | The following question is about sitting or reclining at work, at home, getting to and from places, or with friends including time spent sitting at a desk, sitting with friends, traveling in car, bus, train, reading, playing cards or watching television, but do not include time spent sleeping. | |
| 16 | How much time do you usually spend sitting or reclining on a typical day? | Hours:minutes _____:____ |

Thank you for completing this questionnaire.

# Section 5: Annexures

## 5.1 Ethics approval

R14/49 Mampana Mogolongwane Norah

**HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)**

**CLEARANCE CERTIFICATE NO. M161166**

| | |
|---|---|
| **NAME: (Principal Investigator)** | Mampana Mogolongwane Norah |
| **DEPARTMENT:** | Anaesthesiology<br>Chris Hani Baragwanath Academic Hospital<br>Charlotte Maxeke Johannesburg Academic Hospital<br>Rahima Moosa Mother and Child Hospital<br>Helen Joseph Hospital |
| **PROJECT TITLE:** | Health Habits and Physical Activity Level of Anaesthetists in an Academic Department |
| **DATE CONSIDERED:** | 25/11/2016 |
| **DECISION: CONDITIONS:** | Approved unconditionally |
| **SUPERVISOR:** | Prof Eddie Osthuizen |
| **APPROVED BY:** | Professor P Cleaton-Jones,Chairperson, HREC (Medical) |
| **DATE OF APPROVAL:** | 16/01/2017 |

**This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.**

**DECLARATION OF INVESTIGATORS**

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 301, Third Floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, Parktown, 2193. University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in November and will therefore be due in the month of November each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature Date

**PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES**

## 5.2 Graduate studies approval

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Private Bag 3 Wits, 2050
Fax: 027117172119
Tel: 02711 7172076

Reference: Mrs Sandra Benn
E-mail: sandra.benn@wits.ac.za

06 January 2017
Person No: 0007377M
PAG

Dr MN Mampana
P O Box 388
Marishane
1064
South Africa

Dear Dr Mampana

**Master of Medicine: Approval of Title**

We have pleasure in advising that your proposal entitled *Health habits and physical activity level of anaesthetists in an academic department* has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

## 5.3 Turnitin report

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG | FACULTY OF HEALTH SCIENCES

24th January, 2019

The Chairperson
Graduate Studies Committee
Faculty of Health Sciences
University of the Witwatersrand

Dear Madam,

**M Med: Health habits and physical activity level of anaesthetists in an academic department**

Dr Norah Mampana, student number: 0007377M, has submitted her research report to Turnitin which revealed a similarity index of 15%. These similarities appear not to be plagiarism but mainly the use of common terminology and phrases specific to the topic of the research.

Yours sincerely,

Eddie Oosthuizen
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Department of Anaesthesia

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