



UNIVERSITY  
OF  
JOHANNESBURG

## COPYRIGHT AND CITATION CONSIDERATIONS FOR THIS THESIS/ DISSERTATION



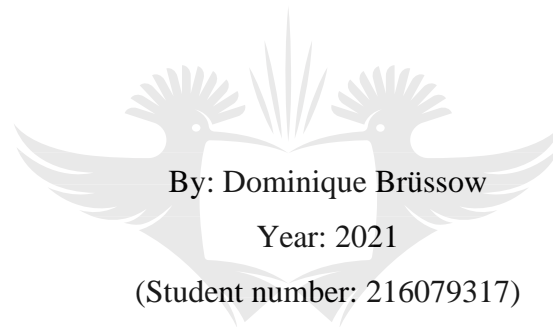
- Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.
- NonCommercial — You may not use the material for commercial purposes.
- ShareAlike — If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original.

### How to cite this thesis

Surname, Initial(s). (2012). Title of the thesis or dissertation (Doctoral Thesis / Master's Dissertation). Johannesburg: University of Johannesburg. Available from: <http://hdl.handle.net/102000/0002> (Accessed: 22 August 2017).

**PSYCHOLOGICAL RESPONSES DURING THE  
CORONAVIRUS DISEASE (COVID-19) PANDEMIC AMONG  
OPTOMETRY AND BIOKINETICS STUDENTS AT UJ**

A research dissertation presented to the Faculty of Health Sciences, University of  
Johannesburg, as partial fulfilment for the Masters of Health Sciences,  
Chiropractic by



By: Dominique Brüssow

Year: 2021

(Student number: 216079317)

UNIVERSITY  
OF  
JOHANNESBURG

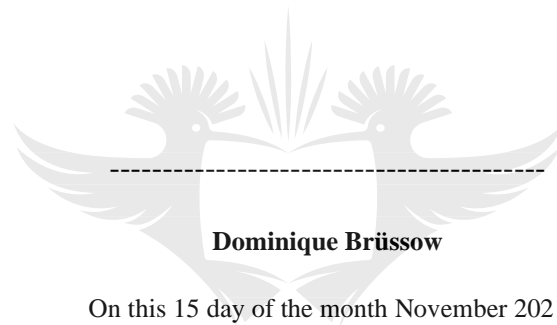
Supervisor: \_\_\_\_\_

Date: \_\_\_\_\_

Dr C. J. Hay

## **DECLARATION**

I, Dominique Brüssow, declare that this dissertation is my own unaided work. It is being submitted for a Masters of Health Sciences, Chiropractic, at the University of Johannesburg. It has not been submitted before for any degree or examination in any other Technikon or University.



**Dominique Brüssow**

On this 15 day of the month November 2021

UNIVERSITY  
OF  
JOHANNESBURG

## **DEDICATION**

To my parents, Herkules and Deirdré Brüssow, I would like to express my greatest appreciation and gratitude for your support, love, patience and encouragement throughout my studies. You have been the calm in the storm and the one certain thing throughout my studies and in the this ever changing and uncertain time. You have instilled qualities of hard work, patience, gratitude, humility and discipline in my life which will continue to aid me in my life to come.

To my sister Marguerite Brüssow, thank you for being my friend and my conscience and for always being on my side.

To Rev J.F. Landmann and Rev J. Wills, thank you for supporting me and keeping me in your prayers.

To Dr. Emeyn de Lange, thank you for introducing me to Chiropractic and setting me on a path that changed my life for good.



## **ACKNOWLEDGEMENTS**

**I would like to express my sincere appreciation to the following individuals:**

To my supervisor, Dr. C.J. Hay, thank you for all your guidance, support, advice, time and patience throughout my research process. It has been an honour working with you.

To my statistician, Ms. Jaclyn de Klerk, thank you for your assistance with my survey and the data analysis, it is greatly appreciated.

To all the participants who took the time to complete and participate in this research, thank you.

To all my family, friends and colleagues, thank you for the support and encouragement.



## **ABSTRACT**

### **Background**

There is a lack in sufficient knowledge concerning the psychological responses to the COVID-19 pandemic among Optometry and Biomechanics students at the University of Johannesburg.

### **Aim**

The aim of the study was to determine the psychological response of Optometry and Biokinetics students at the University of Johannesburg to the COVID-19 pandemic where the psychological responses under investigation were depression, anxiety and stress.

### **Research Methodology**

This was a cross sectional quantitative exploratory study using the Depression, Anxiety and Stress Scale (DASS-42) as an online questionnaire, with an additional demographic section, via the QuestionPro™ platform. It was distributed to the 317 Optometry and Biokinetics students (Optometry comprising of 200 and Biokinetics comprising of 117 students) at the University of Johannesburg. After the respective departments gave their permission to distribute the questionnaire and information documents electronically to the participants. Each participant was required to give consent before completing the questionnaire and take ten minutes to complete the questionnaire. Participants remained anonymous. The data was collected and analysed by the researcher with the assistance of the STATKON department at the University of Johannesburg.

### **Results and Discussion**

It was concluded in this study that on average, Optometry and Biokinetics students at the University of Johannesburg experienced ‘mild’ levels of depression and ‘moderate’ levels of anxiety and stress during the COVID-19 coronavirus pandemic. The method of measurement was the DASS severity rating scale. The data also showed that the senior students experienced statistically significant higher

levels of anxiety and stress compared to the junior students, and that students with financial difficulties had statistically significant higher levels of depression, anxiety and stress compared to students who did not experience financial difficulties. However, the levels of depression, anxiety and stress were still in the ‘mild’ and ‘moderate’ ranges irrespective of course, academic year, and financial situation.

### **Conclusion and Recommendations**

The results reflect that there was no psychological impairment of significance noted. However, regardless of an individual’s situation, mental health issues does affect all students to some degree, hence it is essential to promote mental health to preserve the well-being of students. Additional research is needed utilizing a larger sample size and possibly including students from other universities in South Africa as well to acquire better statistics.

### **Key Words:**

Coronavirus, Pandemic, Depression, Anxiety, Stress, COVID-19, Biokinetics students, Optometry students, Psychological.



## TABLE OF CONTENTS

<b>DECLARATION</b> .....	ii
<b>AFFIDAVIT</b> .....	iii
<b>DEDICATION</b> .....	iv
<b>ACKNOWLEDGEMENTS</b> .....	v
<b>ABSTRACT</b> .....	vi
<b>LIST OF FIGURES</b> .....	xi
<b>LIST OF TABLES</b> .....	xii
<b>LIST OF APPENDICES</b> .....	xiii
<b>CHAPTER ONE: INTRODUCTION</b> .....	1
1.1 Problem Statement.....	1
1.2 Aim.....	1
1.3 Possible Outcomes.....	2
<b>CHAPTER TWO: LITERATURE REVIEW</b> .....	3
2.1 Introduction.....	3
2.2 Psychological Responses to COVID-19.....	3
2.3 Optometry and Biokinetics Students.....	5
2.3.1 History of Optometry.....	5
2.3.2 History of Biokinetics.....	7
2.4 Education at the University of Johannesburg.....	8
2.4.1 Optometry education.....	8
2.4.2 Biokinetics education.....	10
2.5 Depression, Anxiety, and Stress.....	12
2.5.1 Depression.....	12
2.5.2 Anxiety.....	15
2.5.3 Stress.....	20
2.6 Depression, Anxiety & Stress Scale (DASS).....	22



2.7 Conclusion.....	23
<b>CHAPTER THREE: METHODOLOGY.....</b>	<b>24</b>
3.1 Introduction.....	24
3.2 Study Design.....	24
3.3 Participant Recruitment.....	24
3.4 Sample Selection Size.....	25
3.5 Inclusion Criteria.....	26
3.6 Exclusion Criteria.....	26
3.7 The DASS Questionnaire.....	26
3.8 Validity and Reliability.....	28
3.9 Internal Validity.....	28
3.10 Data Analysis.....	29
3.11 Ethical Considerations.....	29
<b>CHAPTER FOUR: RESULTS.....</b>	<b>31</b>
4.1 Introduction.....	31
4.2 The Sample.....	31
4.2.1 Age distribution.....	31
4.2.2 Gender distribution.....	32
4.2.3 Field of study.....	32
4.2.4 Academic year.....	32
4.2.5 Financial difficulties.....	32
4.2.6 Marital status.....	32
4.3 Results.....	34
4.3.1 DASS questionnaire responses.....	34
4.3.2 Summary of the results.....	40
4.3.3 Test for reliability.....	47
4.3.4 Depression Anxiety and Stress Scale (DASS) scoring instructions...	47
4.3.5 Descriptive statistics for depression, anxiety and stress.....	48
4.3.6 Frequencies for scoring categories.....	49
4.3.7 Tests for normality.....	51

4.3.8 Comparisons between groups.....	53
<b>CHAPTER FIVE: DISCUSSION.....</b>	<b>66</b>
5.1 Introduction.....	66
5.2 Response Rate.....	66
5.3 Research Question 1: What is the Psychological Effect Concerning Depression, Anxiety and Stress During the Coronavirus (COVID-19) Pandemic Among Optometry and Biomechanics Students at the University of Johannesburg?.....	67
5.4 Research Question 2: How Does Course, Academic Year and Financial Difficulties Effect the Level of Psychological Impact?.....	69
5.4.1 Course.....	69
5.4.2 Academic year.....	70
5.4.3 Financial difficulties.....	72
5.5 Research Question 3: How did the psychological responses of the students in these departments differ from each other with regards to COVID-19?.....	74
5.6 What Psychological Intervention Strategies Are Out There?.....	75
5.7 Summary.....	77
<b>CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS.....</b>	<b>78</b>
6.1 Introduction.....	78
6.2 Conclusion.....	78
6.3 Limitations.....	79
6.4 Recommendations for Future Studies.....	79
<b>REFERENCES.....</b>	<b>81</b>

## LIST OF FIGURES

Figure 4.1: Line graph demonstrating mean score for depression.....	59
Figure 4.2: Line graph demonstrating mean score for anxiety.....	60
Figure 4.3: Line graph demonstrating mean score for stress.....	61



## LIST OF TABLES

Table 3.1a: Number of Students in Biokinetics Course.....	25
Table 3.1b: Number of Students in Optometry Course.....	26
Table 4.1: Demographic data of study respondents.....;	32
Table 4.2: DASS Questionnaire Responses.....	34
Table 4.3: Depression Mean Score (Greatest to Smallest).....	40
Table 4.4: Anxiety Mean Scores (Greatest to Smallest).....	42
Table 4.5: Stress Mean Scores (Greatest to Smallest).....	45
Table 4.6: Reliability Analysis.....	47
Table 4.7: Scoring Key.....	48
Table 4.8: Descriptive Statistics for Depression, Anxiety and Stress.....	48
Table 4.9: Depression Category.....	49
Table 4.10: Anxiety Category.....	50
Table 4.11: Stress Category.....	50
Table 4.12: Normality Tests for Course.....	51
Table 4.13: Normality Tests for Juniors vs Seniors.....	52
Table 4.14: Normality Tests for Financial Difficulties.....	53
Table 4.15: Group Statistics.....	54
Table 4.16: Levene's Test for Equality of Variances.....	55
Table 4.17: T-test for Equality of Means.....	55
Table 4.18: Group Statistics.....	56
Table 4.19: Levene's Test for Equality of Variances.....	57
Table 4.20: T-Test for Equality of Means.....	57
Table 4.21: Financial difficulties statistics.....	58
Table 4.22: Test of Homogeneity of Variances.....	61
Table 4.23: Scheffe Table for Stress.....	62
Table 4.24: Dunnett T3 Table for Depression.....	63
Table 4.25: Dunnett T3 Table for Anxiety.....	64

## **LIST OF APPENDICES**

Appendix A: Optometry Curriculum

Appendix B: Biomechanics Curriculum

Appendix C: Permission Letter from Optometry HOD

Appendix D: Permission Letter from Biokinetics HOD

Appendix E: Permission Letter from Department of Research and Innovations

Appendix F: Information Letter

Appendix G: Consent Form

Appendix H: Questionnaire (Section A)

Appendix I: Questionnaire (Section B)

Appendix J: Thank You Page

Appendix K: DASS-42 Score Sheet

Appendix L: Research Ethics Committee Permission Letter

Appendix M: Higher Degree Committee Permission Letter

Appendix N: Turnitin Report



# **CHAPTER ONE: INTRODUCTION**

## **1.1 Problem Statement**

The coronavirus pandemic has affected the entire world. In March 2020, South Africa entered a national state of emergency and implemented the nation-wide lockdown. It became mandatory for tertiary education institutions to go into an early recess at the end of March 2020. People were restricted to their homes and only essential workers were allowed to work and travel. The economy crashed, businesses had to close down and many people were retrenched, losing their jobs. These events along with the fear of infection and the uncertainty of the future could have great psychological consequences. Only after more than 50 days in lock down was the country moved into a level 3 lock down during which one third of university students at the University of Johannesburg (UJ) were allowed to return to on-campus activities, while the rest of the students continued with online learning. These uncertainties related to the COVID-19 pandemic may perhaps trigger unnecessary psychological stressors to the public at large, but more specifically, students. Studies have been done regarding psychological stress to a variety of groups, such as medical students, nurses, and nursing students but according to current literature, no studies have been done involving the optometry students at UJ, nor the biokinetics students at UJ.

## **1.2 Aim of the Study**

The aim of the study was to determine the psychological response of Optometry and Biokinetics students at UJ to the COVID-19 pandemic where the psychological responses under investigation were depression, anxiety, and stress. The three proposed research questions this study intended to answer included:

1. What were the Optometry and Biokinetics students' psychological responses to the COVID-19 pandemic as a whole?
2. How did the psychological responses of the students in these departments differ from each other with regards to COVID-19?

3. Were there any differences in psychological responses identified by comparing various demographic variables?

### **1.3 Possible Outcomes**

The possible outcomes of this study could provide further insight into the psychological effects of stress, anxiety, and depression of the Optometry and Biokinetics students during the COVID-19 pandemic. So too, further insight could be gained regarding any differences between the two groupings regarding stress, anxiety, and depression.



## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

The aim of the literature review was to summarize previous research on this topic. This study investigated the psychological responses during the Coronavirus disease (COVID-19) pandemic among Optometry and Biokinetics students at UJ. The 2020 lockdown in South Africa due to the Corona virus pandemic has left many uncertainties about the future but also deprived human beings of social interaction. Social interaction has shown to be very beneficial not only for mental health but also for physical health (Quadt, Esposito, Critchley and Garfinkel, 2020). Many studies are being done during the pandemic to assess how certain groups of people are coping with the new world they find themselves in.

### **2.2 Psychological responses to COVID-19**

In a study published in China in March 2020 and investigated the immediate psychological responses and associated factors during the initial stage of the 2019 corona virus disease (COVID-19) epidemic among the general population in China using the DASS-21 questionnaire in a cross-sectional survey. It found that more the half of the participants rated their psychological response as moderate-severe and a third of the participants reported moderate-severe anxiety during the initial stages of the epidemic in the general Chinese population. Because of the time-sensitivity of this study, the sampling strategy used was not representative of the true general population and sampling was not strictly random. Some populations were overrepresented (e.g. students) and some were underrepresented (e.g. less educated population) creating selection bias (Wang, Pan, Wan, Tan, Xu, Ho and Ho, 2020).



In another study evaluating the mental situation of college students in China during the epidemic using a questionnaire comprising of the 7-item Generalized Anxiety Disorder Scale. The results showed that 0.9% of students reported severe anxiety, 2.7% moderate anxiety and 21.3% mild anxiety. Having a stable income, living in urban areas and living with parents were protective factors against anxiety. Anxiety was increased in situations where the participants' family members or acquaintances had contracted COVID-19. Social support was negatively correlated with anxiety levels. Delays in academic activities, economic effects and effects on daily life were positively associated with symptoms of anxiety (Cao, Fang, Hou, Han, Xu, Dong and Zheng, 2020).

In Greece, an online cross-sectional survey was used to determine the mental health impact on the first 1000 university students during the lockdown using the State-Trait Anxiety Inventory, the Center for Epidemiologic Studies Depression Scale and the Richmond Agitation Sedation Scale as a questionnaire. There was a 42.5% increase in anxiety, a 74.3% increase in depression and a 63.3% increase in suicidal thoughts during the lockdown period. Sleep quantity increased by 66.3% but the quality of sleep decreased by 43.0% (Kaparounaki, Patsali, Mousa, Papadopoulou, Papadopoulou and Fountoulakis, 2020).

In a cross-sectional study on the psychological impact of the COVID-19 outbreak and lockdown among Spanish university students and workers, 25% - 35% of participants reported symptoms of common mental health disorders. Students in the Engineering and Architecture field showed lower symptomatic scores than those in the Law, Arts, Humanities and Social Sciences. The DASS-21 was used to assess symptoms of depression, anxiety, and stress (Odriozola-González, Planchuelo-Gómez, Irurtia and de Luis-García, 2020).

In a large cross-sectional online survey, the prevalence of the symptoms of depression and anxiety along with the demands for psychological intervention and

knowledge in college students during COVID-19 was investigated using the Zung's Self-rating Scale and the Center for Epidemiologic Studies Depression Scale. In the cases where family members and relatives of the participants were suspected or confirmed to be infected with COVID-19, a higher risk of depression was noted. The literature indicates that there are some groups of people who are able to adjust to the lockdown regulations easier than others (Wang, Yang, Yang, Liu, Li, Zhang, Zhang, Shen, Chen, Song, Wang, Wu, Yang and Mao, 2020). None of these target a specific population but are broad representations of communities. No record was found of such studies being conducted among the South African community. There is a need for a study that targets a specific stratum i.e. Optometry or Biokinetics students and more specifically the differences between the different years of study.

### **2.3 Optometry and Biokinetics Students**

Optometry and Biokinetics are 4-year full-time courses, leading to a Bachelor's degree. Optometry and Biokinetics graduates are registered with the Health Professionals Council of South Africa (HPCSA). These courses have high workloads, which are already challenging under normal circumstances. When all universities were forced to lock down all campuses during the 2020 national lockdown, all learning was moved to an online platform, which may have put even more stress on the students, possibly causing increased levels of depression and anxiety (University of Johannesburg, 2020, 2021).

#### **2.3.1 History of Optometry**

The World Council of Optometry, the World Health Organization (WHO) and others, describe and define Optometry as an autonomous, educated, and regulated (licensed/registered) healthcare profession, where optometrists are the primary healthcare practitioners of the eye and visual system. Providing comprehensive eye

and vision care, which includes detection/diagnosis, refraction, dispensing, and management of disease in the eye and the rehabilitation of conditions of the visual system (World Council of Optometry, n.d.). The University of Johannesburg defines Optometrists as primary health care specialists who are accomplished in the examination of the eyes in order to identify defects in vision, indications of injury to the eyes, ocular disease or abnormalities and problems with general health (University of Johannesburg, 2020).

Optical science dates back thousands of years BC as suggested by the presence of lenses found for decoration in Greece and the Netherlands. The Greeks worked out the laws of reflection in mirrors although they did not understand the principles of refraction. They knew of the crystalline lenses in the eye but did not know about the retina and thought that rays of light came from the eyes. This myth existed until Leonardo da Vinci investigated the physics of light rays and established the role of the retina. Sir Joseph Needham reported the earliest mention of spectacles was in Venetian guild regulations circa 1300 (Needham, 2004).

The use and fitting of eyeglasses was first mentioned in the first complete book on opticians in 1623 by Benito Daza de Valdes. In 1827 the first spectacles to correct astigmatism was made in Ipswich in the United Kingdom by an optician named Fuller. John Isaac Hawkins introduced the terms bifocal and trifocal in London and also patented a trifocal. The development of optical lenses and spectacles is only one part of optometry. In 1864 Donders, a Dutch ophthalmologist and medical scientist described the nature of hypermetropia and presbyopia for the first time and showed how spectacles could be used for the rectification of a squint. The scope of practice of optometry has developed with an increasing emphasis on healthcare during the 20<sup>th</sup> century (Vidyasagar College of Optometry and Vision Science, 1998-2015).

### **2.3.2 History of Biokinetics**

According to the Biokinetics Association of South Africa (BASA), Biokinetics is the science of movement and the application of exercise in rehabilitative treatment of performance. Biokinetics primarily improves physical functioning and health care through exercise as a modality. It is concerned with the promotion of health, final phase rehabilitation and the maintenance of physical abilities by means of scientifically based physical activity programme prescription (BASA, 2021).

Biokinetics developed from the South African Physical Education Programme as a specialisation field and can be tracked back to the 1930's. Biokinetics did not create a new health care profession but it succeeds in an innovative application of existing knowledge. Biokinetics is rooted in the philosophy that exercise is medicine (Ellapen and Swanepoel, 2017).

In 1969 efforts were made to gain official recognition of a clinical exercise rehabilitative health profession at the University of Potchefstroom. In 1973 a formal letter requesting to include Kinesiotherapy, as it was known as then, onto a register of the South African Medical and Dental Council (SAMDC, later Health Professionals Council of South Africa or HPCSA) was drafted. Prof. Strydom continued various discussions with SAMDC until the profession of Biokinetics was officially announced in the South African Government Gazette as a health discipline in September 1983 (Ellapen and Swanepoel, 2017).

In October 1987, the South African Association of Biokinetics was created to govern the profession. Later the name of the association was changed to the Biokinetics association of South Africa (BASA) (Ellapen and Swanepoel, 2017).

There are currently 12 Biokinetics training institutions in South Africa. These are the University of Johannesburg, University of Pretoria, North-West University, University of Free State, University of Kwa-Zulu Natal, University of Zululand, Nelson Mandela Metropolitan University, University of Cape Town, University of Stellenbosch, University of Western Cape, Tshwane University of Technology and

the University of Venda. The new four-year professional degree allows biokinetics education and internship to begin early in the degree which improves the quantity and quality of exposure a biokineticist in training receives (Ellapen and Swanepoel, 2017).

## **2.4 Education at the University of Johannesburg**

### **2.4.1 Optometry Education**

#### *Purpose (University of Johannesburg, 2021)*

The Bachelor of Optometry is a full-time course that affords qualifying students the ability to:

1. Perform the visual examinations and the relevant procedures that are involved in the scope of Optometry, as specified by the Professional board of Optometry and Dispensing Opticians, as an optometrist in the clinical environment.
2. Independently relate diagnostic, promotive and treatment approaches in a cost effective way that is appropriate to community needs.
3. Practice critical optometric reasoning for holistic management approaches in prognosis and diagnosis.
4. Establish a foundation for life skills and research for lifetime learning.

#### *Outcome (University of Johannesburg, 2021)*

Competent Optometrists are able to:

1. Use competency in professional and clinical responsibilities to apply scientific optometry skills, allied and optical technologies to determine the accuracy of the prescription of eye care products to visually compromised persons.

2. Apply scientific optometric technologies and health care skills in the collaborative consultation of patient history while following the appropriate health and safety regulations, medico-legal ethics and codes of conduct.
3. Apply scientific optometric technologies and health care skills in the examination of eye and eye related conditions within the context of health services that are suitable to the needs of the public, while simultaneously following the appropriate health and safety regulations, medico-legal ethics and codes of conduct.
4. Interact consultatively in diagnosis and the proposed delivery and management of eye care therapy, medication and products to visually compromised persons, with the awareness of minimum standards of optometric care and incorporate self-reflective learning approaches during interactions.
5. Interact consultatively in the delivery and management of eye care therapy, medication and products to visually compromised persons, with the awareness of minimum standards of optometric care and incorporate self-reflective learning approaches during interactions.
6. Record and maintain secure, legible data and patient information while following the appropriate health and safety regulations, medico-legal ethics and codes of conduct stated in the patient charter.
7. Administer and manage technical, human and other resources to guarantee optimal prescription, diagnosis and delivery of visual and eye care services or products.
8. Continually advance the optometrically related service inside health care service by applying self-reflective learning strategies appropriate to the specific needs of the client/patient to guarantee professional contribution to the needs of the people.

### ***Pass requirements***

1. A student must pass all the modules set for the first academic year to advance to the second academic year in Optometry. The academic rules and

regulations of the University of Johannesburg should be read in combination with the additional conditions for the program.

2. A student will not be allowed to advance to the second year if they passed less than three modules unless they receive special permission from the Department of Optometry.
3. In order to retain their credits in Optometry 1 and Dispensing Optometry 1, students repeating part of their second year must attend all the practical sessions of the Optometry 1 and Dispensing 1 modules again.
4. In order to complete the program, all the modules must successfully be completed, and a research report must be submitted.
5. Diagnostic Drug Proficiency: To demonstrate their skill in the practical administration of diagnostic drugs and the use of related diagnostic instruments, all fourth year Optometry students must obtain a minimum of 75% for the proficiency examination.
6. It is compulsory for all 4<sup>th</sup> year Optometry students to complete a rotation on the PHELOPHEPA primary health care train.
7. The maximum duration of the Optometry program, discounting community service, is six years. Students must apply to the Health Professional Council of South Africa on graduating and after finalizing the possible community service for full registration (University of Johannesburg, 2021).

The Optometry curriculum can be found in Appendix A.

## **2.4.2 Biokinetics Education**

### ***Purpose***

The Bachelor of Biokinetics is a full-time course which serves as a foundation and core knowledge base whereby the procurement of professional abilities such as competence, skills, values and attitudes are guaranteed. Securing applied competence to act as a specialist health care professional, namely a Biokineticists,

should demonstrate to be the final product. Competent and qualified Biokineticists are able to operate in a range of settings, including the private and public sector and in both rural and urban areas. Biokineticists mainly use their professional expertise I exercise, health education and physical activity to promote and enhance the general health of an individual and more precisely to prevent dysfunction, maintain and restore an individual's compromised functional ability, especially in respect of orthopaedic injury and enduring disease states. The qualification provides a pool of well-qualified individuals whose competence is internationally accepted and who are able to execute specialised biokinetic health care services within any community setting to all economic segments. The professional qualification, namely Health Professional-Biokineticist, is separate from other qualifications in the health care profession as its primary focus is scientifically based prescriptive exercise in the four domains of practice (University of Johannesburg, 2020).

***Outcome (University of Johannesburg, 2020)***

Competent Biokineticists are able to:

1. Demonstrate competence, knowledge, skills and attitudes related to the structure and function of the human body systems.
2. Demonstrate competence, knowledge, skills and attitudes related to the psychosocial aspects of human performance and health.
3. Demonstrate competence, knowledge, skills and attitudes related to biomechanics.
4. Demonstrate competence, knowledge, skills and attitudes related to clinical exercise physiology for rehabilitation and exercise physiology.
5. Demonstrate specialised competence, knowledge, skills and attitudes related to human motor behaviour.
6. Demonstrate adequate competence, knowledge, skills and attitudes related to exercise science.
7. Plan and implement efficient and effective recreational and therapeutic programmes.



8. Apply specialised competence, knowledge, skills and attitudes related to health education, health promotion and health related aspects of physical activity and exercise in individual, community and work context.
9. Apply appropriate and relevant competence, knowledge, skills and attitudes related to the rehabilitation and prevention of musculo-skeletal injuries.
10. Apply relevant competence, knowledge, skills and attitudes in conducting scientific measurement and evaluation in the context of biokinetics.
11. Apply relevant competence, knowledge, skills and attitudes to the manage of disabilities and chronic disease.
12. Demonstrate competence of the research process and various methodologies as well as apply the relevant skills, knowledge and attitudes in conducting a research project on a topic related to biokinetics.
13. Manage a public or private biokinetics practice or health care facility.

### ***Pass Requirements***

Students must have passed a minimum of 60% of the modules in the previous year of study in order to be admitted to the next academic year of study (University of Johannesburg, 2020).

The Biokinetics curriculum can be found in Appendix B.

## **2.5 Depression, Anxiety and Stress**

### **2.5.1 Depression**

Depression has been categorised as having low levels of confidence, and enthusiasm, feeling disheartened in stressful situations and overall feeling down (Tran, Tran and Fisher, 2013). According to the American Psychiatric Association (2015), depression is a condition where the affected individual experiences hopelessness, emptiness, sadness and loss of interest in activities that used to give pleasure for the greatest part of the day. Depression can cause an array of emotional

and physical problems which may affect everyday life (American Psychiatric Association, 2015).

The symptoms of depression can range from mild to very severe and may include (American Psychiatric Association, 2020):

1. Feeling sad all the time or having a depressed mood
2. A loss of interest or pleasure in activities that were once enjoyed
3. Appetite changes like weight loss or weight gain that is unrelated to dieting.
4. Difficulty sleeping or sleeping too much
5. Increased fatigue or loss of energy
6. Increase in purposeless physical activity like pacing, handwringing and the inability to sit still or slowed movements or speech severe enough to be noticed by others
7. Feelings of worthlessness or guilt
8. Difficulty concentrating, decision making or thinking
9. Thoughts of suicide or death

These symptoms must last for at least two weeks and has to represent a change in the previous level of functioning of the individual for a diagnosis to be made. Other medical conditions like thyroid problems, brain tumours or vitamin deficiencies must also be considered and ruled out as they too can mimic symptoms of depression (American Psychiatric Association, 2020).

In any given year, one in 15 adults (6.7%) are estimated to be affected by depression and one in every six individuals (16.6%) will experience depression at least once during their lifetime. Although depression can occur at any age, it most commonly appears during the late teenage years to the mid-20's. Women are more likely than

men to experience depression. Some studies show that one third of women will experience a depressive episode in their lifetime. There is also a hereditary link to depression where 40% of individuals who have depression also have a first-degree relative like a parent, child or sibling with depression (American Psychiatric Association, 2020).

There are several factors which play a role in depression, namely: (American Psychiatric Association, 2020).

1. Biochemistry: Chemical imbalances in the brain may contribute to the symptoms of depression.
2. Environmental factors: Individuals who are continuously exposed to neglect, violence, poverty or abuse may be more vulnerable to depression.
3. Genetics: Depression may run in families like when one identical twin has depression, the other has a 70% chance of having depression sometime during their life.
4. Personality: Individuals with low self-esteem, who are easily overcome by stress, or who are generally pessimistic are more likely to experience depression.

Depression is one of the most treatable mental disorders. Between 80% and 90% of depression sufferers, eventually respond well to the treatment and nearly all gain some relief from the symptoms. A health professional will perform a complete diagnostic evaluation that will include a physical examination and in some cases a blood test to rule out vitamin deficiency or thyroid problems. The health professional will look to identify specific symptoms and explore medical and family history, cultural and environmental factors in order to get a diagnosis and to create a treatment plan (American Psychiatric Association, 2020).

Brain chemistry may contribute to an individual's depression and should be taken into consideration when planning treatment. Anti-depressants may be prescribed to

assist in correcting any imbalances in brain chemistry, which may be causing the depression symptoms. Anti-depressants may cause some improvement within the first couple of weeks, but the full benefits may only appear after two to three months. The health professional will monitor the patient during this time to identify which medication works best for the patient with the least amount of side effects and whether the anti-depressant needs to be substituted for another kind of medication. The patient will usually take the medication for six months or longer after the symptoms have improved and may be prescribed a long-term maintenance treatment protocol to reduce the chances of future episodes of depression, especially in high-risk individuals (American Psychiatric Association, 2020).

Psychotherapy may be the only treatment used to treat mild depression, however, for moderate and severe depression it is often accompanied by medication. Cognitive behavioural therapy (CBT) has proved to be an effective treatment for depression. CBT focuses on problem solving in the present and helps the individual to recognise distorted or negative thinking and change thoughts and behaviours to react to challenges in a more positive manner. Psychotherapy may involve only the individual or groups of people. Depending on the severity of depression, treatment may take a few weeks or much longer (American Psychiatric Association, 2020).

Depression symptoms can also be reduced by regular exercise, which will create a positive feeling and improve mood, getting enough good quality sleep, healthy diet and avoiding alcohol, which is a depressant (American Psychiatric Association, 2020).

### **2.5.2 Anxiety**

Increases in anxiety levels have shown to correlate with an increase in the levels of the release of glucocorticoids from the adrenal cortex and across the memory receptors in the brain. These hormones influence learning by affecting the physical

health of the individual, their cognitive ability, their decision making and their attention span (Wenjuan, Siqing and Xinqiao, 2020).

Anxiety has been categorized as a perception of concern or fear, uncertainty and uneasiness, usually related to dangers or chaotic incidents. Depression and anxiety both share numerous symptoms of negative effect despite the fact that they are two different conditions. Stress is categorised as a multi-dimensional phenomenon and is associated with the development of depression and anxiety (Long, Sun, Tseng, Huang and Chiang, 2015).

Normal everyday anxiety may include taking a test, facing a problem at work or making an important life decision, however, individuals with an anxiety disorder does not experience the anxiety temporarily and it may get worse over time to the point where it interferes with daily activities like their work, their studies, and their relationships. There are many types of anxiety disorders, the most notable being generalised anxiety disorder, panic disorder, and phobia-related disorders (The National Institute of Mental Health, 2018).

#### *Generalised Anxiety Disorder (GAD)*

Individuals with GAD will express excessive anxiety or worry on most days for at least six months regarding things such as health, social interactions, work, and routine life circumstances. This fear and anxiety may affect their lives significantly in terms of their social interactions, studies and work (The National Institute of Mental Health, 2018).

Individuals with GAD may experience: (The National Institute of Mental Health, 2018).

1. Restlessness, feeling wound-up, or on-edge
2. Fatigue

3. Difficulty concentrating
4. Irritability
5. Muscle tension
6. Difficulty regulating feelings of worry
7. Sleep disturbances like difficulty falling or staying asleep, unsatisfying sleep, or restlessness

### *Panic Disorder*

Individuals with panic disorder experience recurrent and unexpected panic attacks. Sudden periods of intense fear that appear quickly and reach their peak intensity within minutes are characteristic of panic attacks. Panic attacks can be triggered unexpectedly or by a known trigger such as a feared situation or object. During a panic attack, individuals may experience:

1. Heart palpitations or an accelerated heart rate
2. Sweating
3. Trembling
4. Shortness of breath, sensations of smothering or choking
5. Feeling of impending doom
6. Feeling out of control (The National Institute of Mental Health, 2018).

Individuals often worry about when the next attack will happen and will avoid places, behaviours and situations they associate with panic attacks to try to prevent future attacks. The worry about attacks and effort put into avoiding the attacks may cause further problems in many areas of the individual's life (The National Institute of Mental Health, 2018).

### *Phobia-related Disorders*

When an individual has an intense fear of – or aversion to – a specific situation or object it is called a phobia. This fear is out of proportion to the actual danger caused by the object or situation. Individuals with a phobia:

- 1. May have irrational or excessive worry about encountering the feared situation or object;
- 2. Take active steps to avoid the situation or object that causes the fear;
- 3. May, upon encountering the feared situation or object, experience immediate intense anxiety; and
- 4. May endure situations or objects that are unavoidable with intense anxiety (The National Institute of Mental Health, 2018).

There are many types of phobias and phobia related disorders, namely:

1. Specific phobias including flying, heights, specific animals like spiders or snakes, receiving injections or blood (ref).
2. Social anxiety disorder (SAD): A general intense fear of or anxiety toward social situations. They worry that others will negatively evaluate the actions or behaviours associated with their anxiety and that they themselves will be embarrassed. This often leads individuals with SAD to avoid social situations (The National Institute of Mental Health, 2018).
3. Agoraphobia: An intense fear of two or more of the following scenarios:
  - Use of public transport
  - Being in open spaces
  - Being in enclosed spaces
  - Being in a crowd or standing in a line
  - Going outside the home alone

These individuals often avoid the above-mentioned scenarios because they think they might not be able to leave in the event that they experience panic like or other embarrassing symptoms. Individuals may become housebound

in the most severe form of agoraphobia (The National Institute of Mental Health, 2018).

5. Separation anxiety disorder: Worry that harm will come to their attachment figures while they are separated. These individuals may have nightmares about being separated or experience physical symptoms when anticipating or being separated (The National Institute of Mental Health, 2018).

Genetic and environmental factors have been shown to contribute to the development of an anxiety disorder. Some of these risk factors include:

- Personality: shyness or behavioural inhibition during childhood;
- Exposure to negative stressful environmental or life events early in childhood or adulthood;
- History of anxiety or mental illness in biological relatives; and
- Medical conditions like thyroid problems, heart arrhythmias, or caffeine, or other substances and medications that can aggravate or cause anxiety symptoms (The National Institute of Mental Health, 2018).

Anxiety disorders can be treated by psychotherapy, medication, or both. Psychotherapy must be specific to the individual's anxieties to work. CBT is one type of psychotherapy which aims to teach the individual different ways to behave, think and react with regards to the anxiety-producing situation or object. CBT can also help the individual master social skills in the case of social anxiety disorder and often makes use of exposure therapy. CBT can be done in groups of people sharing similar difficulties or with individual sessions (The National Institute of Mental Health, 2018).

Medication can help to relieve anxiety symptoms but is not a cure. The most prescribed medications include benzodiazepines, anti-depressants, and beta-blockers. Benzodiazepines are effective in relieving anxiety and the effects can be seen more quickly than anti-depressants. However, it is possible to build up a



tolerance to benzodiazepines if they are taken over a long duration of time leading to higher doses being required to gain the same effect. This may cause some individuals to become dependent on them. If benzodiazepines are abruptly discontinued, the individual may experience withdrawal symptoms, or their anxiety may return. For this reason, the benzodiazepines are usually tapered off slowly. When it comes to long-term use, antidepressants are the first-line medication with benzodiazepines as a second-line treatment for occasional flare-ups. Antidepressants may help the brain to use the different chemicals better which are responsible for mood or stress. Because antidepressants take time to work, it is important to give the medication enough time before deciding on its effectiveness and trying a different medication. Abruptly discontinuing antidepressants may cause withdrawal symptoms. The most common antidepressants used for treating anxiety are selective serotonin reuptake inhibitors and serotonin-norepinephrine reuptake inhibitors. Beta-blockers are most commonly used to treat the physical symptoms of anxiety like shaking, rapid heart rate, blushing and trembling. They can be taken for a short time period to keep physical symptoms at bay (The National Institute of Mental Health, 2018).

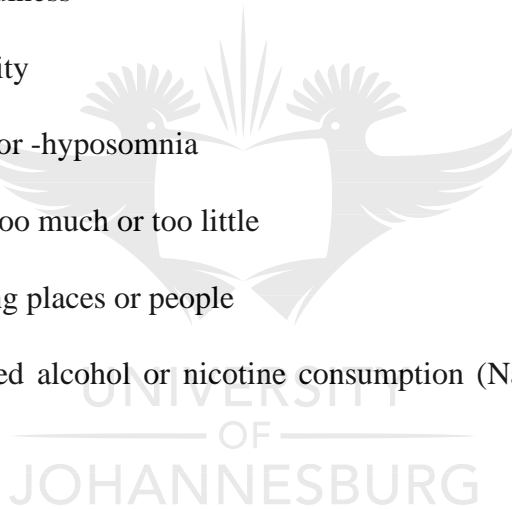
Anxiety can also be managed by meditation techniques, which may enhance the effects of therapy, and aerobic exercise. However, these are not considered standard care (The National Institute of Mental Health, 2018).

### **2.5.3 Stress**

Stress is a reaction to emotional or mental pressure and individuals may feel that they are losing control over something. Adrenaline and cortisol are the hormones the body releases when the individual feels stressed. In some cases, this may help the individual get things done or it may motivate them. However, it may also cause physical symptoms like sweating or rapid heart rate. Being stressed all the time can cause health problems. Symptoms of stress include:

1. Headaches or dizziness

2. Muscle tension or pain
3. Stomach problems
4. Chest pain or increased heart rate
5. Sexual problems
6. Difficulty concentrating
7. Difficulty making decisions
8. Feeling overwhelmed
9. Constant worry
10. Forgetfulness
11. Irritability
12. Hyper- or -hyposomnia
13. Eating too much or too little
14. Avoiding places or people
15. Increased alcohol or nicotine consumption (National Health Service, 2019).



Identifying the cause of stress makes it easier to manage the stress. Causes of stress include:

- Work pressure, unemployment or retirement
- Family, relationship difficulties, caring for a relative or divorce
- Financial problems
- Health conditions, illness, injury, or bereavement (National Health Service, 2019).

Psychotherapy like CBT can be helpful to manage stress. Exercise, time management techniques, breathing exercises, support groups and mindfulness

techniques can all be incorporated to manage stress (National Health Service, 2019).

## **2.6. Depression Anxiety & Stress Scale (DASS)**

Lovibond and Lovibond developed DASS at the University of New South Wales in Australia (Lovibond and Lovibond, 1995). It has since been determined that DASS are viable research instruments (Tran, Tran and Fisher, 2013) for screening of depression and anxiety in many English speaking countries and was later translated into many other languages such as Spanish, Chinese, Malay, Italian with the same success. Then in 2005, the psychometric structure of DASS was developed in statistical ways and claimed that depression, anxiety and stress could theoretically be subdivisions of what would later be called Psychological Distress (Henry and Crawford, 2005). Using the Psychometric structure of Psychological Distress in combination with DASS meant that the concurrent interactions of depression, anxiety and stress could be studied in the data analysis and allow for more complete findings in the researchers' studies (Henry and Crawford, 2005).

DASS-42 consists of 42 statements regarding feelings of depression, anxiety and stress and asks the participants to evaluate their responses to these throughout the past week. The depression subscale deals with inertia, anhedonia, hopelessness, dysphoria, self-depression, devaluation of life, and lack of involvement/interest. The anxiety subscale deals with skeletal muscle effects, autonomic arousal, subjective experience of anxious effects, and situational anxiety. The stress subscale deals with impatience, being over reactive and quickly being irritable, nervous arousal, difficulty relaxing, and easily feeling agitated or upset (Henry and Crawford, 2005).

The four-point Likert scale is used to measure the response to each statement. The options are rated as never (0), sometimes (1), often (2) or almost always (3). Every

subscale is calculated by adding up the scores for depression, anxiety and stress respectively from the score calculation chart (Henry and Crawford, 2005).

According to the DASS-42 manual, the level of depression, anxiety and stress is categorized according to each subscale's score. The depression subscale results can be interpreted as normal (0-9), mild (10-13), moderate (14-20), severe (21-27) and very severe (28+). The anxiety subscale results are interpreted as normal (0-7), mild (8-9), moderate (10-14), severe (15-19) and very severe (20+). The stress subscale results are interpreted as normal (0-14), mild (15-18), moderate (19-25), severe (26-33) and very severe (34+) (Lee, 2019). The DASS is merely a screening tool for depression, anxiety and stress and does not diagnose any of these conditions (Henry and Crawford, 2005). The DASS-42 questionnaire is public domain therefore, permission to receive access was not required.

## **2.7 Conclusion**

The COVID-19 pandemic has been managed by the WHO by testing people, treating infected individuals, developing medications and vaccines, and creating treatment protocols. The psychological and mental health of healthcare providers and students are important to manage to allow these workers to manage the health of those who have been infected. (Pandy, Corbett, Mohan, Reagu, Kumar, Farrell and Lindow, 2021).

## **CHAPTER THREE: METHODOLOGY**

### **3.1 Introduction**

This chapter describes the methodology of this research, including the study design, participant recruitment, sample selection and size, inclusion criteria, questionnaire development, data analysis and ethical considerations. The purpose of this research was to determine the psychological response of Optometry and Biokinetics students at UJ to the COVID-19 pandemic where the psychological responses under investigation were depression, anxiety and stress.

### **3.2 Study Design**

This was a cross sectional quantitative exploratory study using the Depression Anxiety Stress Scale (DASS-42) as an online questionnaire, which was sent to the participants as a link via e-mail. The sample of students was based on a non-probability, voluntary response strategy.

### **3.3 Participant Recruitment**

Permission was requested from the Heads of the Optometry and Biokinetic department, Dr. Ingrid Metsing and Dr. Heather Morris-Eyton respectively, to recruit all the Optometry and Biokinetics students of 2021 (1<sup>st</sup> to 4<sup>th</sup> years)(Appendix C and D).The questionnaire was distributed to the Optometry and Biokinetics students studying at the University of Johannesburg via e-mail from the department of Chiropractic by requesting the department secretary to circulate it. A permission letter was sent to Dr. Carol Nonkwelo, Executive Director: Research &

Innovation, to recruit the participants for this study (Appendix E). Each participant had to read the information letter (Appendix F) and the consent form (Appendix G) and was then required to give consent before completing the questionnaire. They received a link and by clicking the link, they were signifying their consent. The information letter contained the title of the research study, the name of the researchers, brief introduction and purpose of the study, outline of the procedures, benefits of participation, reason/s why the participant may be withdrawn from the study, confidentiality information and research-related injury information. It would take 10 minutes to complete the questionnaire. Participants would remain anonymous.

### 3.4 Sample Selection and Size

All the Optometry and Biokinetics students were asked to complete this questionnaire. Table 3.1a and b resembles the number of students in each year of study for the Optometry and Biokinetics courses during 2021. The total sample group was 317 from Optometry and Biokinetics (200 from Optometry and 117 from Biokinetics) with a minimum of 50 responses from each group (total: 100) required to make this study viable.

**Table 3.1a and b: Number of students in each year:**

**Biokinetics course:**

Year	Number of Students
First	38
Second	27
Third	28
Fourth	24
Total	117

### **Optometry course:**

Year	Number of Students
First	57
Second	48
Third	48
Fourth	43
Total	200

### **3.5 Inclusion Criteria**

The participant had to be enrolled in the Optometry or Biokinetics courses at the University of Johannesburg in the year 2021.

Ages of 18 upwards was included in this study.

### **3.6 Exclusion Criteria**

Any participant that was not enrolled in the Optometry or Biokinetics courses at the University of Johannesburg in the year 2021.

Any participant under the age of 18.

### **3.7 The DASS Questionnaire**

The questionnaire contained a demographics section (Appendix H), the unaltered DASS-42 section (Appendix I) and a thank you page (Appendix J). In the demographics, there was a section on age, gender, year of study, course enrolled and economic status according to the participant's opinion. DASS-42 is the longer form of the Depression, Anxiety and Stress Scale (DASS) and was used to screen for psychological distress over the past 7 days among the study group. This time

frame is in accordance with the DASS questionnaire which requires the participant to only comment on symptoms experienced in the past 7 days. Lovibond and Lovibond developed DASS at the University of New South Wales in Australia (Lovibond and Lovibond, 1995). It has since been determined that DASS are viable research instruments (Tran, Tran and Fisher, 2013) for screening of depression and anxiety in many English speaking countries and was later translated into many other languages such as Spanish, Chinese, Malay, Italian with the same success. Then in 2005, the psychometric structure of DASS was developed in statistical ways and claimed that depression, anxiety and stress could theoretically be subdivisions of what would later be called Psychological Distress (Henry and Crawford, 2005). Using the Psychometric structure of Psychological Distress in combination with DASS meant that the concurrent interactions of depression, anxiety and stress could be studied in the data analysis and allow for more complete findings in the researchers' studies.

DASS-42 consists of 42 statements regarding feelings of depression, anxiety and stress and asks the participants to evaluate their responses to these throughout the past week. The depression subscale deals with inertia, anhedonia, hopelessness, dysphoria, self-depression, devaluation of life, and lack of involvement/interest. The anxiety subscale deals with skeletal muscle effects, autonomic arousal, subjective experience of anxious effects, and situational anxiety. The stress subscale deals with impatience, being overreactive and quickly being irritable, nervous arousal, difficulty relaxing, and easily feeling agitated or upset (Henry and Crawford, 2005).

The four-point Likert scale is used to measure the response to each statement. The options are rated as never (0), sometimes (1), often (2) or almost always (3). Every subscale is calculated by adding up the scores for depression, anxiety and stress respectively from the score calculation chart (Appendix K).



According to the DASS-42 manual, the level of depression, anxiety and stress is categorized according to each subscale's score. The depression subscale results can be interpreted as normal (0-9), mild (10-13), moderate (14-20), severe (21-27) and very severe (28+). The anxiety subscale results are interpreted as normal (0-7), mild (8-9), moderate (10-14), severe (15-19) and very severe (20+). The stress subscale results are interpreted as normal (0-14), mild (15-18), moderate (19-25), severe (26-33) and very severe (34+) (Lee, 2019). The DASS is merely a screening tool for depression, anxiety and stress and does not diagnose any of these conditions. The DASS-42 questionnaire is public domain therefore, permission to receive access is not required.

### **3.8 Validity and Reliability**

The purpose of this research was to determine the psychological response of Optometry and Biokinetics students at UJ to the COVID-19 pandemic where the psychological responses under investigation were depression, anxiety and stress.

### **3.9 Internal Validity**

Cuncic (2020) describes internal validity as accuracy and trustworthiness. This depends greatly on the study procedures and on how meticulously it is performed (Cuncic, 2020). The validity of this survey was ensured by conducting pre-testing of the survey questions. This involved sending out a pilot survey to five students in order to pre-test the efficiency of the survey and also provided feedback regarding the survey. These responses were disregarded from the final survey. The pre-testing helped point out any corrections that needed to be made and ensured that there were no grammatical errors. More importantly, it ensured that the questions were not misunderstood or misinterpreted. The researcher was able to make the necessary changes to ensure the validity of the survey based on these responses.

### **3.10 Data Analysis**

The data was obtained through the self-administered online survey and was analysed independently by the statisticians at STATKON at the University of Johannesburg. This ensured anonymity removed bias. Descriptive analysis was utilised to analyse the data. A meeting was set up between the statistician and the researcher to discuss the results and to answer any questions the researcher had. The researcher was then able to draw results and conclusions from the data. Details of the results are included in chapter four.

### **3.11 Ethical Considerations**

The study was approved by the Ethics Committee (Appendix L) and the Higher Degrees Committee (Appendix M) at the University of Johannesburg granted an ethics number (REC-793-2021).

Once the survey link was activated, all the registered Optometry and Biokinetics students at the University of Johannesburg received an email and were requested to complete the survey. The participants were required to read the information letter before clicking the link to the survey.

The information and consent forms will outline the names of the researcher, purpose of the study and benefits of partaking in the study. It explained that at the end of the questionnaire, a 'Thank You' page will appear with the participants individual scores with regards to depression, anxiety and stress displayed along with the interpretation of the scores. The participant was made aware that their participation is voluntary and confidential, and that they were allowed to withdraw from the study at any point prior to submission of the questionnaire. Beyond that point withdrawal from the study will not be possible due to the anonymous nature of the research. No identifying data was collected and responses could not be traced back to the participant, ensuring anonymity. This was done to ensure honest and truthful

responses from the participants. If the participant had any further questions, those would be explained by the researcher; contact details was made available at the end of the information letter.

There were no risks involved in completing the online survey, however the survey screened for a risk of depression, anxiety and stress in the specific participant and offered help for these at-risk participants. There was no remuneration for completing the questionnaire. The participant carried no expenses other than the data charges necessary to complete the survey. All data would be stored on a password-protected document on a password-protected computer that only the researcher could access. The data would be kept for 5 years.

In order to guarantee that no plagiarism had taken place, the final document, after the analysis of the data and the dissertation was complete, it was submitted to Turnitin (Appendix N).



## **CHAPTER FOUR: RESULTS**

### **4.1 Introduction**

This chapter provides empirical findings and analysis based on the data collected by the research questionnaire, psychological responses during the coronavirus disease (COVID-19) pandemic among Optometry and Biokinetics students at UJ. The IBM SPSS package (version 26) was utilized to analyse the raw data. The analysis presented in this chapter is primarily descriptive and the detailed discussion of results is presented in chapter five.

### **4.2 The Sample**

An online survey was circulated via e-mail to 317 students (200 from Optometry and 117 from Biokinetics) registered with the Optometry and Biokinetics departments at the university of Johannesburg. The survey obtained 33.7% (n=107) responses of students registered for the Optometry and Biokinetics courses at the University of Johannesburg. After data cleaning, 33.7% (n=107) of the responses, were found valid and used for data analysis.

#### **4.2.1 Age distribution**

In terms of age the data revealed that of the n=107 Optometry and Biokinetics students, n=103 (96.3%) of the students were between 18-24 years old; n=4 (3.7%) of the students were between 25-29 years old. This is presented in table 4.1 below.

#### **4.2.2 Gender distribution**

Table 4.1 shows that out of 107 participants, n=24 (22.4%) were male and n=82 (76.6%) were female.

#### 4.2.3 Field of study

Table 4.1 shows that out of the 107 participants n=54 (50.5%) were enrolled in the Optometry course and n=53 (49.5%) were enrolled in the Biokinetics course.

#### 4.2.4 Academic year

From the 107 participants, n=30 (28%) were in their first year of study; n=30 (28%) were in their second year of study; n=30 (28%) were in their third year of study; and n=17 (15.9%) were in their fourth year of study. The students were divided into two groups; the juniors which included the first- and second-year students n=60 (56.1%), and the seniors which included the third- and fourth-year students n=47 (43.9%). This is represented in table 4.1 below.

#### 4.2.5 Financial difficulties

The data represented in table 4.1 illustrates that in terms of financial difficulties during the national lockdown period n=34 (31.8%) of the participants indicated they did experience financial difficulties, n=33 (30.8%) of the participants indicated they did not experience financial difficulties, and 40 (37.4%) of the participants indicated they did experience financial difficulties sometimes.

#### 4.2.6 Marital status

According to the data collected in table 4.1, most of the participants were single. Out of the 107 participants, n=105 (98.1%) were single, n=1 (0.9%) were married, and n=1 (0.9%) were cohabitating.

**Table 4.1: Demographic data of study respondents**

Variable	Frequency	Percent	Valid Percent	Cumulative percent
----------	-----------	---------	---------------	--------------------

Age	18-24	103	96.3	96.3	96.3
	25-29	4	3.7	3.7	100.0
	Total	107	100.0	100.0	
Gender	Male	24	22.4	22.4	22.4
	Female	82	76.6	76.6	99.1
	Of Non-Discriminatory Nature	1	0.9	0.9	100.0
	Total	107	100.0	100.0	
Course	Optometry	54	50.5	50.5	50.5
	Biokinetics	53	49.5	49.5	100.0
	Total	107	100.0	100.0	
Academic Year	1 <sup>st</sup>	30	28.0	28.0	28.0
	2 <sup>nd</sup>	30	28.0	28.0	56.1
	3 <sup>rd</sup>	30	28.0	28.0	84.1
	4 <sup>th</sup>	17	15.9	15.9	100.0
	Total	107	100.0	100.0	
Summarized Comparison for Academic Year	Juniors	60	56.1	56.1	56.1
	Seniors	47	43.9	43.9	100.0
	Total	107	100.0	100.0	
Financial Difficulties During the National Lockdown	Yes	34	31.8	31.8	31.8
	No	33	30.8	30.8	62.6
	Sometimes	40	37.4	37.4	100.0
	Total	107	100.0	100.0	
Marital Status	Single	105	98.1	98.1	98.1
	Married	1	0.9	0.9	99.1
	Cohabitation	1	0.9	0.9	100.0
	Total	107	100.0	100.0	

Table 4.1 provides a review of the demographic information of the study respondents including age, gender, course enrolled in, academic year of study, financial difficulties during the national lockdown at this time and marital status.

### 4.3 Results

#### 4.3.1 DASS-42 questionnaire responses

Table 4.2 below displays the results of the DASS questionnaire completed by the n=107 Optometry and Biokinetics students. The DASS survey consisted of 42 questions. These questions each had a scale of 0-3. The participants had to choose one of the four options depending on how much or how little the question related to them. Potential responses included:

- 0 – It does not apply to me
- 1 – Applied to me some degree of the time
- 2 – Applied to me a considerable degree or a good part of the time
- 3 – Applied to me very much or most of the time

**Table 4.2 DASS-42 Questionnaire Responses**

		<b>Did not apply to me at all</b>	<b>Applied to me to some degree or some of the time</b>	<b>Applied to me to a considerable degree, or a good part of the time.</b>	<b>Applied to me very much, or most of the time</b>	<b>Total</b>
B1 I found myself getting upset by quite trivial things	Count	21	54	20	12	107
	Row N%	19,6%	50,5%	18,7%	11,2%	100,0%

B2 I was aware of dryness of my mouth	Count	59	30	8	10	107
	Row N%	55,1%	28,0%	7,5%	9,3%	100,0%
B3 I couldn't seem to experience any positive feeling at all	Count	38	49	11	9	107
	Row N%	35,5%	45,8%	10,3%	8,4%	100,0%
B4 I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	Count	66	33	6	2	107
	Row N%	61,7%	30,8%	5,6%	1,9%	100,0%
B5 I just couldn't seem to get going	Count	31	39	24	13	107
	Row N%	29,0%	36,4%	22,4%	12,1%	100,0%
B6 I tended to over-react to situations	Count	30	43	15	19	107
	Row N%	28,0%	40,2%	14,0%	17,8%	100,0%
B7 I had a feeling of shakiness (eg, legs going to give way)	Count	74	24	5	4	107
	Row N%	69,2%	22,4%	4,7%	3,7%	100,0%
B8 I found it difficult to relax	Count	39	35	23	10	107
	Row N%	36,4%	32,7%	21,5%	9,3%	100,0%
B9 I found myself in situations that made me so anxious I was most	Count	24	38	29	16	107
	Row N%	22,4%	35,5%	27,1%	15,0%	100,0%



relieved when they ended						
B10 I felt that I had nothing to look forward to	Count	47	28	18	14	107
	Row N%	43,9%	26,2%	16,8%	13,1%	100,0%
B11 I found myself getting upset rather easily	Count	28	41	19	19	107
	Row N%	26,2%	38,3%	17,8%	17,8%	100,0%
B12 I felt that I was using a lot of nervous energy	Count	31	43	20	13	107
	Row N%	29,0%	40,2%	18,7%	12,1%	100,0%
B13 I felt sad and depressed	Count	32	41	22	12	107
	Row N%	29,9%	38,3%	20,6%	11,2%	100,0%
B14 I found myself getting impatient when I was delayed in any way (eg, elevators, traffic lights, being kept waiting)	Count	28	50	20	9	107
	Row N%	26,2%	46,7%	18,7%	8,4%	100,0%
B15 I had a feeling of faintness	Count	70	28	8	1	107
	Row N%	65,4%	26,2%	7,5%	0,9%	100,0%
B16 I felt that I had lost interest in just about everything	Count	46	29	15	17	107
	Row N%	43,0%	27,1%	14,0%	15,9%	100,0%
B17 I felt I wasn't worth much as a person	Count	58	22	14	13	107
	Row N%	54,2%	20,6%	13,1%	12,1%	100,0%

B18 I felt that I was rather touchy	Count	53	36	13	5	107
	Row N%	49,5%	33,6%	12,1%	4,7%	100,0%
B19 I perspired noticeably (eg, hands sweaty) in the absence of high temperatures or physical exertion	Count	75	18	9	5	107
	Row N%	70,1%	16,8%	8,4%	4,7%	100,0%
B20 I felt scared without any good reason	Count	53	31	14	9	107
	Row N%	49,5%	29,0%	13,1%	8,4%	100,0%
B21 I felt that life wasn't worthwhile	Count	67	21	9	10	107
	Row N%	62,6%	19,6%	8,4%	9,3%	100,0%
B22 I found it hard to wind down	Count	42	40	18	7	107
	Row N%	39,3%	37,4%	16,8%	6,5%	100,0%
B23 I had difficulty in swallowing	Count	89	15	1	2	107
	Row N%	83,2%	14,0%	0,9%	1,9%	100,0%
B24 I couldn't seem to get any enjoyment out of the things I did	Count	54	33	14	6	107
	Row N%	50,5%	30,8%	13,1%	5,6%	100,0%
B25 I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate)	Count	60	30	14	3	107
	Row N%	56,1%	28,0%	13,1%	2,8%	100,0%

increase, heart missing a beat)						
B26 I felt downhearted and blue	Count	44	40	19	4	107
	Row N%	41,1%	37,4%	17,8%	3,7%	100,0%
B27 I found that I was very irritable	Count	28	47	20	12	107
	Row N%	26,2%	43,9%	18,7%	11,2%	100,0%
B28 I felt I was close to panic	Count	50	24	22	11	107
	Row N%	46,7%	22,4%	20,6%	10,3%	100,0%
B29 I found it hard to calm down after something upset me	Count	39	34	19	15	107
	Row N%	36,4%	31,8%	17,8%	14,0%	100,0%
B30 I feared that I would be "thrown" by some trivial but unfamiliar task	Count	45	32	20	10	107
	Row N%	42,1%	29,9%	18,7%	9,3%	100,0%
B31 I was unable to become enthusiastic about anything	Count	47	41	12	7	107
	Row N%	43,9%	38,3%	11,2%	6,5%	100,0%
B32 I found it difficult to tolerate interruptions to what I was doing	Count	42	33	26	6	107
	Row N%	39,3%	30,8%	24,3%	5,6%	100,0%
B33 I was in a state of nervous tension	Count	41	35	21	10	107
	Row N%	38,3%	32,7%	19,6%	9,3%	100,0%

B34 I felt I was pretty worthless	Count	63	23	11	10	107
	Row N%	58,9%	21,5%	10,3%	9,3%	100,0%
B35 I was intolerant of anything that kept me from getting on with what I was doing	Count	43	34	20	10	107
	Row N%	40,2%	31,8%	18,7%	9,3%	100,0%
B36 I felt terrified	Count	47	36	14	10	107
	Row N%	43,9%	33,6%	13,1%	9,3%	100,0%
B37 I could see nothing in the future to be hopeful about	Count	64	24	10	9	107
	Row N%	59,8%	22,4%	9,3%	8,4%	100,0%
B38 I felt that life was meaningless	Count	67	23	6	11	107
	Row N%	62,6%	21,5%	5,6%	10,3%	100,0%
B39 I found myself getting agitated	Count	42	41	16	8	107
	Row N%	39,3%	38,3%	15,0%	7,5%	100,0%
B40 I was worried about situations in which I might panic and make a fool of myself	Count	40	29	27	11	107
	Row N%	37,4%	27,1%	25,2%	10,3%	100,0%
B41 I experienced trembling (eg, in the hands)	Count	76	21	9	1	107
	Row N%	71,0%	19,6%	8,4%	0,9%	100,0%
	Count	30	40	19	18	107

B42 I found it difficult to work up the initiative to do things	Row N%	28,0%	37,4%	17,8%	16,8%	100,0%
---	--------	-------	-------	-------	-------	--------

### 4.3.2 Summary of the results

In this section the results concerning the DASS questionnaire above (table 4.2) are interpreted. The questions are arranged based on the mean scores for depression, stress and anxiety. This was ranged from the greatest mean score to the smallest mean score for each category, and each mean score was recorded along with the standard deviation. The mean score signifies the average which is based on the scale between 0-3 for each question, and it illustrates where on the scale most of the questions were chosen.

With each question the participant had to select one of four options subject to how much or how little they associated with each question. The options that most participants chose are discussed in tables 4.3, 4.4 and 4.5.

**Table 4.3: Depression Mean Score (Greatest to Smallest)**

Question	Mean Value	Standard Deviation
B42	1.23	1.042
B5	1.18	0.989
B13	1.13	0.972
B16	1.03	1.103
B10	0.99	1.068
B3	0.92	0.891
B26	0.84	0.848
B17	0.83	1.068
B31	0.80	0.884
B24	0.74	0.894
B34	0.70	0.993

B37	0.66	0.961
B21	0.64	0.983
B38	0.64	0.985

B42 'I found it difficult to work up the initiative to do things' – with a mean value of 1.23, n=40 (37.4%) of the participants experienced this feeling to some degree or some of the time and n=30 (28.0%) did not experience it at all.

B5 'I just couldn't seem to get going' – with a mean value of 1.18, n=39 (36.4%) of the participants experienced this feeling to some degree or some of the time and n=31 (29.0%) did not experience it at all.

B13 'I felt sad and depressed' - with a mean value of 1.13, n=41 (38.3%) of the participants experienced this feeling to some degree or some of the time and n=32 (29.9%) did not experience it at all.

B16 'I felt that I had lost interest in just about everything' - with a mean value of 1.03, n=29 (27.1%) of the participants experienced this feeling to some degree or some of the time and n=46 (43.0%) did not experience it at all.

B10 'I felt that I had nothing to look forward to' - with a mean value of 0.99, n=28 (26.2%) of the participants experienced this feeling to some degree or some of the time and n=47 (43.9%) did not experience it at all.

B3 'I couldn't seem to experience any positive feeling at all' - with a mean value of 0.32, n=49 (45.8%) of the participants experienced this feeling to some degree or some of the time and n=38 (35.5%) did not experience it at all.

B26 'I felt down-hearted and blue' - with a mean value of 0.84, n=40 (37.4%) of the participants experienced this feeling to some degree or some of the time and n=44 (41.1%) did not experience it at all.

B17 'I felt I wasn't worth much as a person' - with a mean value of 0.83, n=22 (20.6%) of the participants experienced this feeling to some degree or some of the time and n=58 (54.2%) did not experience it at all.

B31 'I was unable to become enthusiastic about anything' - with a mean value of 0.80, n=41 (38.3%) of the participants experienced this feeling to some degree or some of the time and n=47 (43.9%) did not experience it at all.

B24 'I couldn't seem to get any enjoyment out of the things I did' - with a mean value of 0.74, n=33 (30.8%) of the participants experienced this feeling to some degree or some of the time and n=54 (50.5%) did not experience it at all.

B34 'I felt I was pretty worthless' - with a mean value of 0.70, n=23 (21.5%) of the participants experienced this feeling to some degree or some of the time and n=63 (58.9%) did not experience it at all.

B37 'I could see nothing in the future to be hopeful about' - with a mean value of 0.66, n=24 (22.4%) of the participants experienced this feeling to some degree or some of the time and n=64 (59.8%) did not experience it at all.

B21 'I felt that life wasn't worthwhile' - with a mean value of 0.64, n=21 (19.6%) of the participants experienced this feeling to some degree or some of the time and n=67 (62.6%) did not experience it at all.

B38 'I felt that life was meaningless' - with a mean value of 0.64, n=23 (21.5%) of the participants experienced this feeling to some degree or some of the time and n=67 (62.6%) did not experience it at all.

B41 'I experienced trembling (eg, in the hands)' - with a mean value of 0.39, n=21 (19.6%) of the participants experienced this feeling to some degree or some of the time and n=76 (71.0%) did not experience it at all.

**Table 4.4: Anxiety Mean Scores (Greatest to Smallest)**

Question	Mean Value	Standard Deviation
B9	1.35	0.991
B40	1.08	1.020
B30	0.95	0.994
B28	0.94	1.045
B36	0.88	0.968
B20	0.80	0.966

B2	0.71	0.962
B25	0.63	0.819
B4	0.48	0.692
B19	0.48	0.839
B15	0.44	0.675
B7	0.43	0.754
B41	0.39	0.683
B23	0.21	0.550

B9 'I found myself in situations that made me so anxious I was most relieved when they ended' - with a mean value of 1.35, n=38 (35.5%) of the participants experienced this feeling to some degree or some of the time and n=24 (22.4%) did not experience it at all.

B40 'I was worried about situations in which I might panic and make a fool of myself' - with a mean value of 1.08, n=29 (27.1%) of the participants experienced this feeling to some degree or some of the time and n=40 (37.4%) did not experience it at all.

B30 'I feared that I would be "thrown" by some trivial but unfamiliar task' - with a mean value of 0.95, n=32 (29.9%) of the participants experienced this feeling to some degree or some of the time and n=45 (42.1%) did not experience it at all.

B28 'I felt I was close to panic' - with a mean value of 0.94, n=24 (22.4%) of the participants experienced this feeling to some degree or some of the time and n=50 (46.7%) did not experience it at all.

B36 'I felt terrified' - with a mean value of 0.88, n=36 (33.6%) of the participants experienced this feeling to some degree or some of the time and n=47 (43.9%) did not experience it at all.

B20 'I felt scared without any good reason' - with a mean value of 0.80, n=31 (29.0%) of the participants experienced this feeling to some degree or some of the time and n=53 (49.5%) did not experience it at all.



B2 'I was aware of dryness of my mouth' - with a mean value of 0.71, n=30 (28.0%) of the participants experienced this feeling to some degree or some of the time and n=59 (55.1%) did not experience it at all.

B25 'I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)' - with a mean value of 0.63, n=30 (28.0%) of the participants experienced this feeling to some degree or some of the time and n=60 (56.1%) did not experience it at all.

B4 'I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)' - with a mean value of 0.48, n=33 (30.8%) of the participants experienced this feeling to some degree or some of the time and n=66 (61.7%) did not experience it at all.

B19 'I perspired noticeably (eg, hands sweaty) in the absence of high temperatures or physical exertion' - with a mean value of 0.48, n=18 (16.8%) of the participants experienced this feeling to some degree or some of the time and n=75 (70.1%) did not experience it at all.

B15 'I had a feeling of faintness' - with a mean value of 0.44, n=28 (26.2%) of the participants experienced this feeling to some degree or some of the time and n=70 (65.4%) did not experience it at all.

B7 'I had a feeling of shakiness (eg, legs going to give way)' - with a mean value of 0.43, n=24 (22.4%) of the participants experienced this feeling to some degree or some of the time and n=74 (69.2%) did not experience it at all.

B41 'I experienced trembling (eg, in the hands)' - with a mean value of 0.39, n=21 (19.6%) of the participants experienced this feeling to some degree or some of the time and n=76 (71.0%) did not experience it at all.

B23 'I had difficulty in swallowing' - with a mean value of 0.21, n=15 (14.0%) of the participants experienced this feeling to some degree or some of the time and n=89 (83.2%) did not experience it at all.

**Table 4.5: Stress Mean Scores (Greatest to Smallest)**

<b>Question</b>	<b>Mean Value</b>	<b>Standard Deviation</b>
B1	1.21	0.890
B11	1.27	1.042
B6	1.21	1.046
B27	1.15	0.940
B12	1.14	0.976
B14	1.09	0.885
B29	1.09	1.051
B8	1.04	0.980
B33	1.00	0.981
B35	0.97	0.985
B32	0.96	0.931
B22	0.91	0.906
B39	0.91	0.917
B18	0.72	0.856

B1 'I found myself getting upset by quite trivial things' - with a mean value of 1.23, n=54 (50.5%) of the participants experienced this feeling to some degree or some of the time and n=21 (19.6%) did not experience it at all.

B11 'I found myself getting upset rather easily' - with a mean value of 1.27, n=41 (38.3%) of the participants experienced this feeling to some degree or some of the time and n=28 (26.2%) did not experience it at all.

B6 'I tended to over-react to situations' - with a mean value of 1.21, n=43 (40.2%) of the participants experienced this feeling to some degree or some of the time and n=30 (28.0%) did not experience it at all.

B27 'I found that I was very irritable' - with a mean value of 1.15, n=47 (43.9%) of the participants experienced this feeling to some degree or some of the time and n=28 (26.2%) did not experience it at all.

B12 'I felt that I was using a lot of nervous energy' - with a mean value of 1.14, n=43 (40.2%) of the participants experienced this feeling to some degree or some of the time and n=31 (29.0%) did not experience it at all.

B14 'I found myself getting impatient when I was delayed in any way (eg, elevators, traffic lights, being kept waiting)' - with a mean value of 1.09, n=50 (46.7%) of the

participants experienced this feeling to some degree or some of the time and n=28 (26.2%) did not experience it at all.

B29 'I found it hard to calm down after something upset me' - with a mean value of 1.09, n=34 (31.8%) of the participants experienced this feeling to some degree or some of the time and n=39 (36.4%) did not experience it at all.

B8 'I found it difficult to relax' - with a mean value of 1.04, n=35 (32.7%) of the participants experienced this feeling to some degree or some of the time and n=39 (36.4%) did not experience it at all.

B33 'I was in a state of nervous tension' - with a mean value of 1.00, n=35 (32.7%) of the participants experienced this feeling to some degree or some of the time and n=41 (38.3%) did not experience it at all.

B35 'I was intolerant of anything that kept me from getting on with what I was doing' - with a mean value of 0.97, n=34 (31.8%) of the participants experienced this feeling to some degree or some of the time and n=43 (40.2%) did not experience it at all.

B32 'I found it difficult to tolerate interruptions to what I was doing' - with a mean value of 0.96, n=33 (30.8%) of the participants experienced this feeling to some degree or some of the time and n=42 (49.3%) did not experience it at all.

B22 'I found it hard to wind down' - with a mean value of 0.91, n=40 (37.4%) of the participants experienced this feeling to some degree or some of the time and n=42 (39.3%) did not experience it at all.

B39 'I found myself getting agitated' - with a mean value of 0.91, n=41 (38.3%) of the participants experienced this feeling to some degree or some of the time and n=42 (39.3%) did not experience it at all.

B18 'I felt that I was rather touchy' - with a mean value of 0.72, n=36 (33.6%) of the participants experienced this feeling to some degree or some of the time and n=53 (49.5%) did not experience it at all.

### 4.3.3 Test for reliability

Reliability reviews the internal consistency of the results, and whether every question for every category is testing for depression, anxiety and stress. Cronbach's Alpha is utilized when assessing reliability and the value of the Chronbach's Alpha ought to be above 0.7 for the results to be valid. The results are reviewed in table 4.6 below.

**Table 4.6: Reliability Analysis**

Construct	No. of Items	Cronbach's Alpha
Depression	14	0.958
Anxiety	14	0.883
Stress	14	0.939

As indicated in table 4.6 above, the Chronbach Alpha values for depression – 0.958, anxiety – 0.883, and stress – 0.939 are all above 0.7 and consequently prove that the values attained in this study are acceptable and reliable.

### 4.3.4 Depression Anxiety and Stress Scale (DASS) scoring instructions

The scores for Depression, Anxiety and Stress are calculated by totaling the scores of the relevant items.

The depression scale items are 3, 5, 10, 13, 17, 17, 21, 24, 26, 31, 34, 37, 38 and 42.

The anxiety scale items are 2, 4, 7, 9, 15, 19, 20, 23, 25, 28, 30, 36, 40 and 41.

The stress scale items are 1, 6, 8, 11, 12, 14, 18, 22, 27, 29, 32, 33, 35 and 39.

The score for each of the respondents over each sub-scale is then evaluated according to the severity – rating index below as seen in table 4.7.

**Table 4.7: Scoring key**

	<b>Depression</b>	<b>Anxiety</b>	<b>Stress</b>
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely Severe	28+	20+	34+

#### **4.3.5 Descriptive Statistics for Depression, Anxiety and Stress**

The summarized average statistics for each category is demonstrated in table 4.8 below.

**Table 4.8: Descriptive Statistics for Depression, Anxiety and Stress**

	<b>Mean</b>	<b>Std. Deviation</b>	<b>Minimum</b>	<b>Maximum</b>
Depression Score	12.34	11.056	0	42
Anxiety Score	9.78	7.648	0	31
Stress Score	14.68	10.005	0	38

The depression score averaged 12.34, using the scoring key in table 4.7 it indicated that on average the Optometry and Biokinetics students have mild depression. Regarding minimum and maximum values, it indicated that the lowest score a participant achieved for depression was 0 and the maximum score a participant obtained was 42.

The anxiety score averaged 9.78, using the scoring key in table 4.7 it indicated that on average the Optometry and Biokinetics students have moderate anxiety. Regarding minimum and maximum values, it indicated that the lowest score a participant achieved for anxiety was 0 and the maximum score a participant obtained was 31.

The stress score averaged 14.68, using the scoring key in table 4.7 it indicated that on average the Optometry and Biokinetics students have mild stress. Regarding minimum and maximum values, it indicated that the lowest score a participant achieved for stress was 0 and the maximum score a participant obtained was 38.

#### 4.3.6 Frequencies for scoring categories

In this section, the overall scores for each category were discussed.

**Table 4.9: Depression Category**

Depression	Frequency	Percent	Valid Percent	Cumulative Percent
Normal	55	51.4	51.4	51.4
Mild	10	9.3	9.3	60.7
Moderate	15	14.0	14.0	74.8
Severe	14	13.1	13.1	87.9
Extremely Severe	13	12.1	12.1	100.0
Total	107	100.0	100.0	

When looking at depression n=55 (51.4%) of the participants were normal, n=10 (9.3%) of the participants experienced mild depression, n= 15 (14.0%) of the participants experiences moderate depression, n=14 (13.1%) of participants

experiences severe depression, and n=13 (12.1%) of the participants experienced extremely severe depression as shown in table 4.9 above.

**Table 4.10: Anxiety Category**

<b>Anxiety</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Normal	53	49.5	49.5	49.5
Mild	10	9.3	9.3	58.9
Moderate	13	12.1	12.1	71.0
Severe	15	14.0	14.0	85.0
Extremely Severe	16	15.0	15.0	100.0
Total	107	100.0	100.0	

When looking at anxiety n=53 (49.5%) of the participants were normal, n=10 (9.3%) of the participants experienced mild anxiety, n= 13 (12.1%) of the participants experiences moderate anxiety, n=15 (14.0%) of participants experiences severe anxiety, and n=16 (15.0%) of the participants experienced extremely severe anxiety as shown in table 4.10 above.

**Table 4.11: Stress Category**

<b>Stress</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Normal	55	51.4	51.4	51.4
Mild	16	15.0	15.0	66.4
Moderate	17	15.9	15.9	82.2
Severe	15	14.0	14.0	96.3
Extremely Severe	4	3.7	3.7	100.0

Total	107	100.0	100.0	
-------	-----	-------	-------	--

When looking at stress n=55 (51.4%) of the participants were normal, n=16 (15.0%) of the participants experienced mild stress, n= 17 (15.9%) of the participants experiences moderate stress, n=15 (14.0%) of participants experiences severe stress, and n=4 (3.7%) of the participants experienced extremely severe stress as shown in table 4.11 above.

#### 4.3.7 Tests for normality

Normality was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests. The Kolmogorov-Smirnov test was used when the group size was greater than 50, and the Shapiro-Wilk test was used when the group size was less than 50. The normality tests for course, academic year (Juniors vs Seniors) and financial difficulties are summarized in the tables below.

**Table 4.12: Normality Tests for Course**

Kolmogorov-Smirnov <sup>a</sup>		Statistic	df	P-Value
Depression	Optometry	0.138	54	0.012
	Biokinetics	0.198	53	0.000
Anxiety	Optometry	0.156	54	0.002
	Biokinetics	0.140	53	0.011
Stress	Optometry	0.126	54	0.031
	Biokinetics	0.133	53	0.020

Table 4.12 above assessed whether the data was normally distributed or not between Optometry and Biokinetics students for depression, anxiety and stress. The Kolmogorov-Smirnov tests were used as both groups were more than 50. There was 54 Optometry students (df=54) and 53 Biokinetics students (df=53). If the p-value



was greater than 0.05 this indicated the data was normally distributed and if the p-value was less than 0.05 this indicated that the p-value was not normally distributed.

As seen in table 4.12, the p-values for the Optometry students were as follows for depression-0.012, anxiety-0.002 and stress-0.031 and the p-values for the Biokinetics students for depression-0.000, anxiety-0.011 and stress-0.020, all these values are smaller than 0.05 and therefor are not normally distributed.

**Table 4.13: Normality Tests for Juniors vs Seniors**

		Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	P-Value	Statistic	df	P-Value
Depression	Juniors	0.196	60	0.000			
	Seniors				0.932	47	0.009
Anxiety	Juniors	0.164	60	0.000			
	Seniors				0.942	47	0.022
Stress	Juniors	0.117	60	0.040			
	Seniors				0.959	47	0.098

Table 4.13 above assessed whether the data was normally distributed or not between juniors and seniors for depression, anxiety and stress. The Kolmogorov-Smirnov tests were used for the juniors as there were more than 50 (df=60), and the Shapiro-Wilk test was used for the seniors as there were less than 50 (df=47). If the p-value was greater than 0.05 this indicated the data was normally distributed and if the p-value was less than 0.05 this indicated that the p-value was not normally distributed.

As seen in table 4.13, the p-values for the juniors were as follows for depression-0.000, anxiety-0.000 and stress-0.040 and the p-values for the seniors for depression-0.009 and anxiety-0.022, all these values are smaller than 0.05 and therefor are not normally distributed. The p-values for stress for the seniors-0.098 was normally distributed.

**Table 4.14: Normality Tests for Financial Difficulties**

Shapiro-Wilk				
		Statistic	df	P-Value
Depression	Yes	0.943	34	0.074
	Sometimes	0.905	40	0.003
	No	0.774	33	0.000
Anxiety	Yes	0.925	34	0.023
	Sometimes	0.895	40	0.001
	No	0.914	33	0.012
Stress	Yes	0.939	34	0.056
	Sometimes	0.960	40	0.166
	No	0.900	33	0.005

Table 4.14 above assessed whether the data was normally distributed or not between participants financial status for depression, anxiety and stress. The Shapiro-Wilk test was used as the group sizes were all less than 50. If the p-value was greater than 0.05 this indicated the data was normally distributed and if the p-value was less than 0.05 this indicated that the p-value was not normally distributed.

As seen in table 4.14, the p-values for depression were as follows for yes-0.074 which is a normal distribution, sometimes-0.003 and no-0.000 which is not a normal distribution. The p-values for anxiety for yes was-0.023, sometimes-0.001 and no-0.012 which indicates they are not normally distributed. The p-values for stress for yes was-0.056, sometimes-0.166 which is a normal distribution, and no-0.005 which is not a normal distribution.

#### **4.3.8 Comparisons between groups**

Parametric tests were utilized for the comparisons, although most of the variables were not normally distributed, parametric tests are extremely robust for deviations

from normality and group sizes were also large enough to make use of parametric tests.

*Comparisons of courses*

The independent samples t-test was used as two groups were compared – Optometry and Biokinetics.

**Table 4.15: Group Statistics**

Course		N	Mean	Std. Deviation	Std. Error Mean
Depression	Optometry	54	12.78	11.074	1.507
	Biokinetics	53	11.89	11.126	1.528
Anxiety	Optometry	54	10.48	8.211	1.117
	Biokinetics	53	9.06	7.034	0.966
Stress	Optometry	54	15.54	10.751	1.463
	Biokinetics	53	13.81	9.205	1.264

Table 4.15 above shows the mean score for depression for Optometry students was 12.78 and for Biokinetics students was 11.89, when looking at the scoring key in table 4.7, this indicated that on average the Optometry students and Biokinetics students experienced ‘mild’ depression levels. For anxiety, the mean score for the Optometry students was 10.48 and for the Biokinetics students was 9.06, when looking at the scoring key in table 4.7, this indicated that on average the Optometry students experienced ‘moderate’ anxiety levels and the Biokinetics students experienced ‘mild’ anxiety levels. For stress, the mean score for the Optometry students was 15.54 and for the Biokinetics students was 13.81, when looking at the scoring key in table 4.7, this indicated that on average the Optometry students experienced ‘mild’ stress levels and the Biokinetics students experienced ‘normal’ stress levels.

**Table 4.16: Levene’s Test for Equality of Variances**

		F	P-Value.
Depression	Equal variances assumed	0.014	0.906
Anxiety	Equal variances assumed	1.265	0.263
Stress	Equal variances assumed	1.802	0.182

Levene’s test for equality of variances looks at whether the spread of the answers are similar or not. As seen in table 4.16 for depression the p-value is 0.906. This number is greater than 0.05 indicating that for depression equal variances are assumed between Optometry and Biokinetics students. For anxiety the p-value is 0.263. This number is greater than 0.05 indicating that for anxiety equal variances are assumed between Optometry and Biokinetics students. For stress the p-value is 0.182. This number is greater than 0.05 indicating that for stress equal variances are assumed between Optometry and Biokinetics students.

**Table 4.17: T-test for Equality of Means**

	T	Df (Degrees of Freedom)	P-Value
Depression	0.415	105	0.679
Anxiety	0.963	105	0.338
Stress	0.891	105	0.375

The t-test tells us whether there are differences between the scores for Optometry and Biokinetics. When looking at table 4.17 above, the p-value for depression is 0.679, the p-value for anxiety is 0.338 and the p-value for stress is 0.375. All these values are greater than 0.05 indicating that there is no significant statistical difference between Optometry and Biokinetics for depression, anxiety and stress.

However, when looking at table 4.15, there was a trend showing that the Biokinetics students had lower scores for depression, anxiety and stress compared to the Optometry students, indicating that they are less depressed, anxious and stressed but the scores are not statistically significant to make a difference.

### *Comparisons for academic year*

The independent samples t-test was used as two groups were compared, juniors and seniors. The juniors consisted of the first- and second-year Optometry and Biokinetics students, and the seniors consisted of the third- and fourth-year Optometry and Biokinetics students.

**Table 4.18: Group Statistics**

Academic Year		N	Mean	Std. Deviation	Std. Error Mean
Depression	Juniors	60	10.80	10.707	1.382
	Seniors	47	14.30	11.298	1.648
Anxiety	Juniors	60	8.33	7.385	0.953
	Seniors	47	11.62	7.660	1.117
Stress	Juniors	60	12.33	8.627	1.114
	Seniors	47	17.68	10.901	1.590

Table 4.18 above shows the mean score for depression for junior students was 10.80 and for senior students was 14.30, when looking at the scoring key in table 4.7, this indicated that on average the junior students experienced 'mild' depression levels and the senior students experienced 'moderate' depression levels. For anxiety, the mean score for the junior students was 8.33 and for the senior students was 11.62, when looking at the scoring key in table 4.7, this indicated that on average the junior students experienced 'mild' anxiety levels and the senior students experienced 'moderate' anxiety levels. For stress, the mean score for the junior students was 12.33 and for the senior students was 17.68, when looking at the scoring key in table 4.7, this indicated that on average the Optometry students experienced 'normal' stress levels and the Biokinetics students experienced 'mild' stress levels.

**Table 4.19: Levene's Test for Equality of Variances**

		F	P-Value
Depression	Equal variances assumed	0.891	0.347
Anxiety	Equal variances assumed	1.571	0.213
Stress	Equal variances assumed	3.778	0.055

Levene's test for equality of variances looks at whether the spread of the answers are similar or not. As seen in table 4.19 for depression the p-value is 0.347. This number is greater than 0.05 indicating that for depression equal variances are assumed between junior and senior students. For anxiety the p-value is 0.213. This number is greater than 0.05 indicating that for anxiety equal variances are assumed between junior and senior students. For stress the p-value is 0.055. This number is greater than 0.05 indicating that for stress equal variances are assumed between junior and senior students.

**Table 4.20: T-Test for Equality of Means**

	T	Df	P-Value
Depression	-1.637	105	0.105
Anxiety	-2.246	105	<b>0.027</b>
Stress	-2.833	105	<b>0.006</b>

The t-test tells us whether there are differences between the scores for juniors and seniors. When looking at table 4.20 above, the p-value for depression is 0.105, the p-value for anxiety is 0.027 and the p-value for stress is 0.006. The values for depression are greater than 0.05 indicating that there is no significant statistical difference between junior and senior students for depression. The values for anxiety and stress are both smaller than 0.05 indicating that there is a significant statistical difference between junior and senior students for anxiety and stress.

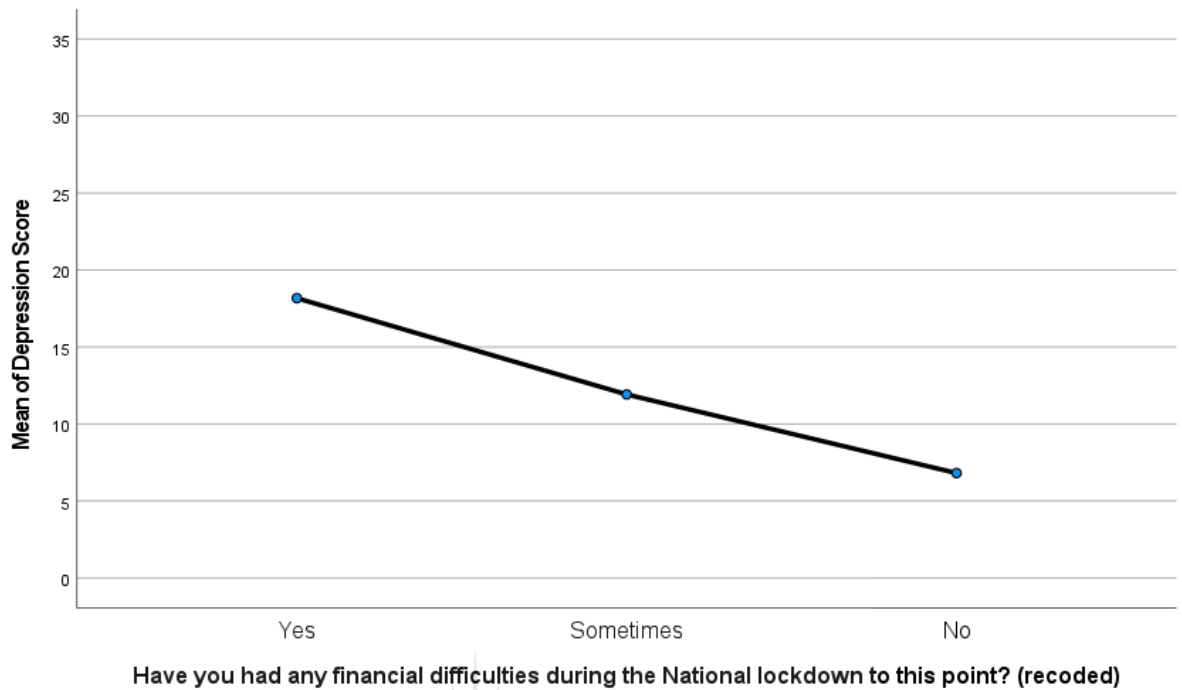
*Comparison for financial difficulties*

The one-way ANOVA test was used when looking at financial difficulties as three groups were compared.

**Table 4.21: Financial difficulties statistics**

		N	Mean	Std. Deviation
Depression	Yes	34	18.18	12.174
	Sometimes	40	11.93	10.029
	No	33	6.82	7.852
	Total	107	12.34	11.056
Anxiety	Yes	34	13.21	7.599
	Sometimes	40	9.53	8.409
	No	33	6.55	4.969
	Total	107	9.78	7.648
Stress	Yes	34	18.68	10.438
	Sometimes	40	14.58	9.589
	No	33	10.70	8.593
	Total	107	14.68	10.005

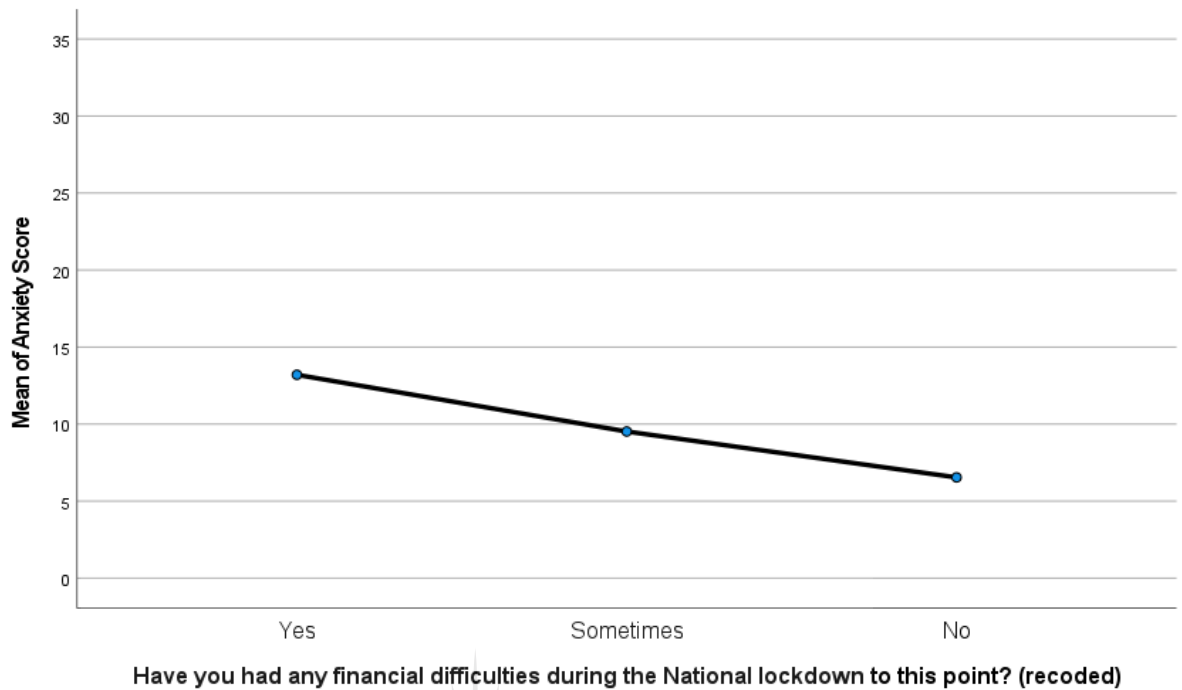
From table 4.21 above the N-value indicates how many participants selected yes, sometimes or no. When looking at depression, the participants who selected ‘yes’ to experiencing financial difficulties had a mean score of 18.8, the participants who selected ‘sometimes’ to experiencing financial difficulties had a mean score of 11.93 and the participants who selected ‘no’ to experiencing financial difficulties had a mean score of 6.82. This indicated that the depression levels for participants with financial difficulties was higher than the depression levels of the participants who selected sometimes and no. In figure 4.1 below a decreasing trend is noted when comparing the mean values for depression.



**Figure 4.1: Line graph demonstrating mean score for depression**

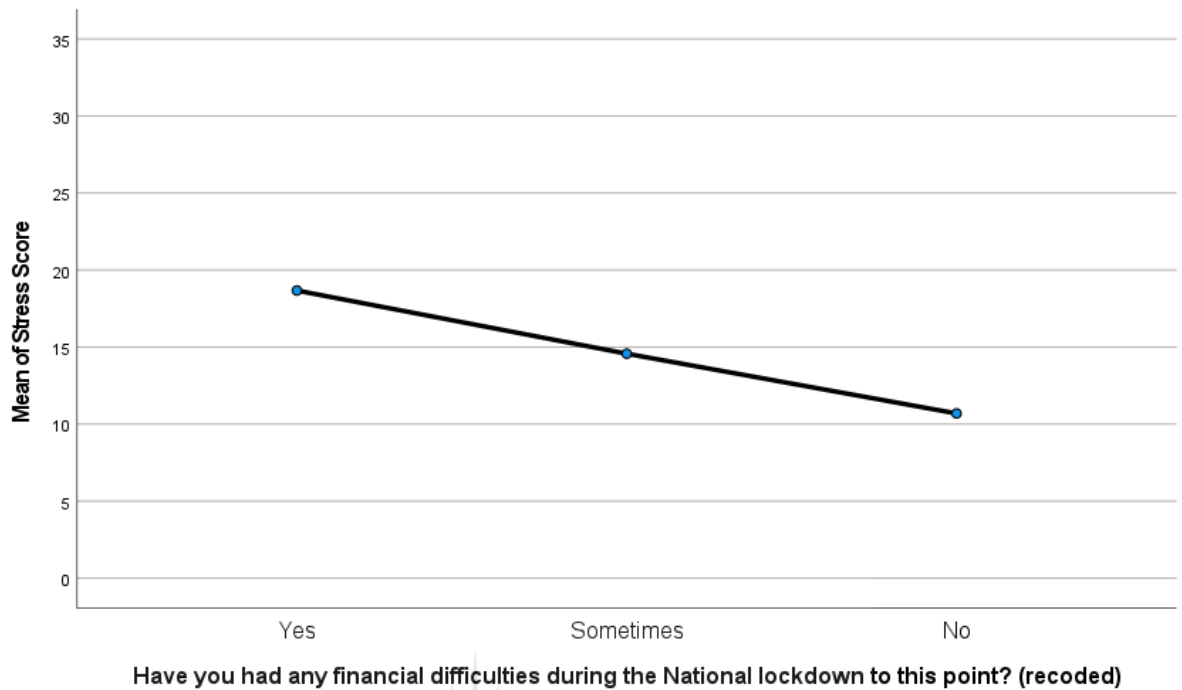
When looking at anxiety, the trend was the same as depression, the participants who selected ‘yes’ to experiencing financial difficulties had a mean score of 13.21, the participants who selected ‘sometimes’ to experiencing financial difficulties had a mean score of 9.53 and the participants who selected ‘no’ to experiencing financial difficulties had a mean score of 6.55. This indicated that the anxiety levels for participants with financial difficulties was higher than the anxiety levels of the participants who selected sometimes and no. In figure 4.2 below a decreasing trend is noted when comparing the mean values for anxiety.





**Figure 4.2: Line graph demonstrating mean score for anxiety**

When looking at stress, the trend was the same as depression and anxiety, the participants who selected 'yes' to experiencing financial difficulties had a mean score of 18.68, the participants who selected 'sometimes' to experiencing financial difficulties had a mean score of 14.58 and the participants who selected 'no' to experiencing financial difficulties had a mean score of 10.70. This indicated that the stress levels for participants with financial difficulties was higher than the stress levels of the participants who selected sometimes and no. In figure 4.3 below a decreasing trend is noted when comparing the mean values for stress.



**Figure 4.3: Line graph demonstrating mean score for stress**

**Table 4.22: Test of Homogeneity of Variances**

		Levene Statistic	df1	df2	P-Value
Depression	Based on Mean	5.815	2	104	0.004
Anxiety	Based on Mean	8.001	2	104	0.001
Stress	Based on Mean	1.759	2	104	0.177

From table 4.22 above the p-value for depression was 0.004, the p-value for anxiety was 0.001 and the p-value for depression was 0.117. Based on the mean, the p-values for stress was greater than 0.05 for the test of homogeneity of variances, therefore stress had equal variances. The Scheffe test (Table 4.23 below) was used to test for stress as the variances were equal. Based on the mean, the p-values for depression and anxiety were both less than 0.05 for the test of homogeneity of variances, therefore anxiety and depression did not have equal variances. The Dunnett T3 test (Table 4.24 & 4.25 below) was used to test for differences in depression and anxiety as the variances were not equal. Because there are

statistically significant differences between the 3 groups (yes, sometimes and no financial difficulties) on depression, anxiety and stress (because the p-values are <0.05), the post-hoc tests (multiple comparisons) were done to check between which groups the differences are, as there are 3 groups that we are comparing.

The Scheffe test was done as a post-hoc test where the variances were equal and the Dunnett T3 test was done as a post-hoc test where the variances were not equal. The Dunnett T3 test was done for Depression and Anxiety, because the variances were not equal and the Scheffe test was done for Stress, as the variances between the 3 groups were equal (as can be seen in table 4.22).

A Bonferroni Adjustment/Correction was done for the post-hoc tests, the level of significance was made stricter, so instead of testing the p-values against a significance level of 0.05, the significance level was divided by 3 (as there are 3 groups) and tested the p-values of the post-hoc tests against a significance level of  $0.05 / 3 = 0.0167$ . If the p-values for the multiple comparisons are <0.0167, then there is a significant difference between the two specific groups.

**Table 4.23: Scheffe Table for Stress**

Stress		Mean Difference (I-J)	Std. Error	P-Value	98,33% Confidence Interval	
					Lower Bound	Upper Bound
Yes	Sometimes	4.101	2.235	0.191	-2.42	10.62
	No	7.980*	2.341	<b>0.004</b>	1.15	14.81
Sometimes	Yes	-4.101	2.235	0.191	-10.62	2.42
	No	3.878	2.253	0.232	-2.70	10.45
No	Yes	-7.980*	2.341	<b>0.004</b>	-14.81	-1.15
	Sometimes	-3.878	2.253	0.232	-10.45	2.70

Looking at table 4.23 above where the Scheffe test has been done for stress, there is a statistically significant difference between the Yes and No groups (students

with financial difficulties and no financial difficulties) as the p-value is 0.004, which is  $<0.0167$ . The p-value when comparing Yes against Sometimes is 0.191 and the p-value for Sometimes against No is 0.232 which are both  $>0.0167$ . Therefore there is a statistically significant difference between the Yes and No groups of participants in terms of their stress scores (no significant difference between Yes and Sometimes and no significant difference between Sometimes and No).

According to the mean values in table 4.21 the Yes group had a mean stress score of 18.68 and the No group had a mean stress score of 10.70. Therefore the students with financial difficulties were more stressed (higher mean score) than the students with no financial difficulties (lower mean score).

**Table 4.24: Dunnett T3 Table for Depression**

Dependent Variable: Depression						
Dunnett T3						
		Mean Difference (I-J)	Std. Error	P-Value	98,33% Confidence Interval	
					Lower Bound	Upper Bound
Yes	Sometimes	6.251	2.622	0.059	-1.26	13.77
	No	11.358*	2.495	<b>0.000</b>	4.17	18.54
Sometimes	Yes	-6.251	2.622	0.059	-13.77	1.26
	No	5.107	2.094	0.051	-0.87	11.09
No	Yes	-11.358*	2.495	<b>0.000</b>	-18.54	-4.17
	Sometimes	-5.107	2.094	0.051	-11.09	0.87

Looking at table 4.24 above where the Dunnett T3 test has been done for depression, then there is a statistically significant difference between the Yes and No groups (students with financial difficulties and no financial difficulties) as the p-value is 0.000, which is  $<0.0167$ . The p-value when comparing Yes against Sometimes is 0.059 and the p-value for Sometimes against No is 0.051 which are both  $>0.0167$ . Therefore there is a statistically significant difference between the Yes and

No groups of participants in terms of their depression scores (no significant difference between Yes and Sometimes and no significant difference between Sometimes and No).

According to the mean values in table 4.21 the Yes group had a mean depression score of 18.18 and the No group had a mean depression score of 6.82. Therefore the students with financial difficulties were more depressed (higher mean score) than the students with no financial difficulties (lower mean score).

**Table 4.25: Dunnett T3 Table for Anxiety**

Dependent Variable: Anxiety						
Dunnett T3						
		Mean Difference (I-J)	Std. Error	P-Value	98,33% Confidence Interval	
					Lower Bound	Upper Bound
Yes	Sometimes	3.681	1.862	0.147	-1.64	9.00
	No	6.660*	1.564	<b>0.000</b>	2.16	11.16
Sometimes	Yes	-3.681	1.862	0.147	-9.00	1.64
	No	2.980	1.586	0.181	-1.56	7.52
No	Yes	-6.660*	1.564	<b>0.000</b>	-11.16	-2.16
	Sometimes	-2.980	1.586	0.181	-7.52	1.56

Looking at table 4.25 above where the Dunnett T3 test has been done for anxiety, then there is a statistically significant difference between the Yes and No groups (students with financial difficulties and no financial difficulties) as the p-value is 0.000, which is  $<0.0167$ . The p-value when comparing Yes against Sometimes is 0.147 and the p-value for Sometimes against No is 0.181 which are both  $>0.0167$ . Therefore there is a statistically significant difference between the Yes and No groups of participants in terms of their anxiety scores (no significant difference between Yes and Sometimes and no significant difference between Sometimes and No).

According to the mean values in table 4.21 the Yes group had a mean anxiety score of 14.21 and the No group had a mean anxiety score of 6.55 Therefore the students with financial difficulties were more anxious (higher mean score) than the students with no financial difficulties (lower mean score).

Therefore Optometry and Biokinetic students with financial difficulties were more depressed, anxious and stressed than students with no financial difficulties.



## **CHAPTER FIVE: DISCUSSION**

### **5.1 Introduction**

In this chapter, the information and results attained from the data analysis in chapter four are discussed further. Through the data analysis of this study, three questions were identified which make up the discussion. The questions are as follows:

- 1) What is the psychological effect concerning depression, anxiety, and stress during the coronavirus (COVID-19) pandemic among Optometry and Biomechanics students at the University of Johannesburg?
- 2) How does gender, academic year and financial difficulties effect the level of psychological impact?
- 3) How did the psychological responses of the students in these departments differ from each other with regards to COVID-19?

This discussion incorporates the new information and findings from the current study, as well as views of other studies.

### **5.2 Response Rate**

According to the STATKON statistician, with a total of 317 Optometry and Biokinetics students (200 from Optometry, 117 from Biokinetics) at the University of Johannesburg, a minimum of 50 responses were needed from each course (Total 100 responses) to make this study statistically significant. A total of 107 responses were received (54 from Optometry and 53 Biokinetics) giving a response rate of 33.7%, thus exceeding the requirement rate.

Similar studies have been conducted around the world looking at depression, anxiety, stress, clinical performance, and social support structures on various students such as medical students, dental students, radiology students and health care professionals, however, studies investigating these factors in Optometry and Biokinetics students are lacking. A study done by George and Dangi (2020) in India on anxiety among Optometry and Nursing students showed that 76.44% of students were experiencing severe anxiety, 23,66% of students were experiencing moderate anxiety and none of the students reported mild anxiety. This study used a non-experimental-survey design incorporating the 12 item Likert scale to assess anxiety. Another study was done in Turkey (2017) by Ediz, Ozcakil and Bilgel on depression and anxiety among medical students where 829 responses were received, showed that 30.5% of students experienced mild and moderate levels of depression, and 8.5% of students experienced severe and extremely severe levels of depression, and 35.8% of students experienced mild and moderate levels of anxiety and stress. Female students reported experiencing depression and anxiety more regularly than male students. Depression was more frequent in first year students, in students with poor socio-economic status, and in students that were unsatisfied with their medical education. The incidence of anxiety and depression seemed to decrease as the grades increased. This study used the Turkish version of the Depression, Anxiety, Stress Scale (DASS-42) and the Beck Anxiety Inventory (BAI) to assess depression, anxiety and stress. The number of participants of this current study may not be high enough to meet international standards; however it does meet the acceptable South African standards.

### **5.3 Research Question 1: What is the Psychological Effect Concerning Depression, Anxiety and Stress during the Coronavirus (COVID-19) Pandemic among Optometry and Biomechanics Students at the University of Johannesburg?**

Pandemics and public health emergencies such as the coronavirus (COVID-19) pandemic affects the health, safety and well-being of all individuals in the general



population. Some groups of individuals are more susceptible than others, particularly students and health-care workers. They may feel more exposed to the virus, they may feel that they have no control over the situation, concerned about the health of their families, being isolated and the significant spread of the virus. These factors cause a variety of emotional reactions like unhealthy behaviors, distress and severe psychological effects such as depression, anxiety, stress, burnout, mental fatigue, panic attacks, irritability and fatigue (Sandesh, 2020). However, in this study, the psychological effects that were assessed included depression, anxiety and stress on Optometry and Biokinetics students at the University of Johannesburg.

From the data obtained in chapter four, the following results were presented: the mean score for depression was 12.34, the mean score for anxiety was 9.78 and the mean score for stress was 14.68. Stress had the highest mean score followed by depression and anxiety, however when looking at the scoring key for each construct from table 4.7 it was noted that the mean value for depression and stress was in the mild category and anxiety was in the moderate category. This indicated that Optometry and Biokinetics students experienced mild stress and depression and moderate anxiety levels during the COVID-19 pandemic.

To the researcher's knowledge, no previous study has been done on Optometry and Biokinetics students at the University of Johannesburg to identify the psychological effects of COVID-19. Similar studies were done by Ediz, Ozcakil and Bilgel (2017) investigating depression and anxiety among a large sample of medical students  $n=829$  and demonstrated that 30.5% of students experienced mild and moderate levels of depression, 8.5% of students experienced severe and extremely severe levels of depression, 12.0% of students experienced severe and extremely severe levels of anxiety, and 5.4% of students experienced severe and extremely severe levels of stress. Comparing these results to the Optometry and Biokinetics students of the current study, 23.3% of participants experienced mild and moderate depression, 25.2% of participants experienced severe and extremely severe depression (Table

4.9). When looking at anxiety 29% of the participants experienced severe and extremely severe anxiety (table 4.10). When looking at stress 17.7% of the participants experienced severe and extremely severe stress (table 4.11).

Another study done by George and Dangi (2020), on Optometry and Nursing students reported 76.4% of students experienced severe anxiety and 23.66% of students experienced moderate anxiety. From the current study, 14.0% of students experienced severe anxiety and 12.1% of students experienced moderate anxiety. This illustrates that mental health issues are widespread among health care students when there is no pandemic and when there is a pandemic.

## **5.4 Research Question 2: How Does Academic Year and Financial Difficulties Effect the Level of Psychological Impact?**

### **5.4.1. Academic year**

The Optometry and Biokinetics students were each divided into 2 groups for academic year. The juniors consisted of the first-and-second year students and the seniors consisted of the third-and-fourth year students.

The relationship between the junior and senior students with regards to their mean scores, is indicated in table 4.18 in chapter four. These scores were rated in accordance with the DASS severity index (table 4.7). The results are discussed below.

#### *Depression*

The juniors recorded an average mean score of 10.8 which indicated that on average the junior students experienced ‘mild’ depression levels. The senior students recorded an average mean score of 14.3 which indicated that on average the senior students experienced ‘moderate’ depression levels on the severity scale.

### *Anxiety*

The mean score for the junior students was 8.33 which indicated that on average the junior students experienced 'mild' anxiety levels. The mean score for the senior students was 11.62, which indicated that on average the senior students experienced 'moderate' anxiety levels on the severity scale.

### *Stress*

The mean score for the junior students was 12.33 which indicated that on average the Optometry students experienced 'normal' stress levels. The mean score for the senior students was 17.68 which indicated that on average the Biokinetics students experienced 'mild' stress levels on the severity scale.

When looking at the trend for mean values, it indicated that seniors show greater levels of depression, anxiety and stress. According to the t-test for equality of variances (table 4.20), the p-values for depression were greater than 0.05 which means that there is no statistically significant differences between the levels of depression experienced by the juniors and the seniors. However, the p-values for anxiety and stress were less than 0.05, which indicates a significant statistical difference between junior and senior students for anxiety and stress.

A study done by Sayeed, Kundu, Banna, Hasan, Begun and Khan (2020), on the mental health outcomes and perceptions among students during the pandemic, showed that students under 22 years of age experienced greater psychological impacts with regards to depression, anxiety and stress compared to those over 22 years of age.

Another study by Mehareen, Rahman, Dhira and Sarker (2021), on the prevalence and socio-demographic correlates of depression, anxiety, and co-morbidity during

COVID-19 among public and private university students of Bangladesh, found that university students between 18 and 22 years of age were significantly more likely to suffer from depression and anxiety.

Bayram and Biguel (2008) found that first and second year students experience more depression, anxiety and stress than third- and fourth-year students.

#### **5.4.2. Financial difficulties**

The participants of the study were asked whether they experienced any financial difficulties during the COVID-19 pandemic. Thirty one point eight percent (n=34) of the participants reported experiencing financial difficulties, 30.8% (n=33) did not experience financial difficulties, and 37.4% (n=40) experienced financial difficulties only sometimes.

The mean scores for each category is indicated in table 4.21 in chapter four. These scores were rated in accordance with the DASS severity index (table 4.7). The results are discussed below.

##### *Depression*

The participants who selected ‘yes’ to experiencing financial difficulties had a mean score of 18.8 which is in the ‘moderate’ range, the participants who selected ‘sometimes’ to experiencing financial difficulties had a mean score of 11.93 which is in the ‘mild’ range and the participants who selected ‘no’ to experiencing financial difficulties had a mean score of 6.82 which is in the ‘normal’ range. This indicated that the depression levels for participants with financial difficulties was higher than the depression levels of the participants who selected sometimes and no.

##### *Anxiety*

The trend for anxiety was the same as for depression. The participants who selected 'yes' to experiencing financial difficulties had a mean score of 13.21 which is in the 'moderate' range, the participants who selected 'sometimes' to experiencing financial difficulties had a mean score of 9.53 which is in the 'mild' range, and the participants who selected 'no' to experiencing financial difficulties had a mean score of 6.55 which is in the 'normal' range. This indicated that the anxiety levels for participants with financial difficulties was higher than the anxiety levels of the participants who selected sometimes and no.

### *Stress*

For stress, the trend was the same as depression and anxiety. The participants who selected 'yes' to experiencing financial difficulties had a mean score of 18.68 which is in the 'moderate' range, the participants who selected 'sometimes' to experiencing financial difficulties had a mean score of 14.58 which is in the 'mild' range, and the participants who selected 'no' to experiencing financial difficulties had a mean score of 10.70 which is in the 'normal' range. This indicated that the stress levels for participants with financial difficulties was higher than the stress levels of the participants who selected sometimes and no.

From table 4.22 the p-value for stress was greater than 0.05 for the test of homogeneity of variances, therefore stress had equal variances. The Scheffe test (table 4.23) was used to test for stress as the variances were equal. Based on the mean, the p-values for depression and anxiety were both less than 0.05 for the test of homogeneity of variances, therefore anxiety and depression did not have equal variances. The Dunnett T3 test (tables 4.24 & 4.25) was used to test for differences in depression and anxiety as the variances were not equal. Because there are statistically significant differences between the 3 groups (yes, sometimes and no financial difficulties) on depression, anxiety and stress (because the p-values are <0.05), the post-hoc tests (multiple comparisons) were done to check between which groups the differences are, as there are 3 groups that we are comparing. The

Dunnet T3 test was done for Depression and Anxiety, because the variances were not equal The Scheffe test was done for Stress, as the variances between the 3 groups were equal. Scheffe test for stress showed there is a statistically significant difference between the Yes and No groups. According to the mean values in table 4.21, the Yes group had a mean stress score of 18.68 and the No group had a mean stress score of 10.70. Therefore the students with financial difficulties were more stressed (higher mean score) than the students with no financial difficulties (lower mean score).

The Dunnett T3 test showed that the p-value for depression comparing the Yes and No groups is 0.000, which is  $<0.0167$ . Therefore there was a statistically significant difference between the Yes and No groups of participants in terms of their depression scores. According to the mean values in table 4.21, the Yes group had a mean depression score of 18.18 and the No group had a mean depression score of 6.82. Therefore the students with financial difficulties were more depressed (higher mean score) than the students with no financial difficulties (lower mean score).

Where the Dunnett T3 test was done for anxiety, there was a statistically significant difference between the Yes and No groups as the p-value is 0.000, which is  $<0.0167$ . Therefore there is a statistically significant difference between the Yes and No groups of participants in terms of their anxiety scores. According to the mean values in table 4.21 the Yes group had a mean anxiety score of 14.21 and the No group had a mean anxiety score of 6.55 Therefore the students with financial difficulties were more anxious (higher mean score) than the students with no financial difficulties (lower mean score).

Therefore Optometry and Biokinetic students with financial difficulties were more depressed, anxious and stressed than students with no financial difficulties.

Khan, Sultana, Hossain, Hasan, Ahmed and Sikder (2020), found that financial uncertainty had a significant negative impact on the mental health of Bangladeshi students. Similarly, Moutinho, Lucchetti, da Silva-Ezequiel, and Lucchetti, (2019) found that having a low income was associated with poorer mental health and quality of life among medical students in Brazil.

### **5.5 Research Question 3: How did the psychological responses of the students in these departments differ from each other with regards to COVID-19?**

From the n=107 Optometry and Biokinetics students that participated in the study, n=54 (50.4%) were enrolled in the Optometry course, and n=53 (49.6%) were enrolled in the Biokinetics course.

Table 4.15 demonstrates the relationship between the course statistics and the mean scores for depression, anxiety and stress. These scores were rated in accordance with the DASS severity index (table 4.7). The results are discussed below.

#### *Depression*

Optometry students recorded a mean score of 12.78 and Biokinetics students recorded a mean of 11.89. This indicated that on average the Optometry students and Biokinetics students experienced 'mild' depression levels according to the severity rating scale.

#### *Anxiety*

The mean score for the Optometry students was 10.48, indicating that on average the Optometry students experienced 'moderate' anxiety levels. The mean score for the Biokinetics students was 9.06 indicating that on average the Biokinetics students experienced 'mild' anxiety levels on the severity rating scale.

#### *Stress*

The mean score for the Optometry students was 15.54 indicating that on average the Optometry students experienced 'mild' stress levels. The mean score for the Biokinetics students was 13.81, indicating that on average the Biokinetics students experienced 'normal' stress levels on the severity rating scale.

According to table 4.17 in chapter four, the results from the t-test for equality of means for course showed that there is no significant statistical difference between Optometry and Biokinetics for depression, anxiety and stress. However, when looking at table 4.15, there was a trend showing that the Biokinetics students had lower scores for depression, anxiety and stress compared to the Optometry students, indicating that they are less depressed, anxious and stressed but the scores are not statistically significant to make a difference. In a study done in India by Pandey, Corbett, Mohan, Reagu, Kumar, Farrell and Lindow (2021), to assess anxiety, depression and behavioral changes in junior doctors and medical students associated with the corona virus pandemic, it was found that there was no significant difference in the levels of depression and anxiety in those who were caring for patients with COVID-19 compared to the pre-pandemic levels.

In another study done in South Africa by Simjee, Mncwabe, Sindhrajh, Khan, Seedat, Xulu, Zondi and Rampersad (2021), on the impact of COVID-19 on the Mental Health of Optometry Students at a Higher Education Institution, showed that the majority of participants had normal levels of depression, anxiety and stress with only 8.8% of participants having severe depression, 15.6% of participants having severe anxiety, and 3.4% having severe stress.

## **5.6 What Intervention Strategies are out there**

The aim of psychological intervention is to deliver effective strategies and methods to allow the individual to deal with stressful situations, increased anxiety levels and



unpleasant thoughts (Ornell, Halpern, Kessler and Narvaez, 2020). According to the results of this study, there was a significant psychological impairment noted among Optometry and Biokinetics students at the University of Johannesburg during the COVID-19 pandemic.

Zhang, Shi, Feng, Fang, Zeng and Qu (2021) concluded in their study that early positive psychological intervention had an effect on improving the levels of anxiety in front-line medical staff.

There are preventative measures that students may perhaps undertake to help them to cope with increased levels of depression, anxiety and stress. These include finding psychological support which is done through the internet interface or telephone as face-to-face counselling might not be possible during the pandemic. The Psycad department at the University of Johannesburg offers counseling and help to students in need. The contact details for Psycad can be found in the third chapter of this research study.

Other helplines available to South Africans are:

- Adcock Ingram Depression and Anxiety Helpline – 0800 70 80 90
- The Akeso Psychiatric Response Unit 24 Hour Helpline – 0861 435 787
- Cipla 24 Hour Mental Health Helpline – 0800 456 789
- Life Line South Africa – 0861 322 322
- The South African Depression and Anxiety Group Mental Helpline – 011 234 4837 (South African Depression and Anxiety Group, 2020).

Fredericks, Miranda, Sidani and Farooqui (2020), evaluated the online psychological interventions available out there to determine whether they were evidence based. They found that less than 25% of the online resources out there are evidence based. Among the 25% that were evidence based, mindfulness and meditation were the most common interventions. These interventions, along with

relaxation therapy and deep breathing have shown to significantly decrease the overall level of psychological depression, anxiety, stress, and post-traumatic stress as well as improving sleep and well-being. Additionally, stretching, yoga, and physical exercise, phone consultation, counselling, peer support, referral to clinics, cognitive behavioral therapy, dialectical behavioral therapy, and the use of a buddy system have shown to improve psychological well-being and resilience. Music therapy has shown to be effective in reducing depression, anxiety, and stress, while tailored tools, self-care information, psychoeducational interventions and crisis planning, proved effective in increasing overall psychological wellbeing. Finally, they found that most application-based interventions only provided the relevant interventions when a monthly subscription was purchased which in turn could add to psychological distress.

### **5.7 Summary**

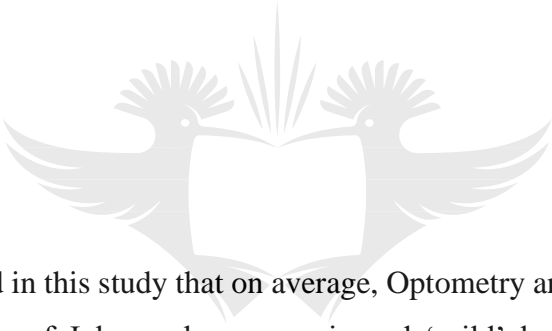
The data gathered in this study revealed that regardless of financial situations, academic year of study and age, in general, the Optometry and Biokinetics students at the University of Johannesburg experienced similar levels of depression, anxiety and stress during the COVID-19 pandemic. All students experience the effects of the COVID-19 pandemic on their mental health and thus mental health promotion, support structures and interventions are indispensable.

## **CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS**

### **6.1 Introduction**

In this chapter, the conclusions regarding the findings reported in chapter four, and the following discussion in chapter five, are presented. The aim of this study was to investigate the psychological responses namely depression, anxiety and stress during the COVID-19 pandemic among Optometry and Biokinetics students at the University of Johannesburg. The limitations of the study and recommendations for further studies will also be discussed.

### **6.2 Conclusion**



It was concluded in this study that on average, Optometry and Biokinetics students at the University of Johannesburg experienced ‘mild’ levels of depression and ‘moderate’ levels of anxiety and stress during the COVID-19 coronavirus pandemic. The data also showed that the senior students experienced statistically significant higher levels of anxiety and stress compared to the junior students, and that students with financial difficulties had statistically significant higher levels of depression, anxiety and stress compared to students who did not experience financial difficulties. However, the levels of depression, anxiety and stress were still in the ‘mild’ and ‘moderate’ ranges irrespective of course, academic year, and financial situation.

Depression, anxiety, and stress are prevalent among Optometry and Biokinetics students at the University of Johannesburg, the effects of which may lead to negative consequences. It is essential to limit the psychological health problems identified in the Optometry and Biokinetics students by providing psychological

intervention opportunities for the students including support groups, self-care, early stress recognition, prevention protocols and education. Mental health strategies, academic concerns, financial worries, and interpersonal relationships can be promoted and addressed by campus health services. Stress can be conquered by coping strategies to preserve the well-being of the Optometry and Biokinetics students.

### **6.3 Limitations**

The following is an acknowledgement of the limitations of this study:

- The response rate was the first limitation and although the 33.7% response rate was within the minimum requirements to make the study statistically significant, it was still low compared to international studies.
- Another limitation was that this was an online survey which was only sent out to Optometry and Biokinetics students studying at the University of Johannesburg. Optometry and Biokinetics students from other universities and post-graduate Optometry and Biokinetics students were not included in the study.
- The third limitation of this study was that the researcher was not able to verify whether the participant completing the questionnaire was actually part of the study population.

The findings of this study may be representative of mental health conditions that the Optometry and Biokinetics students may already have had prior to this study as well as other demographic features not included in this study.

### **6.4 Recommendations for Further Studies**

For future research, the following recommendations are suggested:

- A study utilizing a larger sample size and possibly including students from other universities in South Africa as well to acquire better statistics.
- A study investigating the effects of the COVID-19 pandemic in the long-term with regards to the psychological health - particularly depression, anxiety, and stress - of Optometry and Biokinetics students and possibly including post-graduation students or recently qualified Optometrists and Biokineticists.
- A survey that is physically distributed (possibly after the COVID-19 pandemic) to the Optometry and Biokinetics students and not done online to acquire better response rates.
- A study to investigate the efficacy of the COVID-19 vaccine on the psychological responses among university health care students in South Africa.



## REFERENCES

- American Psychiatric Association., (2020) 'What is Depression?' [Online]. Available at <https://www.psychiatry.org/patients-families/depression/what-is-depression>. [Accessed 12 10 2021].
- Arpacioglu, S., Gurler, M., Cakiroglu, S. (2020). Psychological Effects of COVID-19 on Society and its Reflections on Education. *Turkish Studies*, Volume 15(4), pp. 1-13. doi: <https://dx.doi.org/10.7827/TurkishStudies.44336>.
- Bayram, N., Bigel, N. (2008). The Prevalence and Socio-Demographic Correlations of Depression, Anxiety and Stress Among a Group of University Students. *Social Psychiatry and Psychiatric Epidemiology*, Volume 43(8), pp. 667-672. doi: 10.1007/s00127-008-0345-x.
- Biokinetics Association of South Africa., (2021) 'What is Biokinetics' [Online]. Available at: [https://www.biokineticssa.org.za/Public/Biokineticist\\_MoreInfo](https://www.biokineticssa.org.za/Public/Biokineticist_MoreInfo). [Accessed 18 02 2021].
- Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J. and Zheng, J. (2020) 'The psychological impact of the COVID-19 epidemic on college students in China', *Psychiatry Research*, Volume 287, pp. 1-5.
- Cuncic, A., (2019) 'Understanding Internal and External Validity' [Online]. Available at: <https://www.verywellmind.com/internal-and-external-validity-4584479>. [Accessed 05 05 2021].
- Daniel, J. (2020). Education and the Covid-19 Pandemic. *Prospectus*, Volume 49(91), pp. 92-96. doi: <https://doi.org/10.1007/s11125-020-09464-3>.
- Ediz, B., Ozcakil, A. and Bilgel, N. (2017). Depression and Anxiety Among Medical Students: Examining Scores of the Beck Depression and Anxiety Inventory and the Depression Anxiety and Stress Scale with Student Characteristics. *Cogent Psychology*, Volume 4(1). doi: 10.1080/23311908.2017.1283829.

Ellapen, T.J., Swanepoel, M., (2017) 'Evolution of the Profession of Biokinetics', *South African Journal for Research in Sport, Physical Education and Recreation*, Volume 39, Number 1, pp. 57-65.

Fredericks, S., Miranda, J., Sidani, S. and Farooqui, M.A. (2020). Identifying evidence informed psychological interventions during the COVID-19 pandemic: Rapid review of the literature. *Brain Behaviour and Immunity – Health*, Volume 9. doi: <https://doi.org/10.1016/j.bbih.2020.100171>.

George, M. and Dangi, R.R. (2020). Psychological Perception of Students During COVID-19 Outbreak in India. *High Technology Letters*, Volume 26(6), pp. 142-148.

Kaparounaki, C.K., Patsali, M.E., Mousa, D.V., Papadopoulou, E.V.K., Papadopoulou, K.K.K. and Fountoulakis, K.N. (2020) 'University students' mental health amidst the COVID-19 quarantine in Greece', *Psychiatry Research*, Volume 290, pp. 1-2.

Khan, A.H., Sultana, S., Hossain, S., Hasan, T., Ahmed, H.U. and Sikder, T. (2020). The impact of COVID-19 pandemic on mental health & wellbeing among home-quarantined Bangladeshi students: A cross-sectional pilot study. *Journal of Affective Disorders*, Volume 277, pp. 121-128. doi: <https://doi.org/10.1016/j.jad.2020.07.135>.

Liu, X., Ping, S., Gao, W. (2019). Changes in Undergraduate Students' Well-Being as they Experience University Life. *International Journal of Environmental Research and Public Health*, Volume 16(2864), pp. 2-3. doi: 10.3390/ijerph16162864.

Long, A., Sun, F.K., Tseng, S.T., Huang, H.M. and Chiang, C.Y. (2015) 'Undergraduate Student Nurses Lived Experiences of Anxiety During Their First Clinical Practicum: A Phenomenological Study'. *Nursing Education Today*, Volume 37, pp. 21-26.

Lovibond, P. and Lovibond, S., (1995) 'The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories', *Behaviour Research and Therapy*, Volume 33, Number 3, pp. 335-343.

Mehareen, J., Rahman, M.A., Dhira, T.A. and Sarker, A.R. (2021). Prevalence and socio-demographic correlates of depression, anxiety, and co-morbidity during COVID-19: A cross-sectional study among public and private university students of Bangladesh. *Journal of Affective Disorders Reports*, Volume 5. doi: <https://doi.org/10.1016/j.jadr.2021.100179>.

Moutinho, I.L.D., Lucchetti, A.L.G., da Silva-Ezequiel, O. and Lucchetti, G. (2019). Mental health and quality of life of Brazilian medical students: Incidence, prevalence, and associated factors within two years of follow-up. *Psychiatry Research*, Volume 274, pp. 306-312. doi: <https://doi.org/10.1016/j.psychres.2019.02.041>.

The National Institute of Mental Health., (2018) '*Anxiety Disorders*' [Online]. Available at <https://www.nimh.nih.gov/health/topics/anxiety-disorders>. [Accessed 12 10 2021].

National Health Service., (2019) '*Stress*' [Online]. Available at <https://www.nhs.uk/mental-health/feelings-symptoms-behaviours/feelings-and-symptoms/stress/>. [Accessed 13 10 2021].

Needham, J., (2004) '*Science and Civilization in China*', Volume 4: Physics and Physical Technology; Part 1: Physics, pp. 118-120.

Odriozola-González, P., Planchuelo-Gómez, Á., Iruetia, M. J. and de Luis-García, R. (2020) 'Psychological effects of the COVID-19 outbreak and lockdown among students and workers of a Spanish university', *Psychiatry Research*, Volume 290, pp. 1-8.

Ornell, F., Halpern, C.S., Kessler, P.H.F. and Narvaez, M.C.J. (2020). The Impact of the Covid-19 Pandemic on the Mental Health of Health Care Professionals. *Candernos De Saude Publica*, Volume 36(4), pp. 1-6. doi: 10.1590/0102311X00063520.



Pandy, U., Corbett, G., Mohan, S., Reagu, S., Kumar, S., Farrell, T. and Lindow, S. (2021). Anxiety, Depression and Behavioral Changes in Junior Doctors and Medical Students Associated with the Coronavirus Pandemic: A Cross-Sectional Survey. *The Journal of Obstetrics and Gynecology of India*, Volume 71, pp. 33–37. doi: <https://doi.org/10.1007/s13224-020-01366-w>.

Quadt, L., Esposito, G., Critchley, H. D. and Garfinkel, S. N.; (2020) 'Brain-body interactions underlying the association of loneliness with mental and physical health' *Neuroscience & Biobehavioral Reviews*, Volume 116, pp. 283-300.

Sandesh, R., Shahid, W., Dev, K., Mandhan, N., Shankar, P., Shaikh, A. and Rizwan, A. (2020). Impact of COVID-19 on the mental health of Health Care Professionals in Pakistan. *Cureus*, Volume 12(7), pp. 1-5. doi:10.7759/cureus.8974.

Sayeed, A., Kundu, S., Banna, H., Hasan, T., Begun, M.R. and Khan, S.I. (2020). Mental Health Outcomes During the COVID-19 and Perceptions Towards the Pandemic: Findings From a Cross-Sectional Study Among Bangladeshi Students. *Children and Youth Services Review*, Volume 119. doi: <https://doi.org/10.1016/j.chilyouth.2020.105658>.

Simjee Y, Mncwabe Z, Sindhrajh K, Khan, R., Seedat, M., Xulu, L., Zondi, S. and Rampersad, N. (2021). Impact of COVID-19 on the Mental Health of Optometry Students at a Higher Education Institution: A Case Study. *Afr Vision Eye Health*, Volume 80(1), a652. doi: <https://doi.org/10.4102/aveh.v80i1.652>.

South African Depression and Anxiety Group, (2020). Available at: <https://www.sadag.org/>. Accessed [27 10 2021].

Tran, T., Tran, T. and Fisher, J. (2013) ' Validation of the depression anxiety stress scales (DASS-21) as a screening instrument for depression and anxiety in a rural community-based cohort of northern Vietnamese women', *BMC Psychiatry*, 13, p. 1-6.

University of Johannesburg. (2020). *Optometry*. [Online]. Available at: <https://www.uj.ac.za/faculties/health/Optometry>. [Accessed 17 02 2021].

University of Johannesburg. (2021). *Biokinetics*. [Online]. Available at: <https://www.uj.ac.za/faculties/health/Pages/Biokinetics.aspx>. [Accessed 19 02 2021].

Vidyasagar College of Optometry and Vision Science. (1998-2015). *History of Optometry*. [Online]. Available at: <https://www.vcovs.org/about-optometry/history-of-optometry.html>. [Accessed 17 02 2021].

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C.S. and Ho, R.C., (2020) 'Immediate Psychological Responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China', *The International Journal of Environmental Research and Public Health*, Volume 17, pp. 1-25.

Wang, Z., Yang, H., Yang, Y., Liu, D., Li, Z., Zhang, X., Zhang, Y., Shen, D., Chen, P., Song, W., Wang, X., Wu, X., Yang, X. and Mao, C. (2020) 'Prevalence of anxiety and depression symptom, and the demands for psychological knowledge and interventions in college students during COVID-19 epidemic: A large cross-sectional study', *Journal of Affective Disorders*, Volume 275, pp. 188-193.

Wenjuan, G., Siqing, P., Xinqiao, L. (2020) 'Gender Differences in Depression, Anxiety and Stress Among College Students: A Longitudinal Study From China'. *Journal of Affective Disorders*, Volume 263, pp292-300.

World Council of Optometry., (n.d). *WCO's Concept of Optometry*. [Online]. Available at: <https://worldcouncilofoptometry.info/concept-of-optometry/>. [Accessed 17 02 2021].

Zhang, N., Shi, W., Feng, D., Fang, W., Zeng, Q. and Qu, Y. (2021). A preliminary study on the anxiety and depression situation and psychological intervention of the first-line medical staff in our hospital during the COVID-19 epidemic. *Journal of Clinical Neuroscience*, Volume 91, pp. 9-12. doi: <https://doi.org/10.1016/j.jocn.2021.06.037>.

## Appendix A – Optometry Curriculum

### Optometry Curriculum (University of Johannesburg, 2020)

Table 1: Optometry curriculum first year

<b>First year</b>		
Module name	Module code	Prerequisite code
<b>Semester one</b>		
Human Anatomy 1A	HAN01A1	
Mathematics 1A	MAT01A1	
Psychology 1A	PSY1AA1	
Physics 1C	PHY1CA1	
Chemistry 1A	CEM1CA1	
<b>Semester two</b>		
Physics 1D	PHY1DB1	PHY1CA1
Human Anatomy 1B	HAN01B1	HAN01A1
Psychology 1B	PSY1BB1	PSY1AA1
<b>Year modules</b>		
Introduction to Optometry	OPI00Y1	

Table 2: Optometry curriculum second year

<b>Second year</b>		
Module name	Module code	Prerequisite code
<b>Semester one</b>		
Human Physiology 2A	HPH02A2	HAN01A1 HAN01B1
Microbiology 2A	MCB01A2	
Statistical Methods 1A	SMT01A1	
<b>Semester two</b>		
Biochemistry 1B	BIC01B1	
Human Physiology 2B	HPH02B2	HPH02A2
<b>Year modules</b>		
Ophthalmic Optics	OOP00Y2	PHY1CA1 MAT01A1

		PHY1DB1 OPI00Y1
Dispensing Optometry 1	DOP00Y2	PHY1CA1 MAT01A1 PHY1DB1
Optics	OPO00Y2	PHY1CA1 MAT01A1 PHY1DB1
Optometry 1 Practical	OPP00Y2	PHY1CA1 MAT01A1
Optometry 1 Theory	OPT00Y2	PHY1CA1 MAT01A1 OPI00Y1
General Pathology for Optometry	OPA00Y2	HAN01A1 HAN01B1 CEM1CA1

Table 3: Optometry curriculum third year

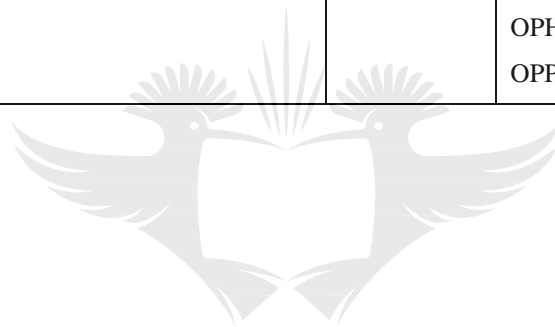
<b>Third year</b>		
Module name	Module code	Prerequisite code
<b>Semester one</b>		
Ocular Anatomy and Physiology 3A	OAF03A3	HAN01A1 HAN01B1 HPH02A2 HPH02B2 OPA00Y2
<b>Semester two</b>		
Ocular Anatomy and Physiology 3B	OAF03B3	HAN01A1 HAN01B1 HPH02A2 HPH02B2 OPA00Y2 OAF03A3
<b>Year modules</b>		
Binocular Vision 1	BVI00Y3	OPP00Y2 OPT00Y2

Contact Lenses 1	CTL00Y3	OPP00Y2 OPT00Y2 BIC01B1 OPO00Y2
Optometry 2 Practical	OPP00Y3	OPP00Y2 OPT00Y2 DOP00Y2
Optometry 2 Theory	OPT00Y3	OPP00Y2 OPT00Y2 DOP00Y2
Dispensing Optometry 2	DOP00Y3	OPP00Y2 OPT00Y2 DOP00Y2
Paediatric Optometry 1	PED00Y3	OPP00Y2 OPT00Y2 PSY1AA1
General and Ocular Pharmacology	OPH00Y3	OPA00Y2 HPH02A2 HPH02B2 MCB01A2
Ocular Pathology 1	OPA00Y3	OPA00Y2 OPP00Y2 OPT00Y2

Table 4: Optometry Curriculum Fourth Year

<b>Fourth year</b>		
Module name	Module code	Prerequisite code
<b>Year modules</b>		
Binocular Vision 2	BVI00Y4	BVI00Y3 OPP00Y3 OPT00Y3
Contact Lenses 2	CTL00Y4	CTL00Y3 OPP00Y3 OPT00Y3
Low Vision 1	LVI00Y4	OPP00Y3 OPT00Y3 OPA00Y3

Optometry 3 Theory	OPT00Y4	OPT00Y3 OPP00Y3 BVI00Y3 PED00Y3
Optometry 3 Research Methods	OPP00Y4	OPP00Y3 OPT00Y3
Paediatric Optometry 2	PED00Y4	OPP00Y3 PED00Y3 BVI00Y3
Community and Environmental Optometry	COB01Y4	OPP00Y3 OPT00Y3
Business Practice, Ethics and Jurisprudence	COB02Y4	OPP00Y3 OPT00Y3
Ocular Pathology 2	OPA00Y4	OPA00Y3 OPH00Y3 OPP00Y3



UNIVERSITY  
OF  
JOHANNESBURG

## Appendix B – Biomechanics Curriculum

### Biomechanics Curriculum (University of Johannesburg, 2021)

Table 10: Curriculum Biokinetics first year

<b>First year</b>		
Module name	Module code	Prerequisite code
<b>Semester one</b>		
Nutrition 1	NUT01A1	
Practice Administration 1	PAM01A1	
Psychology 1A	PSY1AA1	
<b>Semester two</b>		
Biomechanics 1	BIM01B1	
<b>Year modules</b>		
Anatomy and Physiology 1	AAP01Y1	
Biokinetics 1	BIK01Y1	

Table 11: Curriculum Biokinetics second year

<b>Second year</b>		
Module name	Module code	Prerequisite code
<b>Year modules</b>		
Anatomy and Physiology 2	AAP01Y2	AAP01Y1
Biokinetics 2	BIK01Y2	BIK01Y1
Exercise Physiology	EXP01Y2	AAP01Y1
Perpetual Motor Behaviour	PMB01Y2	

Table 11: Curriculum Biokinetics third year

<b>Third year</b>		
Module name	Module code	Prerequisite code
<b>Semester one</b>		
Exercise Science	EXS01A3	AAP01Y2
Research Methodology	RME01A3	
<b>Semester two</b>		
Clinical Exercise Science	CEX01B3	AAP01Y2
<b>Year modules</b>		

Biokinetics Practice 1	BIO01Y3	BIK01Y2
Biokinetics 3	BIK01Y3	BIK01Y2

Table 11: Curriculum Biokinetics fourth year

<b>Fourth year</b>		
Module name	Module code	Prerequisite code
<b>Semester one</b>		
Practice Management and Entrepreneurship	PME01A1	
<b>Year modules</b>		
Biokinetics Practice 2	BIO01Y4	BIK01Y3
Biokinetics 4	BIK01Y4	BIK01Y3
Biokinetics Research: Mini Dissertation	BRD01Y4	





## Appendix C – Permission letter from Optometry HOD



### Letter requesting permission from the Department of Optometry to include students in a research study

Dear Dr. Ingrid Metsing,

My name is Dominique Brüßow, I am currently completing my master's degree in Chiropractic. I am a final year student in the process of completing my dissertation, which is a requirement of my degree. In order to do this I will need to conduct a research study, which will involve the participation of students at the University of Johannesburg, Doornfontein campus.

The study will target all the students currently enrolled in the Bachelor of Optometry and Bachelor of Biokinetics courses. This includes the students from 1<sup>st</sup> year of study to 4<sup>th</sup> year of study. My research topic is: Psychological responses during the coronavirus disease (COVID-19) pandemic among Optometry and Biokinetics students at UJ

The study will be done in the form of an online questionnaire that will take approximately 10 minutes to complete. The department secretary will be requested to circulate the questionnaires via e-mail. No personal information will be requested. The students will remain anonymous in this study. The questionnaire will screen for the presence of depression, anxiety and stress. The participants will be referred to the appropriate professionals at the end of the questionnaire, if the participant falls in the 'severe' or 'extremely severe' category. The University's Centre for Psychological services and Career development (PsyCaD) will be available. Please find a copy of the questionnaire attached.

I am writing this email to request permission from the Department of Optometry for students to partake in my research.


Kind Regards,

Dominique Brüßow

216079317

Chiropractic student

Head of Department: Dr. Ingrid Metsing

  
-----  
CHAIR: DRC

## Appendix D – Permission Letter from Biokinetics HOD



### **Letter requesting permission from the Department of Biokinetics to include students in a research study**

Dear Dr. Heather Morris-Eyton,

My name is Dominique Brüssow, I am currently completing my master's degree in Chiropractic. I am a final year student in the process of completing my dissertation, which is a requirement of my degree. In order to do this I will need to conduct a research study, which will involve the participation of students at the University of Johannesburg, Doornfontein campus.

The study will target all the students currently enrolled in the Bachelor of Optometry and Bachelor of Biokinetics courses. This includes the students from 1st year of study to 4th year of study. My research topic is: Psychological responses during the coronavirus disease (COVID-19) pandemic among Optometry and Biokinetics students at UJ

The study will be done in the form of an online questionnaire that will take approximately 10 minutes to complete. The department secretary will be requested to circulate the questionnaires via e-mail. No personal information will be requested. The students will remain anonymous in this study. The questionnaire will screen for the presence of depression, anxiety and stress. The participants will be referred to the appropriate professionals at the end of the questionnaire, if the participant falls in the 'severe' or 'extremely severe' category. The University's Centre for Psychological services and Career development (PsyCaD) will be available. Please find a copy of the questionnaire attached.

I am writing this email to request permission from the Department of Biokinetics for students to partake in my research.

Kind Regards,

Dominique Brüssow

216079317

Chiropractic student

Head of Department: Dr. Heather Morris-Eyton

A handwritten signature in black ink, appearing to read "Dominique Brüssow". The signature is written in a cursive style and is positioned above a horizontal dashed line.

08/04/2021

## Appendix E – Permission Letter from Department of Research and Innovations



### Letter requesting permission from the Department of Research and Innovation to treat students

Dear Dr Nonkwelo,

My name is Dominique Brüssow, I am currently completing my master's degree in Chiropractic. I am a final year student in the process of completing my dissertation, which is a requirement of my degree. In order to do this I will need to conduct a research study, which will involve the participation of students at the University of Johannesburg, Doornfontein campus.

The study will target all the students currently enrolled in the Bachelor of Optometry and Bachelor of Biokinetics course. This includes the students from 1<sup>st</sup> year of study to 4<sup>th</sup> year of study. My research topic is: Psychological responses during the coronavirus disease (COVID-19) pandemic among Optometry and Biokinetics students at UJ

The study will be done in the form of an online questionnaire that will take approximately 10 minutes to complete. The department secretary will be requested to circulate the questionnaires via e-mail. No personal information will be requested. The students will remain anonymous in this study. The questionnaire will screen for the presence of depression, anxiety and stress. The participants will be referred to the appropriate professionals at the end of the questionnaire, if the participant falls in the 'severe' or 'extremely severe' category. The University's Centre for Psychological services and Career development (PsyCaD) will be available. Please find a copy of the questionnaire attached.

I am writing this email to request permission from the Department of Research and Innovation to undertake research at the University of Johannesburg Doornfontein campus, and for students to partake in my research.

Kind Regards,

Dominique Brüssow

216079317

Chiropractic student

Dr. Nonkwelo

.....

## Appendix F – Information Letter



**DEPARTMENT OF CHIROPRACTIC**  
**RESEARCH STUDY INFORMATION LETTER**

**REC 11.0**

20 September 2020

**Good Day**

My name is Dominique Brüssow. **I WOULD LIKE TO INVITE YOU TO PARTICIPATE** in a research study on Psychological responses during the 2021 coronavirus disease (COVID-19) pandemic among Optometry and Biokinetics students at UJ.

Before you decide on whether to participate, I would like to explain to you why the research is being done and what it will involve for you. This should take about 10 minutes. The study is part of a research project being completed as a requirement for a Masters of Health Sciences in Chiropractic through the University of Johannesburg.

**THE PURPOSE OF THIS STUDY** is to determine the psychological responses, specifically depression, anxiety and stress, during the coronavirus disease (COVID-19) pandemic among Optometry and Biokinetic students at UJ.

Below, I have compiled a set of questions and answers that I believe will assist you in understanding the relevant details of participation in this research study. Please read through these. If you have any further questions I will be happy to answer them for you.

- 1. DO I HAVE TO TAKE PART?** No, you don't have to. It is up to you to decide to participate in the study. I will describe the study and go through this information sheet. If you agree to take part, I will then ask you to sign a consent form.
- 2. WHAT EXACTLY WILL I BE EXPECTED TO DO IF I AGREE TO PARTICIPATE?** You will receive a link to a questionnaire where you will have to give your consent by clicking on the "Agree and continue with survey" when you agree to take part in the study. After this, you will have to fill out a questionnaire, which will ask you questions about your demographics and your state of mind over the past week. Please answer the questionnaire taking **ONLY THE LAST WEEK INTO CONSIDERATION**. Once you have completed the questionnaire, your score will immediately appear at the end. The depression subscale results can be interpreted as normal (0-9), mild (10-13), moderate (14-20), severe (21-27) and very severe (28+). The anxiety subscale results are interpreted as normal (0-7), mild (8-9), moderate (10-14), severe (15-19) and very severe (20+). The stress subscale results are interpreted as normal (0-14), mild (15-18), moderate (19-25), severe (26-33) and very severe (34+). If you score more than 21 for depression, 15 for anxiety and 26 for stress, you are in the 'severe' or 'very severe' group and I strongly urge you to find professional help. This questionnaire is merely a screening tool and does not diagnose you with these conditions. The details for PsyCaD will appear on the page. This information will not be shared with the researcher. Your identity and contact details will not be made available.
- 3. APPROXIMATELY HOW LONG WILL MY PARTICIPATION TAKE?**  
Your participation will take approximately 10 minutes.

- 4. WHAT WILL HAPPEN IF I WANT TO WITHDRAW FROM THE STUDY?** If you decide to participate, you are free to withdraw your consent at any time, before the point of the submission of the questionnaire, without giving a reason and without any consequences. Beyond this point withdrawal of consent is not possible due to the anonymous nature of the research.
- 5. IF I CHOOSE TO PARTICIPATE, WILL THERE BE ANY EXPENSES FOR ME, OR PAYMENT DUE TO ME?** You will not be paid to participate in this study. You will bear no expenses other than the data charges necessary to complete the survey.
- 6. IF I CHOOSE TO PARTICIPATE, WHAT ARE THE RISKS INVOLVED?** You might be screened as having a high risk for depression, anxiety or stress.
- 7. IF I CHOOSE TO PARTICIPATE, WHAT ARE THE BENEFITS INVOLVED?** By taking part in this survey you will be screened for signs of depression, anxiety and stress and can find out whether you are at risk and if needed be referred to PsyCaD so that you may receive help in dealing with your emotional distress and anxiety. You will also assist the understanding of the psychological effects of the pandemic on the Optometry and Biokinetics students and thereby determine what strategies can be implemented to assist the students during such times.
- 8. WILL MY PARTICIPATION IN THIS STUDY BE KEPT CONFIDENTIAL?** Yes, as no identifying information will be asked. All reasonable efforts will be made to keep your personal information confidential and respect your right to privacy. The questionnaire is anonymous and responses cannot be traced back to the participants. You will not be identified in any research reports that are published. The anonymised data will be kept in a password protected file for a duration of 5 years.

**9. WHAT WILL HAPPEN TO THE RESULTS OF THE RESEARCH**

**STUDY?** The results will be written into a research report that will be assessed. In some cases, results may also be published in a scientific journal. In either case, you will not be identifiable in any documents, reports or publications. You will be given access to the results of this if you would like to see them, by contacting me. If you decide to seek effective treatment post-trial, you will be offered the opportunity to do so.

**10. WHAT WILL YOUR RESPONSIBILITIES BE, AS THE**

**RESEARCHER?** As the researcher, I will make sure that all participants are well informed of what the study involves and will be reachable when you or any other participant contacts me. It is my responsibility to collect the data as accurately as possible and to abide by the guidelines of my research. No data will be falsified to benefit myself, or anyone else. It is also my responsibility to maintain the anonymity and confidentiality of all the participants.

**11. WHO IS ORGANISING AND FUNDING THIS RESEARCH STUDY?**

The study is being organised by me, under the guidance of my research supervisor at the Department of Chiropractic at the University of Johannesburg. This study has received funding from the supervisor linked bursary.

**12. WHO HAS REVIEWED AND APPROVED THIS STUDY?**

Before this study was allowed to start, it was reviewed in order to protect your interests. This review was done first by the Department of Chiropractic, and then secondly by the Faculty of Health Sciences Research Ethics Committee at the University of Johannesburg. In both cases, the study was approved.

**13. ARE THERE ANY CONFLICT OF INTERESTS PERTAINING TO THIS STUDY?** There are no conflict of interests held by anyone involved in this study.

**14. WHAT IF THERE IS A PROBLEM?** If you have any concerns or complaints about this research study, its procedures or risks and benefits, you should ask me. You should contact me at any time if you feel you have any concerns about being a part of this study. My contact details are:

Dominique Brüssow

072 8099 437

dominiquebrussow@gmail.com

You may also contact my research supervisor:

Dr. Caroline Hay

carolineh@uj.ac.za



If you feel that any questions or complaints regarding your participation in this study have not been dealt with adequately, you may contact the Chairperson of the Faculty of Health Sciences Research Ethics Committee at the University of Johannesburg:

Prof. Christopher Stein

Tel: 011 559-6564

Email: [cstein@uj.ac.za](mailto:cstein@uj.ac.za)

**FURTHER INFORMATION AND CONTACT DETAILS:** Should you wish to have more specific information about this research project information, have any questions, concerns or



complaints about this research study, its procedures, risks and benefits, you should communicate with me using any of the contact details given above.

*Researcher:*

Dominique Brüßow

A handwritten signature in black ink, appearing to read 'D. Brüßow', is shown on a light grey rectangular background.

## Appendix G – Consent Form



DEPARTMENT OF CHIROPRACTIC

RESEARCH CONSENT FORM

REC 11.0

### Psychological responses during the coronavirus disease (COVID-19) pandemic among Optometry and Biokinetics students at UJ


Please initial each box below:

I confirm that I have read and understand the information letter dated 20 August 2020 for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

I understand that my participation is voluntary and that I am free to withdraw from this study, before the point of submission, without giving any reason and without any consequences to me.

I agree to participate in the above research.

\_\_\_\_\_  
Name of Participant                      Signature of Participant                      Date

Dominique Brüssow                                            21 August 2020

\_\_\_\_\_  
Name of Researcher                      Signature of Researcher                      Date



## Appendix H – Questionnaire (Section A)



Dear Participant

I, Dominique Brüssow, am a Chiropractic Masters student at the University of Johannesburg. I am undertaking this study to explore and understand your psychological responses to the COVID-19 pandemic.

Please complete the questionnaire regarding **your perception and attitude toward the COVID-19 lockdown ONLY DURING THIS LAST WEEK**. This questionnaire will take about 10 minutes of your time. The questionnaire will be anonymous, and your identity and contact details will not be made available. At the end of the questionnaire, you will receive your individualized scores with regards to depression, anxiety and stress and if your score falls within the 'severe' or 'very severe' parameters, I seriously urge you to seek professional help. This is merely a screening and does not diagnose you with any particular condition. Your response is very valuable to us.

This questionnaire together with your responses will be **anonymous** and does not require any personal, identifying information.

To maintain confidentiality, the researcher will be the sole person responsible for handling data. No other person will have access to the data. The information will be stored on a password-protected document as well as a password-protected computer.

Kindly click on the link and follow the steps to complete the questionnaire.

The results of this study will be available upon request.

Feel free to contact me with any queries or comments on 072 809 9437 or e-mail me on [dominiquebrussow@gmail.com](mailto:dominiquebrussow@gmail.com)

Kind Regards

Dominique Brüssow.

**Section A:**

**General Information and Demographic Data**

**1. Age:**

18-24	1
25-29	2
30-34	3
35-39	4
40 and older	5

**2. Gender:**

Male	1
Female	2
Of Non-Discriminatory nature	3

**3. What course are you enrolled in?**

Chiropractic	1
Complementary Health	2
Optometry	3

Podiatry	4
EMC	5
MIRS	6
Biokinetics	7
Sports Management	8

**4. Academic year enrolled in currently**

1 <sup>st</sup> year	1
2 <sup>nd</sup> year	2
3 <sup>rd</sup> year	3
4 <sup>th</sup> year	4
5 <sup>th</sup> year	5
6 <sup>th</sup> year	6

**5. Have you had any financial difficulties during the National Lockdown to this point?**

Yes	1
No	2
Sometimes	3

**6. Marital status**

Single	1
Married	2
Divorced	3
Cohabitation	4
Widowed	5

## Appendix I - Questionnaire (Section B)

Please read each statement carefully and choose the number which best describes your state of mind during the Coronavirus pandemic.

Please do not spend too much time on any statement.

There are no right or wrong answers.

Please answer the questions referring **ONLY TO THE LAST WEEK**.

### Rating scale:

- **0:** Does not apply to me at all
- **1:** Applied to me to some degree or some of the time
- **2:** Applied to me to a considerable degree or a good part of my time
- **3:** Applied to me very much or most of the time

	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1. I found myself getting upset by quite trivial things				
2. I was aware of dryness of my mouth				
3. I could not seem to experience any positive feeling at all				
4. I experience breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)				
5. I just could not seem to get going				
6. I tended to over-react to situations				
7. I had a feeling of shakiness (eg, legs going to give way)				
8. I found it difficult to relax				
9. I found myself in situations that made me so anxious I was most relieved when they ended				
10. I felt that I had nothing to look forward to				
11. I found myself getting upset rather easily				

12. I felt that I was using a lot of nervous energy				
13. I felt sad and depressed				
14. I found myself getting impatient when I was delayed in any way (eg, elevators, traffic lights, being kept waiting)				
15. I had a feeling of faintness				
16. I felt that I had lost interest in just about everything				
17. I felt I wasn't worth much as a person				
18. I felt that I was rather touchy				
19. I perspired noticeably (eg, hands sweaty) in the absence of high temperatures or physical exertion				
20. I felt scared without any good reason				
21. I felt that life wasn't worthwhile				
22. I found it hard to wind down				
23. I had difficulty in swallowing				
24. I couldn't seem to get any enjoyment out of things I did				
25. I was aware of the action of my heart in the absence of physical exertion				
26. I felt down-hearted and blue				
27. I found that I was very irritable				
28. I felt I was close to panic				
29. I found it hard to calm down after something upset me				
30. I feared that I would be "thrown" by some trivial but unfamiliar				
31. I was unable to become enthusiastic about anything				
32. I found it difficult to tolerate interruptions to what I was doing				
33. I was in a state of nervous tension				
34. I felt I was pretty worthless				
35. I was intolerant of anything that kept me from getting on with what I was doing				
36. I felt terrified				
37. I could see nothing in the future to be hopeful about				



38. I felt that life was meaningless				
39. I found myself getting agitated				
40. I was worried about situations in which I might panic and make a fool of myself				
41. I experienced trembling (eg, in the hands)				
42. I found it difficult to work up the initiative to do things				



UNIVERSITY  
 OF  
 JOHANNESBURG

## Appendix J – Thank You Page



Thank you for your Participation

Your Results:

Depression – X

Anxiety – X

Stress - X

Below is a table of possible scores for depression, anxiety and stress.

This questionnaire is used to detect risk of Depression, Anxiety and Stress.

	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely Severe	28+	20+	34+

If you scored in the severe ranges or higher, you are at risk of Depression, Anxiety or stress respectively. We would strongly urge you to seek professional counselling through PsyCaD. Please contact the person below for professional counselling:

Ms Mbalenhle Gumbi

[mbalenhleg@uj.ac.za](mailto:mbalenhleg@uj.ac.za)

011 559 5752

## Appendix K – DASS-42 Score Sheet

### DASS 42 SCORE SHEET

Enter each score from the questionnaire into the first two columns.

Add up each row and enter the score into the available box (D, A or S)

Add up the each of the D, A and S columns.

The total for each column is the score for that trait:

D = Depression

A = Anxiety

S = Stress

Use the ratings table below to assess the meaning of each score.

Q	Score	Q	Score	All D scores	All A scores	All S
1		22				
2		23				
3		24				
4		25				
5		26				
6		27				
7		28				
8		29				
9		30				
10		31				
11		32				
12		33				
13		34				
14		35				
15		36				
16		37				
17		38				
18		39				
19		40				
20		41				
21		42				
Total for D	Total for A	Total for S				

<b>Interpretation</b>	<b>Depression (D)</b>	<b>Anxiety (A)</b>	<b>Stress (S)</b>
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely Severe	>28	>20	>34



UNIVERSITY  
OF  
JOHANNESBURG

## Appendix L – Research Ethics Committee Letter



### FACULTY OF HEALTH SCIENCES

### RESEARCH ETHICS COMMITTEE

NHREC Registration: REC 241112-035

### ETHICAL CLEARANCE LETTER

(RECX 2.0)

Student/Researcher Name	Dominique Brüssow	Student Number	216079317
Supervisor Name	Hay, Caroline		
Department	Chiropractic		
Research Title	PSYCHOLOGICAL RESPONSES DURING THE CORONAVIRUS DISEASE (COVID-19) PANDEMIC AMONG OPTOMETRY AND BIOKINETICS STUDENTS AT UJ		
Date	02 November 2020	Clearance Number	REC-793-2020

Approval of the research proposal with details given above is granted, subject to any conditions under 1 below, and is valid until 2021/11/01.

#### 1. Conditions:

Gatekeeper permission, as required.

#### 2. Renewal:

It is required that this ethical clearance is renewed annually, within two weeks of the date indicated above. Renewal must be done using the Ethical Clearance Renewal Form (REC 10.0), to be completed and submitted to the Faculty Administration office. See *Section 12 of the REC Standard Operating Procedures*.

#### 3. Amendments:

Any envisaged amendments to the research proposal that has been granted ethical clearance must be submitted to the REC using the Research Proposal Amendment Application Form (REC 8.0) prior to the research being amended. Amendments to research may only be carried out once a new ethical clearance letter is issued. See *Section 13 of the REC Standard Operating Procedures*.

#### 4. Adverse Events, Deviations or Non-compliance:

Adverse events, research proposal deviations or non-compliance must be reported within the stipulated time-frames using the Adverse Event Reporting Form (REC 9.0). See *Section 14 of the REC Standard Operating Procedures*.

The REC wishes you all the best for your studies.

Yours sincerely,



Prof. Christopher Stein  
**Chairperson: REC**  
Tel: 011 559 6564  
Email: [cstein@uj.ac.za](mailto:cstein@uj.ac.za)

RECX 2.0 – Faculty of Health Sciences  
Research Ethics Committee

**Secretariat:** Ms Raihaanah Pieterse  
Tel: 011 559 6073 email: [rpieterse@uj.ac.za](mailto:rpieterse@uj.ac.za)



**Appendix M – Higher Degrees Committee Letter**



**FACULTY OF HEALTH SCIENCES  
HIGHER DEGREES COMMITTEE**

**HDC-01-79- 2020  
20 October 2020**

**TO WHOM IT MAY CONCERN:**

**STUDENT: BRUSSOW, D  
STUDENT NUMBER: 216079317**

**TITLE OF RESEARCH PROJECT:** Psychological Responses during the 2020 Coronavirus Disease (COVID-19) Pandemic among Optometry and Biokinetics Students at UJ

**DEPARTMENT OR PROGRAMME: CHIROPRACTIC**

**SUPERVISOR: Dr C Hay CO-SUPERVISOR: -**

The Faculty Higher Degrees Committee has scrutinised your research proposal and concluded that it complies with the approved research standards of the Faculty of Health Sciences; University of Johannesburg.

The HDC would like to extend their best wishes to you with your postgraduate studies

Yours sincerely,

A handwritten signature in blue ink, appearing to read "A Temane", is written over a horizontal line.

**Prof A Temane  
Chair: Faculty of Health  
Sciences HDC  
Tel: 011 559 6972  
Email: anniet@uj.ac.za**

## Appendix N - Turnitin

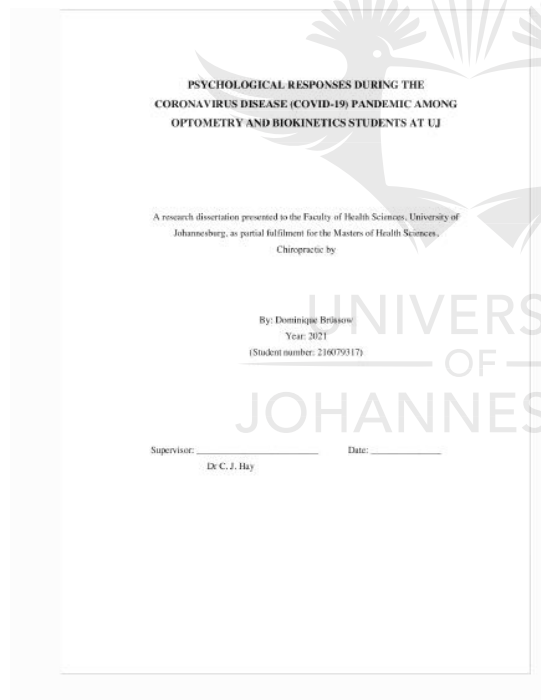


### Digital Receipt

This receipt acknowledges that Turnitin received your paper. Below you will find the receipt information regarding your submission.

The first page of your submissions is displayed below.

Submission author: D BRUSSOW  
Assignment title: Turnitin  
Submission title: Psychological Responses During the Coronavirus (COVID-19) ...  
File name: final\_version\_for\_turnitin.docx  
File size: 928.21K  
Page count: 144  
Word count: 28,522  
Character count: 158,547  
Submission date: 11-Nov-2021 07:40PM (UTC+0200)  
Submission ID: 1699954266



Match Overview		
<b>15%</b>		
Currently viewing standard sources		
<a href="#">View English Sources (Beta)</a>		
Matches		
1	<a href="http://www.uj.ac.za">www.uj.ac.za</a> Internet Source	6% >
2	<a href="http://hdl.handle.net">hdl.handle.net</a> Internet Source	2% >
3	Submitted to University... Student Paper	1% >
4	Submitted to University... Student Paper	1% >
5	<a href="http://ujcontent.uj.ac.za">ujcontent.uj.ac.za</a> Internet Source	1% >
6	<a href="http://pubcovid19.pt">pubcovid19.pt</a> Internet Source	1% >
7	<a href="http://www.vcovs.org">www.vcovs.org</a> Internet Source	1% >
8	<a href="http://www.coppellisd.com">www.coppellisd.com</a> Internet Source	1% >
9	<a href="http://www2.upmin.edu.ph">www2.upmin.edu.ph</a> Internet Source	1% >
10	<a href="http://en.wikipedia.org">en.wikipedia.org</a> Internet Source	1% >
11	Submitted to Stadio Ho... Student Paper	1% >