



UNIVERSITY OF THE PHILIPPINES

Master of Arts in Nursing

Ronald Ian T. Lim, RN

**The Effect of Virtual Reality on Improving Biophysical Profile and
State of Mind Among End-Stage Renal Disease Patients on Hemodialysis
in Metro Manila, Philippines**

Thesis/Dissertation Adviser:

Asst. Prof. Queenie R. Ridulme, MAN, RN
Faculty of Management and Development Studies

Thesis/Dissertation Critic:

Asst. Prof. Rita C. Ramos, MAN, RN
Faculty of Management and Development Studies

Date of Submission

25 June 2020

Permission is given for the following people to have access to this thesis/dissertation:

Available to the general public	Yes
Available only after consultation with author/thesis/dissertation adviser	Yes
Available only to those bound with confidentiality agreement	Yes

Student's Signature:

Signature of Thesis/Dissertation Adviser:

University Permission Page

"I hereby grant the University of the Philippines a non-exclusive, worldwide, royalty-free license to reproduce, publish, and publicly distribute copies of this thesis or dissertation in whatever form subject to the provisions of applicable laws, the provisions of the UP IPR policy and any contractual obligations, as well as more specific permission marking on the Title Page."

"Specifically, I grant the following rights to the University:

- a) To upload a copy of the work in the theses database of the college/school/institute/department and in any other databases available on the public internet;*
- b) To publish the work in the college/school/institute/department journal, both in print and electronic or digital format and online; and*
- c) To give open access to above-mentioned work, thus allowing "fair use" of the work in accordance with the provisions of the Intellectual Property Code of the Philippines (Republic Act No. 8293), especially for teaching, scholarly, and research purposes."*

Ronald Ian T. Lim (25 June 2020)

Student Name Over Signature and Date



UNIVERSITY OF THE PHILIPPINES
OPEN UNIVERSITY
FACULTY OF MANAGEMENT AND DEVELOPMENT STUDIES

CERTIFICATE OF ACCEPTANCE OF THESIS

The thesis attached hereto, **The Effect of Virtual Reality on Biophysical Profile and State of Mind among End-Stage Renal Disease Patients undergoing Hemodialysis in Metro Manila** prepared and submitted by **MR. RONALD IAN LIM**, in partial fulfillment of the requirement of the requirement for the degree **Master of Arts in Nursing** with specialization in **Adult Health Nursing** is accepted.

ASST. PROF. QUEENIE R. RIDULME
Chair/Adviser

Accepted as partial fulfillment of the requirements for the degree of

MASTER OF ARTS IN NURSING

DR. PRIMO G. GARCIA
Dean
Faculty of Management and Development
Studies
UP Open University



UNIVERSITY OF THE PHILIPPINES
OPEN UNIVERSITY

FACULTY OF MANAGEMENT AND DEVELOPMENT STUDIES

APPROVAL SHEET

We, the members of the oral examination panel for **MR. RONALD IAN LIM** unanimously approved the thesis entitled **“The Effect of Virtual Reality on Biophysical Profile and State of Mind among End-Stage Renal Disease Patients undergoing Hemodialysis in Metro Manila”**. The thesis attached hereto was defended on June 11, 2020 at UPOU Learning Center in Manila for the degree of **Master of Arts in Nursing** is hereby accepted.

PANEL MEMBERS

SIGNATURE

ASST. PROF. QUEENIE R. RIDULME
Chair/Adviser

ASST. PROF. RITA C. RAMOS
Critic

MS. MA. ELMA L. MIRANDILLA
Member

MS. RIA VALERIE CABANES
Member

MS. GRACE RIEGO DE DIOS
Member

We therefore recommend that **MR. RONALD IAN T. LIM** be awarded the degree of **Master of Arts in Nursing** from the **Faculty of Management and Development Studies**.

Very truly yours,

ASST. PROF. QUEENIE R. RIDULME
Chair/Adviser

Endorsed:

ASST. PROF. QUEENIE R. RIDULME
Program Chair, MAN

DR. PRIMO G. GARCIA
Dean

TABLE OF CONTENTS

	Page
Title Page	i
University Permission Page	ii
Certificate of Acceptance of Thesis	iii
Approval Sheet	iv
Table of Contents	v
List of Tables	vii
List of Figures	viii
List of Appendices	ix
Acknowledgment	x
Abstract	xii
Chapter 1: The Research Problem	
Background of the Study	1
Statement of the Problem	4
Research Objectives	4
Research Questions	4
Research Hypothesis	5
Significance of the Study	5
Chapter 2: Theoretical Background	
Review of Related Literature	8
Theoretical Framework	17
Conceptual Framework	18
Operational Definition of Terms	20
Chapter 3: Research Methodology	
Research Design	22
Research Variables	23

Sampling Technique	23
Research Setting	24
Method and Procedure of Data Collection	25
Research Instrument and Tools	28
Plan for Data Analysis & Interpretation	33
Ethical Considerations	34
Chapter 4: Results and Discussion	
Demographics	35
State of Mind and Biophysical Profile Before and After VRE	36
Significance of Pre-post VR Measurement Variances	54
State of Mind and Biophysical Correlation	57
Chapter 5: Summary, Conclusion and Recommendations	
Summary	60
Conclusion	60
Recommendations	61
References	62
Appendices	68

LIST OF TABLES

Table 1.	Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults	30
Table 2.	Spielberger State-Trait Anxiety Inventory	32
Table 3.	Spielberger's Manual to Interpret Scores	33
Table 4.	Demographical Data of Participants	35
Table 5.	Biophysical Measures	36
Table 6.	Biophysical Profile of Mean Scores during Second Visit	38
Table 7.	Biophysical Profile of Mean Scores during Third Visit	39
Table 8.	Level of Anxiety Scores for First Visit	42
Table 9.	Level of Anxiety Scores for Second Visit	43
Table 10.	Level of Anxiety Scores for Third Visit	44
Table 11.	Level of Anxiety Scores for Total Visit	45
Table 12.	State of Mind in Terms of Per Item Scale for First Visit	46
Table 13.	State of Mind in Terms of Per Item Scale for Second Visit	48
Table 14.	State of Mind in Terms of Per Item Scale for Third Visit	50
Table 15.	State of Mind in Terms of Per Item Scale for Total Visit	52
Table 16.	Pre-Post VR Exposure Mean Difference in ANOVA	54
Table 17.	STAI-S and Biophysical Profile Correlations	57

LIST OF FIGURES

Figure 1	Conceptual Framework	18
Figure 2	Pre-post Biophysical Parameters across VR Exposure Visits	41
Figure 3	Pre-post Anxiety Across VR Exposure Visits	45

LIST OF APPENDICES

Appendix. A	Informed Consent	68
Appendix. B	Survey Questionnaire	70
Appendix. C	Documentation	79
Appendix. D	Curriculum Vitae	80

ACKNOWLEDGEMENTS

I cannot express enough thanks to my committee for their continuous support and encouragement: Asst. Prof. Queenie R. Ridulme, MAN, RN, my Adviser; Asst. Prof. Rita Ramos, MAN, RN, my critic; Prof. Mirandilla, Prof. Cabanes, Prof. Riego De Dios, my panel members. I offer my sincere appreciation for the learning opportunities provided by my committee.

To my Parents for their moral encouragement, financial assistance as well as their spiritual support.

To my Children, thank you for giving me personal time for this research writing and for serving as my motivation and inspiration to pursue this path.

To my Wife, Angelie, thank you for the love, guidance, advices, support and for turning on the light when the time is dark.

And lastly, to Almighty God, thank you for bestowing me wisdom, knowledge, and courage to strive harder and pursue this journey.

ABSTRACT

End-Stage Renal Disease (ESRD) patients frequently experienced disturbed activities of daily living (ADL) and functional health pattern affecting their biophysical profile and state of mind. The study aimed to determine the effect of Virtual Reality Exposure (VRE) intervention to manage anxiety of End-stage renal disease patients in terms of improvement of Biophysical Profile and State of Mind undergoing hemodialysis as part of nursing intervention. The study was conducted in a dialysis center in Las Pinas City and in a tertiary hospital in Paranaque City. The research utilized Pre-post Experimental design. Assessment survey (biophysical profile and anxiety) were collected pre and post VRE during hemodialysis treatment and were observed all throughout three (3) sessions. From Purposive convenience sampling, thirty-three (33) were included. Throughout the (3) sessions, biophysical profile was observed to decrease every after VRE where Systolic BP (137 vs 130/bpm, $p = < .00001$), Diastolic BP (84 vs 81/bpm, $p = .00174$), Heart rate (79 vs 77/bpm, $p = .00089$) and Respiration (20 vs 19/cpm, $p = .00048$). Anxiety level of participants were also improved from 42 (high anxiety) vs 28 (low anxiety) where p value is $< .00001$. All throughout the visits, "state of mind" shows a significant reduction in scores for statements of "not relax", "contented", "calm" and "feeling worried." Results also showed that there was a correlation between person's state of mind and BP, also with HR. Respiration was very weakly correlated to state of mind ($r=0.04$) but insignificant ($p=.825$). This study revealed that integration of VRE was effective in reducing anxiety for pre-post VRE exposure. In conclusion, integrating VRE visualization helped ESRD patients changed their outlook by keeping a calm and relax state all throughout hemodialysis.

CHAPTER 1

THE RESEARCH PROBLEM

BACKGROUND OF THE STUDY

Chronic Kidney disease or CKD, a common chronic illness to elderly, became surprisingly popular to young Filipinos. Tacio (2018) had further described of unforeseen development that tapped the public issue of worsening case and management of CKD in the Philippines. Chronic kidney disease is a condition wherein patient's kidneys have been damaged resulting to inefficient blood filtration that cause excessive fluid retention and wastes in the body. On year 2018, there is an increasing case of 7,000 CKD patients recorded by DOH which alarmingly affects younger age from 20 to 30s. Arising number of CKD patients especially those who are in End-Stage Renal Disease or ESRD have to undergo dialysis has been a problem since only handful can keep up with the expenses. Financial load is just one of obvious burden associated in having ESRD along with decreasing daily performance and a drastic lifestyle change hence the condition brings disturbance in the actual state of mind of ESRD patients.

ESRD patients are required to undergo dialysis therapy to control the disease prognosis. Research show that these patients frequently experienced disturbed activities of daily living (ADL) and functional health pattern. These disturbances are associated to stress and anxiety brought by patient's ESRD condition (Bross et al., 2016). Prolonged severe anxiety results to increase frequency of hospital visits and directly affect the span of patient survival and rate of mortality. Anxiety is also a barrier in providing efficient care to patients resulting to slow improvement of their emotional and mental state (Augustyniak-Bartosik et al., 2018).

To address these factors contributing to patient's anxiety, forms of anxiety-reduction and state-of-mind improvement techniques under Cognitive Behavioural Therapy (CBT) have been used such as guided-imagery and exposure therapy. Recently, Virtual Reality technology was incorporated as a non-pharmacologic tool to be used for anxiety and fear reduction. Cope, Tyrrant and Viczko (2018) described that VR technology had long been used in the medical field due to its positive effects in improving physiologic and mental state of the patients through virtual exercise, 3D videos screening for meditation and relaxation and walk-through effects for re-enactment and recollection of past experiences and places. VR technology was integrated as an Exposure intervention used to patients experiencing post-traumatic disorders (PTSD) and phobias. Patients are exposed in a controlled image wherein patient can "virtually feel" the positive presence through its 360° engaging video results to strong feeling of relaxation through watching 3D videos design for relaxation and entertainment (Cope H. et al, 2018). A same study in Iran was also carried to 30 primigravida mothers who will undergo episiotomy repair after normal birth delivery. A 3D video was assigned to be watched as form of distraction and relaxation technique. Result showed that anxiety scores of the intervention group have decreased after VR exposure compared to the controlled group who received normal post-partum care (Golmakhani et al., 2016). This same scenario occurred when the researcher experiences first-hand the effectiveness of using Virtual Reality Box (VR box) as a tool for fear reduction. The study was conducted for pre-operative patients who were then asked to wear VR head gear to watch videos in 3-dimensional format prior operation. Finding shows that those patients who undergone VR exposure intervention has lower scores of fears compared to patients who proceed to normal pre-op care mainly due to relaxation and positive diversion of 3D videos from stress and fear of operation.

Vital signs of patients such as heart rate, pulse rate and blood pressure are also improved. The study proved that VR exposure is a contributing factor in fear reduction resulting to a more stable biophysical condition (Lim et.al, 2018). The study had given hope to the researcher that VR Exposure intervention can also be applied to chronically ill patients who experience moderate anxiety for a period as a form of relaxation, diversion or entertainment for improving state of mind and biophysical state during hemodialysis.

Above mentioned studies showed the effectivity of Virtual Reality technology as a psychotherapeutic approach in reducing anxiety and fear, but this tool has not been yet tested in improving the state of mind of chronically ill patients. This would be a challenge since state of mind of chronically ill patients may be different and their anxiety may last longer as compare to patients who will have to undergo a one-time only procedure. Case of ESRD patients in Hemodialysis is a good starting point most especially these patients must undergo dialysis procedure with no definite time. Their anxiety may occur most often during dialysis and if poor state of mind persists longer and frequently, anxiety can be a barrier in providing quality care and biophysical state of patients may also be altered.

The goal of the research was to reduce anxiety by letting patients immerse on a virtual reality experience by improving their state of mind through relaxation, meditation, entertainment and to divert them from anxiety as part of nursing intervention. The researchers believed that Virtual reality exposure can significantly reduce anxiety during hemodialysis, as well as biophysical status of the patient that result to better provision of care. The VR exposure intervention was established to be effective in reducing anxiety of hemodialysis patients and can be of used to fill the gap

in finding new and modern ways in improving patient care experience particularly to chronically ill patients.

Statement of the Problem

The problem of the study was to identify the effect of Virtual Reality Exposure intervention through 3D video experience using Virtual Reality Box in reducing anxiety by improving Biophysical measures and State of Mind of End-stage renal disease patients undergoing hemodialysis treatment.

Objectives of the Study

The primary objective of the study was to determine the effect of Virtual Reality Exposure intervention to manage anxiety of End-stage renal disease patients in terms of improvement of Biophysical measures and State of Mind undergoing hemodialysis treatment.

Research Questions

The study aims to answer the following questions:

1. What is the level of anxiety of ESRD patients undergoing hemodialysis before and after in repeated measures Virtual Reality Exposure (VRE) in terms of:

1.1. Biophysical measures

1.1.1. Blood Pressure

1.1.2. Heart Rate

1.1.3. Respiratory Rate

1.2. State of Mind

2. Is there a significant difference between the level of anxiety of ESRD patients undergoing hemodialysis before and after VRE in terms of:

2.1. Biophysical measures

2.1.1. Blood Pressure

2.1.2. Heart Rate

2.1.3. Respiratory rate

2.2. State of mind

3. Is there a significant relationship between the state of mind and biophysical measures?

Research Hypothesis

Based on the foregoing, the following were the specific hypothesis for this study:

Research Arguments:

State of mind: $H_1(-)$: VR exposure sessions will result to decrease in anxiety level.

Biophysical measures: $H_2(-)$: VR exposure sessions will result to decrease vital signs.

Significance of the study

Anxiety is commonly experienced by people with End-stage Renal Disease and is associated with decrease state of Quality of Life (QoL) and has clinical implications. It is important to emphasize to care these patients holistically in physiologic and psychologic needs. If anxiety during their dialysis treatment is reduced, it will encourage the patients not to fear their next visit and will promote adherence, hence physiologic state of patient is also enriched. An improvement of state of mind also resists the barrier of giving better-quality care due to anxiety. Meanwhile, it can also be used by nurses to include as VR new intervention in managing anxiety, which is user friendly, appealing and entertaining to patients and promotes relaxation and comfort when used. It can also be an additional facility by dialysis treatment centers to make the atmosphere more relaxing, patient-friendly and fitting to patients

especially to pediatric patients. The result of the study can bridge the gap of using VR technology in other mental areas aside from its common use in PTSD and phobias. For the researchers and future researchers, the findings will promote in-depth understanding on the role of science and technology in human health. This study will also be used as reference for future research in line with Virtual Reality technology.

Scope and Limitation

The research study was conducted to patients with end-stage renal disease who will undergo hemodialysis treatment. It is then noted that qualified participants are those who exhibit generalized anxiety disorder using assessment tools provided. The patients were selected from different dialysis centers in Metro Manila. In this study, participants were assessed using subjective questionnaires for signs of moderate anxiety. Qualified participants were subjected to VR Exposure intervention during hemodialysis. Biophysical measures and current state of mind were measured pre- and post-intervention every session.

The planned timeline for this study was proposed to be carried for four (4) visits/session per each participant, in line with the brief CBT. However, due to unforeseen challenges brought by the recent pandemic during the study period, the researcher decided to shorten the visits from four (4) to three (3) visits/ session per each participant as compliance to the safety guidelines and protocol set by the governing agencies. Nevertheless, it was assured that the study was still aligned to its protocol and the shortened timeframe would not affect the result of the study. There are studies that showed one-time use of Virtual Reality for pre-post operation and had showed proven effective in alleviating fear and anxiety among patients (Dhonneur et al., 2017; Lim et.al, 2018). A 75-minutes length VRE intervention single visit was also carried out to show VRE effectiveness in reducing Generalized Anxiety Disorder

(GAD) scores through relaxation and meditation and result showed improvement on their biophysical scores and GAD scores (Cope, Tyrant and Viczko, 2018). The above-mentioned studies indicated that the effect of Virtual Reality can be observed in a limited time and the shortened visits would not affect the result of the study. The approved study protocol was still observed and performed, regardless of the cut time frame. All data gathered during the entire session were analysed and studied.

CHAPTER 2

THEORETICAL BACKGROUND

Review of Related Literature

Chronic Kidney Disease: an emerging chronic illness

In the recent years, chronic diseases which were once experienced by elderly have become common to younger generation. A concrete example of the said chronic disease which is now pertinent in young adults is the Chronic Kidney Disease (CKD) or Chronic Renal Failure (CRF). According to Philippine Renal Disease Registry, cases of new patients that underwent dialysis rose by the end of year to 32,077 from 18,603 in January 2015 (Philippine Star, 2017). Alarmingly, new cases of CKD had lowered from age 8 due to inherited diabetes and continue to affect younger professionals aged 12-18 far from the average age of 60-65 age range who were diagnosed with CKD. Magtubo (2017) reported that despite of the continuous efforts of the DOH to raise awareness regarding kidney health, kidney problem is still on rise with 70,000 cases of patients undergoing dialysis which is equivalent to 20% of Filipinos having Chronic Kidney Disease. Reports like these warrants health practitioners to address the issue of rising kidney problems and to improve the current situation of patients with CKD.

By medical terminologies, Chronic Kidney Disease or Chronic Renal Failure is a progressive, irreversible deterioration of renal function wherein the body fails to maintain fluid and electrolyte balance resulting to uraemia (Balita, 2016). Simply, it is a condition in which the kidneys are damaged or can no longer filter blood thus wastes and excess fluid in the blood remain in the body causing other health problems (NCKD, 2017). Patients who are diagnosed with CKD are subjected to intensive control and

management of the disease to minimized further complication and slow down the progression of the condition. When the kidney function is lost by 85-90%, it will be coined as End-Stage Renal Failure (ESRF) or End-Stage Renal Disease (ESRD) wherein patients should undergo dialysis, be it peritoneal or hemodialysis, or kidney transplant (nkti.gov.ph, 2015). But because the latter is too costly and requires longer waiting time for the donor, hemodialysis is the common treatment among Filipinos most often suggested compared to peritoneal dialysis (Magtubo, 2017). Hemodialysis is a form of treatment that uses dialyzer that functions as an artificial kidney in cleaning the blood. Tubes are connected in the machine that filters wastes and extra water and flows back the filtered blood into body in the other tubes. Hemodialysis is usually performed based on doctor's recommendation and lasts for 4 hours (nkti.gov.ph, 2015). A patient diagnosed with ESRD should continue this treatment and its frequency will be determined based on body's response. If dialysis is no longer feasible, last option is kidney transplant or it may lead to further complication to death. Patients who have ESRD consider it as life sentence and their physiologic condition is greatly affected by their mental and emotional state.

Anxiety among ESRD patients

Patients who are diagnosed with ESRD have disturbed activities of daily living (ADL) and decrease functional health pattern due to experienced anxiety, stress, and comorbid psychiatric disorders (Bross et al., 2016). Clinical outcomes show that presence of anxiety disorder is common to hemodialysis patients with low Quality of Life (QoL) manifested by poor nutritional status, disturbed sleeping habits, and decrease ADL. A study was also carried and found that CKD patients who have low QoL complicates treatment regimen. An evident sign of low physical activity

associated with low QoL was linked to more hospital visits and aggravates comorbidities leading to mortality (Bross et.al.,2016).

Though only few studies focused on the impact of anxiety to patients, this can lead to adverse clinical events. Zhong Sheng Goh & Konstadina Griva (2018) study showed that for instance, anxiety directly affects CKD patients largely when hemodialysis is not require and unmanaged anxiety leads to thinking about death and early dialysis initiation. Anxiety can be a barrier in providing quality of care to patients most especially during hemodialysis. This will result to poor progression of biophysical state of patients. Kyungmin, Gun Woo, and Jungmin (2018) research findings validate that addressing psychosocial and psychological needs of patients with ESRD requires of great importance in assuring that dialysis treatment will be maintained, and one should not focus on the medical needs alone

However, given the reports that CKD/ESRD patients experience great deal of anxiety, many are still unaware that it can directly affect their over-all health. Anxiety is a common emotional state when an individual experience intense fear, dread and uncertainty from anticipation on what seem threatened situation. It can easily be noticed based on individual's action such as restlessness, tension and abrupt changes in physical and cognitive state depending on level of anxiety (Balita, 2016). But the problem lies on the fact that CKD/ESRD patients and even their families have come to a thought that decreased daily activity, sadness, loss of appetite and interest are part of symptoms associated with CKD and not associated in anxiety (Zhong Sheng Goh and Konstadina Griva, 2018). Because anxiety is a common occurrence to everyday living, its adverse effects to body and mind has been overlooked by many. Unmanaged anxiety can trigger to more serious condition like anxiety attacks, altered

daily activity, poor nutritional status, disturbed sleeping pattern and many other which aggravate physiologic state of the patient.

In this research, ESRD patients will be assessed to identify if they are exhibiting moderate signs of anxiety. Qualified participants will undergo intervention to measure level of anxiety and to identify if improvement of actual state of mind has a relation to biophysical state of patients.

Psychotherapies on anxiety

At this point, it has been established based on several studies that anxiety and state of mind correlates on having ESRD but only few studies have been made on how it can be managed. There are pharmacologic and evidence-based psychological therapies and methods suggested in alleviating anxiety and depression such as Cognitive Based therapy (CBT). In CBT, an individual is helped by changing its negative thinking to positive and realistic environment. This can be done through words empowerment, relaxation techniques and social support from other people. In this way, an individual may change attitude and behaviour that contribute to patient's state of mind (NIMH, 2015).

Effectiveness of CBT as a psychotherapy has been carried to 101 ESRD patients using the HED-SMART intervention (HEmoDialysis Self-Management Randomized Trial) which is a brief self-management intervention developed in Singapore that aim to use the theory of Social learning, self -management and monitoring to improve treatment adherence and clinical outcomes. Findings shows that ESRD patients who completed HED-SMART showed decrease anxious symptoms translated to lesser clinical consultations due to increase adherence to medications (Konstadina et al., 2018). Another study was also done to see the

effectiveness of CBT in addressing anxiety and stress among ESRD patients. A preliminary study was carried by a group of researchers that use brief Cognitive behavioural intervention on ESRD hemodialysis patients. Sixty-two participants with a mild to moderate scores of anxieties (Beck Anxiety Inventory) were randomly assigned to intervention and controlled groups for 5 weeks. The CBI group were put into a positive self-reinforcement, relaxation techniques and cognitive restructuring. After the 5-week intervention and post-BDI and BDA, results show a significant decrease on anxiety and cognitive distortions and an increase on the QoL of the controlled group (Bermudez et al., 2017). The given study showed that CBT intervention showed a significant change in anxiety and stress scores and improved QoL of ESRD hemodialysis patient.

In this study, research intervention will apply Exposure therapy as an arm of CBT and to be tested as part of nursing intervention process. Differently from traditional CBT, the objective of Exposure therapy is for the patients to translate negativity, improve actual state of mind and transform stress to a relaxing environment. Nadja Ilona Dorig (2014) stated that this can be done through virtual stimulation which will enable patients form cognitive inferences and convert negative thoughts to affirmative perception to reduce anxiety. Exposure therapy had been effective as proven on a study conducted to a group of 340 patients with a total score of at least 20 points on the posttraumatic diagnostic scale (PDS-5) were put into an intervention called Narrative Exposure therapy (NET) which is primarily based on the concept of Cognitive behavioural therapy. During the time of study, patients were equally randomized into two groups and been observed for six months. The experimental group received the usual case management along with improved NET therapy. After the 6- and 12-months endpoint, result showed a relief on PTSD

symptoms. The researchers added that combination of brief NET and case management could improve primary care of PTSD patients (Gensichen et al, 2018).

Virtual Reality technology and health

In recent years, technology-based treatments had been studied in CBT including the use of Virtual Reality. Virtual Reality is a new technology that creates a “virtual environment” to act as an alternative reality, wherein an individual may immerse self in a virtual place. Alessandra Gorini and Giuseppe Riva (2014) stated that VR technology uses computers to synthesize a graphically generated environment and through this synthetic setting, it creates a feeling or an illusion that an individual was immersed in the Virtual reality making the experience an alternative reality. VR has the technology to initiate more intensive feeling of awe because of its 360°-degree video compared to two-dimensional appearance. VR made an individual engage in presentation with more concentration and interest on the images and videos shown (Chirico et al., 2017). VR technology has now been made affordable, more economical, and sustainable through the VR head mounted display that only needed mobile phone technology that can project images and videos into a 360-degress virtual reality and make the illusion that virtual persons communicating with them are in face-to-face (Boulos et al., 2018). A study was carried to twenty-two patients with Anxiety Social disorder or ASD to test a mobile based virtual reality program in treating ASD through VR Exposure or VRE as part of CBT approach. Via mobile-based self-training VR exposure program, patients with ASD will be exposed in a virtual world and will interact to other “avatars” to perform a real-life situation and interaction. From there, they will be assessed on how self-training change their anxiety, depression and avoidance score compared to traditional group-live training. The study then revealed that patients who undergone in the mobile based VR self-training program showed a

significant improvement in the ($p < 0.001$), voiced-time ratio ($p < 0.001$), and subjective self-ratings on the performance measured within the program for subjective nervousness ($p < 0.001$) and for the subjective confidence in content ($p = 0.039$). The self-training mobile-based VR program has been effective in overcoming ASD with minimal supervision and cost boasting it as a stand-alone treatment that can be even done at home and with no time constraints (Hong et al., 2017).

Virtual Reality Exposure and Anxiety

Virtual Reality Exposure has made its place in psychology as several studies were made and proven its efficacy in dealing cases of cognitive and social disorder. There are also studies made that prove VRE can be positive as likely addition in anxiety management. A study was conducted to 20 preoperative patients who will undergo maxillofacial and plastic surgery to test the effectiveness of VR in reducing anxiety. Results show that there is a significant reduction in Visual analog scale (VAS) score ($P < 0.009$) as was the level of salivary cortisol ($P < 0.04$) after the VR simulation. It showed that pre-operative stress can be reduced using a non-invasive nonpharmacologic way with no side effects using VR technology (Dhonneur et al., 2017). An immersive VR exposure was also used in a study conducted to 80 breast cancer patients in Jordan who reported a significant level of pain and anxiety. Immersive VR therapy was used along with morphine to the intervention group and results show that there is a significant reduction in self-reported pain and anxiety on the intervention group compared to patients who have just take morphine alone. Eslam Bani Mohammad and Muayyad Ahmad (2018) study suggests the high efficiency of VR in managing pain and anxiety as an adjuvant intervention.

In a similar study, Virtual reality exposure was used to relive anxious symptoms to participants with Generalized Anxiety Disorder. Researchers used GAD-7 and

State-Trait Anxiety Inventory-Y (STAI) to assess anxiety and stress level. Out of 49 respondents who have score of 8 or higher on the GAD-7, only 26 were eligible to participate. The objective of the study is to use VR exposure as tool to reduce stress and anxiety. The intervention was to put the participants in an intervention-rest-intervention trial and to conclude the results through EEG. Participants are then requested to have a 75-minute sit-in interview to explain the process. From then, participants were asked to sit in a swivel chair and put on a VR headgear Gear (VR gear powered by Samsung Android s7 phone) and watched a 2 minute and 3 seconds video of a high school football game. After the said video, participant's EEG was determined to measure anxiety scores. Upon determining EEG and a 5-minute rest, participants watch another video which is The Mindfulness in nature experience for 5-min and 41 s in length. It shows mountains, valleys, clouds with a voice of a woman asking them to connect them on the environment they are seeing through 360-degree video. After the scenery, an inspirational quote was flashed at the end of the video. A post-test and EEG scoring were done after the intervention. Results of the study found that there is a uniquely significant decrease on anxiety based on EEG during VR experience. This indicates that integration of VR exposure has an impact on the psychological and psychophysiological changes compared to quiet resting alone. This is a good standpoint to use VRE to add on relaxation technique for patients with anxiety and stress disorders, to make use of this technology to those who have no access to nature and make use of VR in psychotherapies such as CBT (Cope, Tyrant and Viczko, 2018).

Blair, Cole, Kapil and Rodriguez (2018) study showed a VRE intervention tested to a female patient with cystic fibrosis who is placed in Veno-Venous Extracorporeal Membrane Oxygenation (VeV ECMO) and was then asked to use VR headgear to

manage anxiety. Episodes of tachycardia and tachypnoea were recorded which results to ECMO circuit flow interference and poor oxygen delivery. The patient's team tried to incorporate VR to reduce anxiety to the patient. VR headgear strapped safely while the patient is watching "Pebbles the penguin", virtual experience built specially to hospitalized patients with minimal head movement in supine position. A hand controller was placed on patient's right hand to manipulate the "penguin" avatar. The baseline level of stimulation is low to moderate to create calm and relax environment. After the VR experience, the patient's anxiety was then reduced after posing questions of "Has your anxiety level changed?" followed with the question "Are you more anxious, less anxious or about the same?". The researchers stated that the study is an initial experiment on using VR exposure as a form of anxiety-reducing technique to patients in ICU and on ECMO and more data and patient assessment is needed for its effectivity. However, researchers then encouraged to utilize a valid assessment such as State-Trait Anxiety Inventory for Adults (STAI-AD) for future trials for a more objective effect of VR exposure in anxiety reduction.

VR Exposure and chronic illness

The above-mentioned studies warrant the researcher to maximize the use of VR technology to improve primary care of patients in other areas where anxiety can directly interfere on good prognosis of patient's condition. Most VR studies applied this intervention in addressing social phobias and cognitive disorders through exposure of patients to "virtual world" so they can be trained and be exposed to an alternative reality until anxiety, phobias and disorders were overcome. However, there are limited studies that use VR exposure intervention to patients who are experiencing anxiety and fear out of their critical and chronic condition which unfortunately they will be experienced within lifetime.

To bridge the gap of potential use of VR technology in other medical areas, this research study, integrate Virtual Reality Exposure as part of brief CBT and a new approach of nursing intervention in addressing anxiety among ESRD hemodialysis patients. The researcher believed that Virtual Reality technology can be used as a part of Exposure therapy to further utilize its positive effects on anxiety and stress reduction. VR Exposure was proven to improve state of mind of ESRD patients and this tool was used as an additional adjuvant nursing intervention to address anxiety that hinders in providing quality care. Previous studies show that an improved state of mind is related to better self-care, increase activity of daily living, improved functional health pattern and nutrition.

The potential of Virtual Reality Exposure to discourse mental health of chronically ill patients fill the gap of finding an alternative way to address mental issues into a more accessible, user-friendly and exciting way suitable across all ages even outside psychotherapy such as the common anxiety of patients. The result of the study can be of used as a reference to include VRE as part of nursing intervention in managing anxiety during treatment and hospitalization.

Theoretical Framework

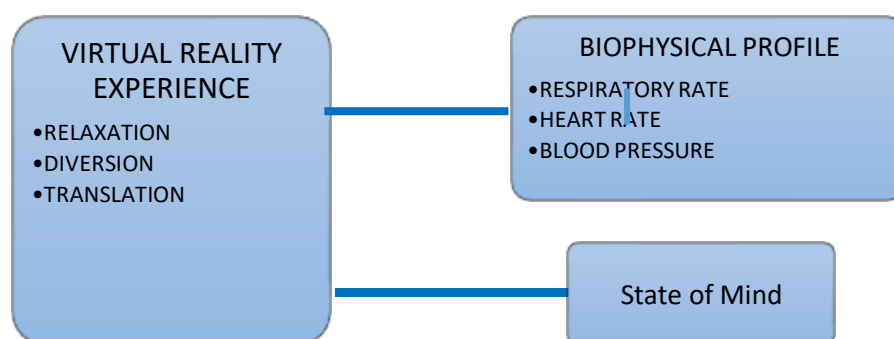
The concept of managing anxiety to improve biophysical measures and state of mind through nursing intervention is the backbone of the study. Herewith, the model theory behind Cognitive Behavioral Therapy will be used as it will be the basis of the research intervention.

According to the model theory of Cognitive therapy (CT or CBT) formulated by Aaron Beck in 1979, most of our emotions and behaviours are result on what we believe in. Feelings, attitudes, and emotions are biased on the schemas, automatic

thoughts and emotional assumptions which are believed have an interaction in the environment resulting to fear, anxiety and depression CBT (Beck, Rush, Shaw and Emery., 1979). Nadja Ilona Dorig (2014) further described that severe anxiety occurs when there is irrational dysfunctional cognition or “negative thoughts” by a person that is repetitive, persistent, and uncontrollable which disturbs daily activity and may affect physiological state. Based on the theory presented, it is believed that state of mind can be improved by translating negative thoughts to constructive point of view through exposure therapy and through with relaxation and proper deviation that a feeling of anxiety and restlessness can be reduced. In line with this, the researcher will integrate Virtual Reality through CBT exposure as nursing intervention to help the patients reduced anxiety. Kemppainen et al. (2012) stated that as healthcare provider, nurses should act as health educator and counsellor until the patient be well again and could manage anxiety with or without assistance.

Conceptual Framework

Figure 1. Conceptual Framework



The CBT theory provide researcher understanding on how cognition directly affects action-reaction to a certain stimuli and scenario and vice versa. Anxiety as form of fear being felt by patients resulted from conditional assumptions can be reduced by letting them to stay calm and composed throughout the process via positive

translation. The theory also help researcher to answer research questions on how to integrate technology as part of nursing intervention in the traditional but effective and validated CBT approach.

The figure above shows how Virtual technology was applied to interact with state of mind and biophysical measures as represented by Virtual Reality Experience. In this research study, Virtual Reality technology was used as Exposure device as an arm of Cognitive behavioural therapy and as a part of nursing intervention in reducing anxiety symptoms. Based on CBT, a process of Virtual Reality exposure experience involves translation of negative thoughts brought by current condition or illness. A relax and calm environment produced positive stimuli to a person hence irrational thoughts that form poor state of mind will be blocked and lessen. Anxiety was reduced as expressed through relaxation techniques and diversion to fear. These techniques are part of nursing practice to provide care and assistance to patients until such patients are capable in dealing with their anxiety.

The objective of the study as presented was to reduced patient's anxiety by improving biophysical profile and state of mind as an effect of VRE intervention. Because people are capable of learning, role of science and technology were integrated in the aspect of human health. In this case, virtual reality exposure was incorporated in patient's care. Through relaxation, diversion and positive translation as defined by Virtual reality experience, it will also affect actual state of mind and biophysical profile. A decrease in anxiety was exhibited through controlled blood pressure, heart rate and respiratory rate and by post-assessment scores of anxieties.

Operational Definition

Anxiety - is an emotional state where an individual experiences “fear of the unknown”, uncertainty and dread from the anticipation of a threatening situation. This is manifested through increased sympathetic arousal, agitation and negative affect; a person may be anxious with a score of ≥ 10 on GAD-7 anxiety severity.

Biophysical profile - is a measurement of vital signs including blood pressure (BP) /mmHg, heart rate (HR) / bpm and respiratory rate (RR)/cpm. This can be affected by stimuli, activities, and diseases.

Cognitive behavioural therapy or CBT- is a form of psychotherapy that use visual, physical to auditory exposure of patients in a controlled environment or schemas purposively to change pre-set irrational thoughts or “negative perception” to affirmative reaction and outlook.

End-Stage Renal Disease (ESRD) / Chronic Kidney Disease (CKD) - a condition in which kidneys are damaged or can no longer filter blood thus wastes and excess fluid in the blood remain in the body causing other health problems.

Hemodialysis - is a form of treatment that uses dialyzer that functions as an artificial kidney in cleaning the blood.

STAI-S – or Spielberger State-Trait Anxiety Inventory (STAI: Y-6 item) is an assessment survey to measure state of mind or real time anxiety of participants prior dialysis and exposure.

State of mind - is defined as a psychological state of a person’s cognitive process at a certain time. The actual cognition or emotion can be assessed through verbal and non-verbal cues such as through conversation, interview, and written questionnaire.

Virtual Reality - is a new technology uses computers or programs to synthesize a graphically generated environment creating a “virtual environment” in a 360°-dimensional format.

Virtual Reality Exposure or VRE - it is the integration of Virtual Reality in Exposure CBT. VR exposure makes use of Virtual Reality to act as an alternative environment where stimuli that induced feelings and actions to a person can be given graphically in synthetic setting. This is usually done through 3-dimensional (3D) and 360°-dimensional video playing, 3D video game stimulation and mobile application.

CHAPTER 3

RESEARCH METHODOLOGY

RESEARCH DESIGN

An experimental design (pre and post design) was used in the research study. This type of design was appropriate in identifying the effect of an intervention to a treatment group. A pre-measurement was done to gather baseline data and post-measurement in determining any significant difference that occur upon applying the treatment. In this study, pre-measures of level of anxiety and biophysical status were compared to post-measure results to found if VR exposure has any effect, as assumed that anxiety will be reduced, has no effect at all, or otherwise.

Herewith, the objective of the study was to determine the effects of Virtual Reality exposure intervention using Virtual Reality box (VR box) in reducing anxiety by improving biophysical profile and state of mind of end-stage renal patients who undergo dialysis treatment. Survey questionnaires were given to qualified participants to answer brief personal information. They were given brief introduction about the research, the risk and benefits of the intervention and an informed consent stating non-disclosure of their identity and results, otherwise indicated. A self-assessment questionnaire was given to measure their anxiety level and those who will exhibit moderate anxiety will be eligible to join the program. An ample time was provided until they finished the questionnaires. Current state of mind of participants was assessed and vital signs were measured before and after VR exposure. All data gathered were studied and analysed at the end of the research intervention.

RESEARCH VARIABLES

The *independent variable* used in the study was the integration of Virtual reality exposure as nursing intervention which includes the use of VR headgear for Virtual Reality experience. Variables that can be explained by independent variables are dependent variables. The *dependent variables* in the study include patients' state of mind, biophysical profile such as Respiratory rate, Heart rate and Blood pressure.

The *Intervening or mediating variables* that may affect the data includes unexpected withdrawal of patients to intervention by removing VR glasses showed through agitation, patients request and caregiver directives. In any case patient expressed sudden severe to panic anxiety attack all throughout research process, the attention of healthcare provider and relatives will be called. To avoid these biases, those patients who were qualified and undergo to the treatment but withdraw not until given time of intervention were not included in the study.

SAMPLING TECHNIQUE

The purpose of the study was to identify the effects of using Virtual Reality exposure through Virtual Reality Box in reducing anxiety of end-stage renal patients undergoing hemodialysis treatment. Participants were patients who undergo dialysis in selected dialysis centers in Metro Manila. Patients participate in the study upon meeting the *Inclusion criteria*: a) is diagnosed with chronic renal disease and on its end-stage regardless of age and sex; b) is on hemodialysis treatment; c) has manifest moderate level of generalized anxiety symptoms; d) first time to undergo VR exposure therapy and other forms of psychotherapy and e) willing to participate. *Exclusion criteria* included a) has major visual problems (e.g., cataract, legally blind, etc.); b) has a history of balance disorder (e.g., Meniere's disease); and c) has

history of severe neurologic illness, cognitive impairment or psychotic symptoms. Patients who e) is taking anti-anxiety medication and f) have been under other psychological therapies and intervention was excluded in the study to assure that only Virtual Reality exposure has direct implication on anxiety scores after intervention.

Purposive convenience sampling was used in the study. A total of fifty-two (52) End-Stage Renal disease patients who will undergo hemodialysis were invited and interviewed for the research study. Out of the invited participants, seventeen (17) participants were excluded in the study. Of which, seven (7) had eye problem like cataract and glaucoma and came from post-surgery, seven (7) were disqualified based on GAD (Generalized Anxiety Disorder) score, two (2) refused to participate and one (1) patient was disoriented. Over-all 35 patients were qualified to participate in the research study.

RESEARCH SETTING

The research study was carried in two (2) dialysis centers/ hospitals in Metro Manila. The first dialysis center is a privately owned dialysis facility located in Barangay Pamplona Uno in Las Pinas City and the latter is a private tertiary hospital in Barangay San Antonio in City of Paranaque, which gave permission to use the place to look for participants and conduct the study. Reports showed that most dialysis centers were strategically located in cities such as in National Capital Region. Hence, most patients from provinces are coming in Metro Manila to undergo dialysis.

The collection of data started on 20th of February and ended on 14th of March 2020. Each qualified participant underwent three (3) visits/sessions based on their

assigned dialysis schedule and the entire data collection lasted for three weeks. The data collection ended before the unexpected community quarantined protocol set by government agencies as part of pandemic control management.

METHOD AND PROCEDURE OF DATA COLLECTION

Participants were qualified patients based on the presented criteria and were present on the time being and scheduled for dialysis were asked to answer a self-assessment form for anxiety called Generalized Anxiety Disorder Scale or GAD-7 for further screening process. Only participants who scored with a cut-off point of 8-10/pts which correlates to having “moderate level” of anxiety were eligible to participate on the study proper. This is to ensure that only patients who were experiencing generalized anxiety that requires intervention were selected. Qualified participants were asked to sign an informed written consent approved by the ethics board committee prior to partaking of the study.

Based on several studies on VRE application, a typical pattern of therapy sessions was on biweekly to weekly intervention, typically lasts for max. of 60 minutes and for 4-12 weeks. However, the research was designed for a brief Exposure CBT and hence, a 3week/individual session was allotted (Bermudez et al., 2017). The date and time of VRE intervention session depend on dialysis schedule of participants.

The first day session was for personal data gathering, patient education about the pros and cons of the research and a brief teaching about Virtual Reality technology. First day session was also set to begin their first and initial *Virtual Reality exposure trial* via “VR box” wherein procedures and virtual setting was explained to

participants, health care providers and even to their families who were willing as part of VRE education and awareness.

Virtual Reality exposure trial via “VR box” procedure

1. All participants undergo brief teaching regarding the use of VR equipment for familiarization. VR equipment to be used in the study includes a proto-type “VR box” head gear latched with Samsung Galaxy Grand mobile. VR box technology will then create a virtual environment via head-mounted (HMD) display. Three-dimensional (3D) videos (Universe relax VR edition 3D, Forest video stereoscopic 3D, Ocean world 3D and PANGEA the never ending world) excerpt from youtube.com ranging from 5-8 minutes long were played throughout the study and the participants had the option to select the video they preferred to watched at a time of each session. Videos were set in mild to medium stimulation to create a relaxing and calm environment.

Collection of VR videos played during VRE intervention:

- Universe relax VR edition 3D- cosmic and intergalactic systems were played showing series of lights, planetary systems and cluster of galaxies.

Minutes: 5 minutes and 34 secs

- Forest video stereoscopic 3D- a walkthrough forest videos showing horses, flying daffodils and butterflies and cows grazing in meadows with birds chirping at the end of the video.

Minutes: 5 minutes and 17 secs

- Ocean world 3D- video showing underwater paradise displaying school of different fishes, coral reefs, and other sea creatures.

Minutes: 5 minutes and 2 secs

- PANGEA the never-ending world- a walkthrough video showing the prehistoric era (dinosaur age). It shows a newly hatch dinosaur egg at the beginning and its journey living in a world of dinosaurs. At the end of the video, it shows the mother of the baby dinosaur protecting her kid.

Minutes: 7 minutes and 56 secs

2. Participants undergo routinely pre-hemodialysis care to check if vital signs were stable. Researchers record biophysical measures such as heart rate (HR), respiratory rate (RR) and blood pressure (BP).
3. Upon recording vital signs, participants were asked to answer a pre-assessment test called Spielberger State-Trait Anxiety Inventory (STAI: Y-6 item) to measure state of mind or real time anxiety of participants prior dialysis and exposure.
4. After completion of the pre-test (STAI: Y-6), participants were asked to wear the "VR-box", safely strapped in their head with padded cushions to support their head and neck in sitting position. Participants choose the video of their choice that will be played and watched. Dialysis also starts along with VR exposure intervention. VR box were then removed after video has ended.
5. Participants were asked to have a 5-minute rest after VR exposure. Vital signs were measured post-exposure and a post-test (STAI: Y-6) survey was asked to fill out. This step was to identify if there were any changes in biophysical status and real-time anxiety level of participants after VR exposure during

dialysis. Vital signs and anxiety scores were gathered immediately even dialysis had not yet finished thus avoiding internal validity threat. This was to ensure that post-measures after VR exposure were raw and will not be influenced or affected by external threats (e.g. participants may tend to fall asleep, may have relative that will talk to them and other scenarios that are unavoidable).

6. All data gathered were kept by the assistant in a sealed envelope for privacy and confidentiality.

The same *Virtual Reality exposure trial via "VR box" procedure* was repeated and observed up to until three visits/sessions in order to gather sufficient and observable data. Termination of data gathering and VRE trial for each participant will be in effect upon meeting the required three visits/session.

RESEARCH INSTRUMENTS AND TOOLS

The research study used quantitative approach for the purpose of data collection. Hence, research instruments and tools used in the study include structured survey questionnaire and assessment tools. The objective of the study was to determine the effects of Virtual Reality Exposure intervention in reducing anxiety among ESRD patients by improving biophysical measures and state of mind during hemodialysis treatment. Although several studies have shown that anxiety was common among ESRD patients, participants were still assessed if they were exhibiting Generalized Anxiety. In order to do this, a Generalized Anxiety Disorder Scale or GAD-7 was performed as a screening procedure.

A Generalized Anxiety Disorder Scale or GAD-7 is a subjective assessment tool initially developed to measure level and severity of anxiety. It is a 7-item self-

report scale that asks how patients were bothered by the symptoms for the past 2 weeks. Response categories options include, “not at all,” “several days,” “more than half the days,” and “nearly every day,” with an assigned score of 0, 1, 2, and 3, respectively. Total scores for the seven item ranges from 0-21 with the scores 5, 10 and 15 representing cut points for mild, moderate, and severe anxiety. In this study, the cut point is a score of 8 recommended for moderate anxiety screening shown to have 92% sensitivity and 76% specificity in relation to a diagnosis of GAD (Spitzer et al., 2006). Participants who have a score of at least 8-10/pts that manifest moderate anxiety based on GAD survey were eligible to participate in the study proper. Study stated that a cut-off score of 8 (moderate) exhibits clinically significant anxiety and therefore should be addressed for treatment and intervention (Roy-Byrne et al., 2009). A severe anxiety level which has 11 or more in scores require in-depth clinical approach and pharmacotherapy which was not applicable in the research study protocol. A mobile based and internet app delivered interventions which in turn showed high effectivity even without therapist guidance were also recommended only for people experiencing mild-to-moderate anxiety (Kay- et al., 2018). Based on the above-mentioned studies, ESRD participants experiencing only moderate anxiety were most qualified participants to undergo VRE trial as their anxiety level and state of mind require only brief intervention/ therapy and can be self-administered in future basis.

Vital signs of participants were gathered and measured before hemodialysis and after the VRE intervention as part of routinely nursing care. Biophysical measurements such as BP, HR and RR served as the research objective data in determining VRE implication in vital signs and if “state of mind” had relationship in their biophysical status.

Blood pressure or BP, which is the force of the blood pushing against the artery walls during contraction and relaxation of the heart, was measured manually using sphygmomanometer. BP levels will indicate the cardiovascular response of the patients before and after VRE intervention. Blood pressure will be interpreted as follows based on AHA blood pressure guideline (AHA, 2017).

Table 1: Guideline for the Prevention, Detection, Evaluation and Management of High Blood Pressure in Adults

Blood pressure category	SYSTOLIC mmHg (upper number)		DIASTOLIC mmHg (lower number)
Normal	Less than 120	and	Less than 80
Elevated	120-129	and	Less than 80
High Blood Pressure (Stage 1)	130-139	or	80-89
High Blood Pressure (Stage 2)	140 or higher	or	90 or higher
Hypertensive crisis	Higher than 180	and/or	Higher than 120

From American Heart Association. (2017). *2017 Guideline for the Prevention, Detection, Evaluation and Management of High Blood Pressure in Adults*.

Other biophysical parameters such as heart rate and respiration were also gathered during pre-post VRE. Heart rate (HR) is defined as the number of times the heart beats per minute and it also indicates heart rhythm and pulse strength. The normal resting heart rate for adults is between 60 and 100 beats per minute /bpm and beyond or lower from the parameters were regarded irregular (AHA,2017). Heart rate of the participants was measured using Inmed® pulse oximeter, an electronic device that measure oxygen of the blood. It has a clip-like probe that was placed in the finger for a short minute and the pulse oximeter will give results for pulse rate and oxygen level of the body. But since oxygenation was not included in the study parameters, only the pulse rate result will be recorded. The heart rate

measurement of the participants was used in determining the body response from anxiety after VRE intervention.

Respiration rate (RR) is the number of breaths a person takes each minute. RR was measured usually when a person is at rest by counting how many times chest rises. The normal respiration rate for an adult person was at range from 12 to 20 cycles per minute/cpm. Normally respiration rates increase with exercise, illness, and other medical related conditions (John Hopkins Medicine, 2020). In this study, RR was measured to identify for any changes and to determine for any relationship between anxiety and respiratory status.

Aside from gathering biophysical measurement, "state of mind" or the anxiety level was also determined using a structured questionnaire. Before VRE intervention, an assessment test called Spielberger State-Trait Anxiety Inventory (STAI: Y-6 item) was used to measure state of mind or real time anxiety of participants before and after VRE. A Spielberger State-Trait Anxiety or STAI Inventory is a self-assessment tool that purposively measure presence and intensity of the current symptoms of anxiety. In this study, a modified STAI called as (STAI: Y-6 item) or "STAI-S" as coined terminology in the study were used for brief anxiety assessment. Brown, Henriques and Tluczek (2009) described the shorter form of STAI with 6-item statements that was proven to have the same internal consistency reliabilities ($r \geq .90$) compared on the longer STAI form. STAI-Y6 was preferred to be used in the study since it is more sensitive to fluctuations in state anxiety which was the main focal point of the study. Bekker and Marteau (1992) also stated that STAI-Y6 was an advised alternative since it offers a briefer yet still an acceptable scale compared to the full-form of STAI.

STAI-S include the “state” part of the original STAI-Y which refers to the palpable reaction of an individual (ESRD patients) that takes place in a specific situation (hemodialysis). It was also a good indicator of transitory anxiety changes of patients under counselling, psychotherapy and behavioral therapies. STAI-S contained specific items that will determined their “current state of mind” with two categories. Under Category 1 include statements that determine “Presence of Anxiety” while on Category 2 had statements showed “Absence of Anxiety” as follows:

Table 2. The development of a six-item short-form of the state scale of the Spielberger State-Trait Anxiety Inventory (STAI)

Category1	Category 2
Presence of Anxiety	Absence of Anxiety
S2.I am tense	S1.I feel calm
S3.I feel upset	S4.I am relaxed
S6.I am worried	S5.I feel content

From Bekker H. and Marteau TM., (1992). *The development of a six-item short-form of the state scale of the Spielberger State-Trait Anxiety Inventory (STAI)*. British Journal of Clinical Psychology. 1992;**31**:301-306

Responses that show the “intensity” of their feelings include “Not at all”, “Somewhat”, “Moderately” and “Very much” with an assigned score of 1, 2, 3 and 4 for all statements respectively, wherein statements on Category 2 will be scored reversely. Gaining high scores or rating for both categories showed high presence and severity of the anxiety felt. Rating scores will be multiplied to 20/6 to get the over-all score. Total scores for the six-item range from 20-80 and can be interpreted as follows to determine anxiety level based on ‘Spielberger’s manual to interpret scores’:

Table 3: Spielberger’s manual to interpret scores

STAI-S SCORE	Presence of Anxiety
Less than 34	Low
34 – 36	Normal
Higher than 36	High

From Bekker H. and Marteau TM., (1992). *The development of a six-item short-form of the state scale of the Spielberger State-Trait Anxiety Inventory (STAI)*. British Journal of Clinical Psychology. 1992;**31**:301-306

Data were then analysed and calculated to check for a relation in the biophysical status and state of mind of participants and if a reduction in anxiety upon integration of VR exposure was to be found.

PLAN FOR DATA ANALYSIS AND INTERPRETATION

Descriptive statistical data as frequency distribution, mean and standard deviation were used for demographic characteristics. All gathered data were calculated for its mean, standard deviation, and standard error means. STAI-S “state of mind” per item result were also calculated by getting the total average scores based on their actual rating scores per statement item. The researcher used a one-way repeated measure ANOVA (Analysis of Variance) statistical test, to compare the pre and post anxiety assessment scores and biophysical parameters of patients after series of VRE and to decide for significant difference on level of anxiety or state of mind and biophysical measures. Pearson- R correlation coefficient statistical analysis was used to test the relationship between the biophysical measures and anxiety score or state of mind. This was to determine the effect of state of mind on biophysical profile of patients.

ETHICAL CONSIDERATIONS

The research study and protocol were approved and evaluated by the committee of Ethics Review Board of University of The Philippines Open University. A request letter was sent to the appropriate coordinator of dialysis centers for review and approval. Participants were informed that the study was for academic research and data were to be used to any purpose aside from stated. The participants were advised that they are free to withdraw in case they found the study inconvenient to them. All documents and information used in the study were kept in a sealed envelope and were opened after the data collection period has ended. If the participant wished to know their scores and evaluation, they may opt to put their name for proper identification. The result of their assessment can be sent either through letter, electronic mail or personal if they wished to. Otherwise indicated, data and information of each participant were treated secured and cannot be viewed without proper authorization by the participant in line with the Data Privacy Act of 2012 (Republic Act of 10173). All data gathered, in form of physical and electronic records will be properly disposed after the completion of research study.

CHAPTER 4

RESULTS AND DISCUSSIONS

This chapter presents the findings and analysis of data on the effects of virtual reality intervention on the biophysical profile and state of mind of the research participants. The tables below show the demographic data, difference between the biophysical profile (Blood pressure, heart rate and respiration) and State of mind, and the last part is the correlation between variables (biophysical profile and state of mind).

Demographics

The table below show the demographic profile of the participants engaged on the research study. A total of 33 participants included in the study after filtering the population (N=52) based on the inclusion and exclusion criteria.

Table 4. Demographical data of participants

Demographics	F	%
Gender		
Male	12	36.4
Female	21	63.6
Generation Category/ Age		
Generation Z (8-21)	1	3.0
Millennials (22-37)	5	15.2
Generation X (38-53)	9	27.3
Boomers (54-72)	18	54.6
Silent (73-90)	0	0
Educational Attainment		
Elementary	4	12.1
High School	14	42.4
Undergraduate	6	18.2
Associate / Bachelor's Degree	9	27.3
Master's Degree	0	0
Doctorate Degree	0	0
Co-morbidities		
Hypertension		
Diabetes Mellitus	21	63.6
Stroke	15	45.5
Others (Lung and Heart Disease)	0	0
	7	21.2

The total participants(n) in the study were thirty-three n=33 which less than the initial n=35 since two (2) of the participants did not finished the research timeline. Demographical data showed that majority of the qualified participants who exhibit moderate anxiety from the past two (2) weeks were female (21) who comprise the 63.6% of population sample. In terms of age groups, the majority belong in Boomers Generation (18), followed by Gen. X (9) and Millennials (5) in third. Educational attainment results showed (14) had Highschool degrees, (9) had Associate/Bachelor's degree and (6) were Undergraduate. The top two (2) co-morbidities observed were Hypertension (n=21, 63%) and Diabetes Mellitus (n=15, 45.5%).

State of Mind and Biophysical Profile before and after VRE

Participants underwent brief CBT intervention by VR Exposure during hemodialysis. Herewith, the objective is to assess the level of anxiety of participants, status of their biophysical measures and their actual "state of mind" before and after VRE. Biophysical parameters were measured to observe any sign of changes after integration of VRE intervention as well as their anxiety level.

Table 5. Biophysical Profile mean scores during First visit

		Biophysical Measures			
		Systolic BP (mmHg)	Diastolic BP (mmHg)	Heart rate (bpm)	Respiration (cpm)
1st Visit	Pre	138	83	79	20
	Post	132	80	77	19

During the initial pre-VRE, blood pressure score was recorded as 138/83 mmHg which was categorized as border line high Stage I hypertension. When a person is

anxious, it increases cardiac output, constrict blood vessels, and raise arterial blood pressure. Because participants had high anxiety level before hemodialysis, an elevated BP level was expected. Rise of BP may also be influenced by physiologic factors such as age and the disease itself. Environmental factors like room lighting, temperature and ambience can also influenced behavioural response resulting to elevated BP level (Chadachan et al., 2018). In this study, most patients belong to Generation Boomers and Silent which were at vulnerable age. Their existing ESRD accompanied by additional burden from treatment costs and burn-out due to their disease also add to their anxiousness. It was also observed that although treatment facilities were modern and in good integrity structure, patients have no personal space and multiple simultaneous television viewing were distracting and adds physical noise. The above mentioned physiologic and external factors were perceived as contributors on the elevation of BP level of participants.

Heart rate of 79/bpm and Respiratory rate of 20/cpm were recorded in both of which are still in normal values. Palpitations, tremors, and shortness of breath were not observed among the participants.

Shortly after intervention, post-VRE measurements for blood pressure was reduced to 132/80 mmHg. Although it was a minimal reduction, a decrease of 8/mmHg in systolic is still significant on BP variability. This reduction changed the BP level from being border line high (138/mmHg) to border line low (132/mmHg) Stage I hypertension. Meanwhile, Heart rate measurement was also reduced from 79bpm to 77bpm (SD diff.= -2.27bpm) upon post-VRE intervention. A significant reduction in heart rate was explained by the decrease in sympathetic nervous function. When the participants undergone VRE, the body started to relax thus stimulating parasympathetic response where blood vessels started to dilate. Nakao Matsuhiro

(2019) explain that this bodily response will be resulted to slower heart rate and lower blood pressure brought by relaxation. Respiration rate had minimal reduction from 20cpm to 19cpm (SD diff.= -0.46). The respiration reduction was still significant, but the difference was not evident as compared to other biophysical parameters. Increase respiration and shallow breathing was commonly observed when a person was provoked by intense stress and anxiety. But during hemodialysis, respiration scores were normal from pre-dialysis to post-VR hence only slight change was observed.

Table 6. Biophysical Profile mean scores during Second visit

		Biophysical Measures			
		Systolic BP (mmHg)	Diastolic BP (mmHg)	Heart rate (bpm)	Respiration (cpm)
2nd Visit	Pre	136	83	77	20
	Post	130	79	74	18

During the second visit, BP measurement for pre-VRE was recorded 136/83 mmHg which was a two (2) point reduction to both systolic and diastolic BP level compared to first visit. This reduction in BP can be associated on improve cognitive disposition of participants prior hemodialysis and VRE. However, BP level was still categorized on border line high Stage I hypertension for systolic BP during 2nd visit before hemodialysis. Improvement on pre-VRE Heart rate was also observed during 2nd visit from 79/bpm on 1st visit to 77/bpm. Meanwhile, Respiration level for pre-VRE remained the same on 20/cpm. It was recognized that the previous VRE trial had positive effect on participants' disposition based on the reduced biophysical measures during their 2nd visit. According to Beth Israel (2018) studies show practice of relaxation techniques change cognitive response of the brain resulting on physical changes in blood pressure and other markers. For this reason, pre-hemodialysis measurements

for BP and HR during 2nd visit significantly improved compared to previous measurement last 1st visit.

After the 2nd VRE intervention, improvement on post- VRE measurements for biophysical markers was still observed. There was still a minimal reduction in BP level measured as 130/79 mmHg for both systolic and diastolic BP compared to previous post-VRE yet still under on border line low Stage I hypertension. A three-point decreased was also observed in Heart rate from 77/cpm to 74/cpm and in Respiration rate from 20/cpm to 18/cpm. Based on observations gathered, biophysical measures were gradually improving as evident by decreased BP level, HR and RR after VRE intervention. Aside from reduced pre-VRE scores, improved and continuous post-VRE scores reduction was also seen every after VRE trial. Other research claimed a decrease in HR and BP was noticed mainly due to improvement of autonomic balance and cardiovascular health after practicing relaxation techniques (Gopal et.al., 2014). Because participants on this study were less anxious before the onset of hemodialysis, a significant reduction on post-VRE for biophysical measures was expected.

Table 7. Biophysical Profile mean scores for Third visit

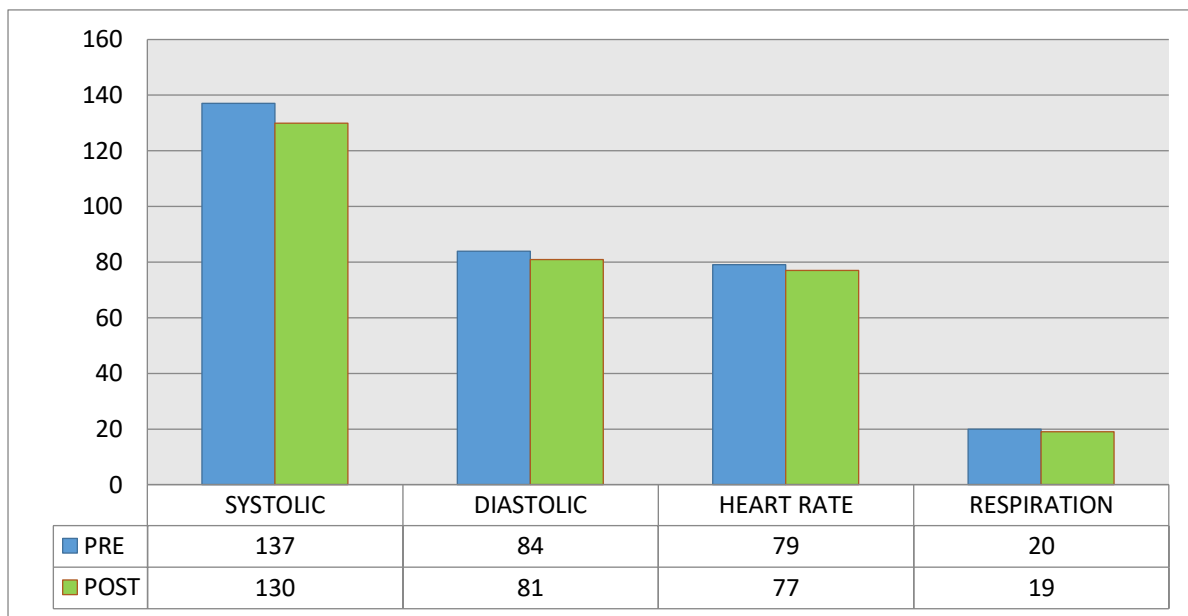
		Biophysical Measures			
		Systolic BP (mmHg)	Diastolic BP (mmHg)	Heart rate (bpm)	Respiration (cpm)
3rd Visit	Pre	136	86	81	19
	Post	129	84	79	19

On the 3rd visit and last VRE trial, same procedures were carried out to qualified participants. Pre-dialysis checks on BP, HR, and RR were carried prior hemodialysis and VRE. Blood pressure measurement for pre-dialysis was recorded 136/86 mmHg

which was a 2-point more on diastolic level compared on the last visit. There was also a noticed increased for HR from 77/bpm on last visit to 81/bpm. Respiration on the other hand had a 1-point decrease from 20/cpm to 19/cpm. An increase in diastolic and HR pre-dialysis during the 3rd visit was observed to be associated to increase tension on the surroundings which also reflect on “state of mind” of participants. During the last day of visit for VRE trial, mostly everyone was focused on the news regarding a new pandemic disease which has no vaccine or definite treatment. The said disease was known to target immune-suppressed individuals which add to worries among the participants since they belong to the most vulnerable population. This anxiety increases BP in short term and doubles heart rate as a body coping mechanism to stress (Jin et.al, 2015).

Post-VRE measurement for biophysical measures and anxiety level were recorded after the last VRE trial. Blood pressure level was measured as 129/84 mmHg which was lower than the pre-VRE measurement. However, because pre- diastolic BP (86/mmHg) was elevated compared to last visit (83/mmHg), it was expected that the post-VRE measurement for diastolic BP (84/mmHg) was also higher compared to 2nd visit diastolic BP (79/mmHg). Heart rate score was also reduced from pre-81/bpm to post-79/bpm yet still higher compared on post-VRE of 74/bpm on last visit. Studying this result, it showed that VRE can still reduce BP level and improved HR but a sudden drop improvement on BP and HR was not feasible as there were other contributing factors on BP and HR elevation. Physiologic factors such as age, pre-existing condition and lifestyle were common factors on high BP whereas, stress and poor coping mechanism were some added causes of a sudden HR rise (Jin, Y. et.al, 2015). Respiration rate on the other hand had no reported changes on post-VRE measurement of 19/cpm.

Figure 2. Pre-post Biophysical Parameters Across VR Exposure Visits



Note: Bar graph representation of pre-post biophysical changes across VR visits

In summary, findings showed that there is an evident decrease in systolic blood pressure from pre-dialysis to post-VR exposure. Meanwhile, diastolic blood pressure also had a decrease but not so apparent as compared to systolic blood pressure. Overall, blood pressure of participants had improved in general form from 140/80mm/Hg to 130/80mmHg. This is significant since there is a decrease of 10/mmHg in systolic from being categorically in Stage 2 level (140 mmHg or higher) to Stage 1 (130-139) based on AHA guidelines in blood pressure categories (AHA, 2017). Heart rate had also improved from 79 bpm to 77bpm, showing sign of deceleration especially during VR exposure (post-VR SD= 2.25). Respiration rate decreased clearly during 2nd visit but remain mostly constant all throughout the intervention. Looking closely improved blood pressure, heart rate and respiration was observed based on pre- dialysis and post VR measurement.

Overall, biophysical measures of the participants were observed to decrease every after VRE intervention. The reduction of scores of pre-post VRE measurements

proved that Virtual Reality exposure was effective in reducing anxiety symptoms by promoting calmness and relaxation during hemodialysis.

Aside from biophysical measures, the level of anxiety was also observed as it was suggested that changes in biophysical parameters was related on the level of anxiety. The level of anxiety was determined based on the accumulated scores per item on the survey. Mainly, if the patient felt more anxious than being relaxed, a high score of anxiety scores will be gained.

Table 8. Level of Anxiety scores for First visit

	N=33	1st Visit
Anxiety	Pre	41.5
	Post	28.6

Note: N refers to number of participants

The level of anxiety of participants was at a baseline score of 41.50 considered as significant for “heightened anxiety” during the initial visit prior hemodialysis and VRE intervention. This observation proved that majority of patients who underwent hemodialysis experienced anxiety symptoms and ESRD patients had high prevalence of anxiety (Bezerra et al.,2018). Because ESRD had implication son physical and emotional state of patients, most of them are experiencing symptoms of anxiety unconsciously. Before hemodialysis, some patients had mixed feeling of agitation and restlessness. It was also noticed that patients were hasty and want to get done on hemodialysis as early as possible.

After the first VRE intervention, the level of anxiety was reduced to 28.6 considered as having low presence of anxiety. This showed that the intervention had positive influence on anxiety level by improving patients’ reaction towards

hemodialysis treatment from being less anxious and less tense. Ali, Uzma, Hassan and Shazia (2010) described that through relaxation brought by VRE, a constructive cognition was set resulting to a more controlled body tensions and reduction of anxiety symptoms during hemodialysis as explained by decreased anxiety scores.

Table 9. Level of Anxiety scores for Second visit

	N=33	2nd Visit
Anxiety	Pre	36.77
	Post	26.36

Note: N refers to number of participants

During the 2nd visit, an improvement on biophysical measures was found to be associated on cognitive disposition of participants thus a reduce level of anxiety was observed. The pre-VRE anxiety level was reduced to 36.77 which was categorized as “above normal” anxiety level ($36 < 36.77$) in comparison to 1st visit with “high” anxiety level ($36.77 < 41.50$). A reduced anxiety level even before VRE on 2nd visit implied that participants had either changed their outlook towards hemodialysis or participants had anticipated VRE experience trial, so they were feeling more at ease and participative during the 2nd visit.

Meanwhile, after the 2nd VRE exposure, anxiety level was also reduced to 26.36 from 36.77 making anxiety level from “above normal” to “low” indicating a reduced anxiety symptom. The post-VRE anxiety score was also less during 2nd visit from 28.60 compared to post-VRE score of 26.36 on 1st visit. An improved post-VRE score shows that VRE was effective in reducing anxiety but well as keeping anxiety level in “low presence”. The use of VR headgear as a form of relaxation tool helped the participants to relax and temporarily deviate their attention to more constructive environment thus

causing a decreased in anxiety level. An increase concentration and engagement on constructive environment had proven effective in changing disposition and reduction of anxiety symptoms (Cope et.al, 2018). This outcome justified the reason why VRE is effective in reducing anxiety because participants were given a chance to experienced privacy even in communal areas and temporary detachment through VR technology.

Table 10. Level of Anxiety scores for Third visit

	N=33	3rd Visit
Anxiety	Pre	35.76
	Post	27.58

Note: N refers to number of participants

Going to the last and 3rd visit, it was recorded that although the anxiety level score was still lower compared to score on 2nd visit, a 1.01 reduction in scores from 36.77 to 35.76 was still less compared to the 4.73 difference from 1st to 2nd visit. It just showed that some patients were not as “less anxious” as compared to their previous visit although the change of anxiety from “above normal” to “normal” level was noted to be more important than the difference. This variability in anxiety level from 2nd visit to 3rd visit can be explained by the scores gained on “state of mind” which will be explained later.

Nevertheless, after the last VRE intervention, the level of anxiety for post-VRE was noticed to decreased again from 35.76 to 27.58 from “normal” to “low” anxiety level. The influence of VRE intervention was still in effect on their level of anxiety which was evident on their “state of mind” scores. However, because of the variability in

“state of mind” scores during the time of 3rd trial, reduction of anxiety score was less compared to previous visit.

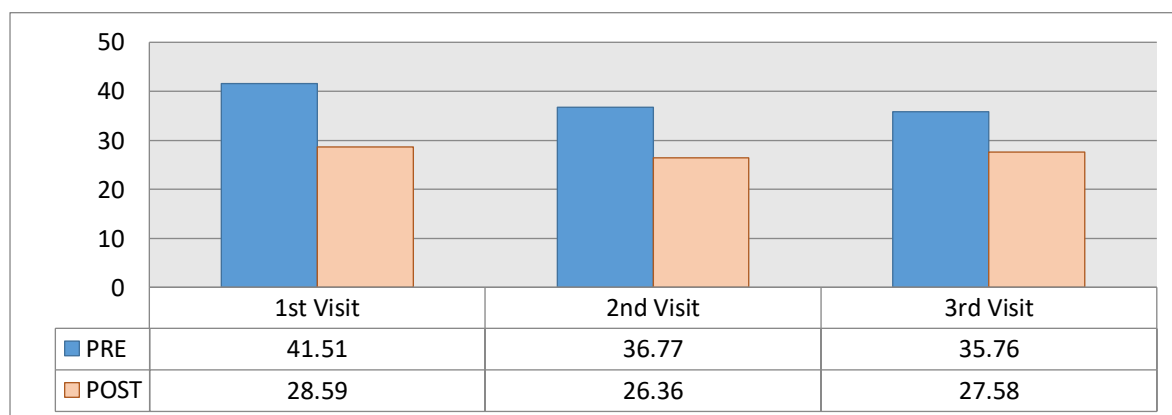
Over-all, the anxiety level of participants was improving every after VRE intervention and a decreased in trend in anxiety level before hemodialysis was also noticeable.

Table 11. Level of Anxiety scores for Total visit

	N=33	Total visits*
Anxiety	Pre	38.01
	Post	27.51

Note: N refers to number of participants

Figure 3. Pre-post Anxiety Across VR Exposure Visits



Note: Bar graph representation of pre-post anxiety changes across VR visits

Anxiety level based on anxiety scores showed a steady decrease on pre-post VRE measurements. VRE intervention had a positive effect on their state of anxiety by reducing its level from “high presence of anxiety” to “low presence of anxiety”. It was observed that low level of anxiety was maintained all throughout the visits. Although pre-post differences were varied every after visit, VRE was still observed as an effective adjunctive tool to increase relaxation and comfort during hemodialysis. Research proved that providing other forms of relaxation therapies such as VRE has

an impact on the psychological and psychophysiological state of patients compared to quiet resting alone during hemodialysis (Cope. Tyrant and Viczko., 2018).

The moment of peace and brief meditation during VRE had improved the cognitive level of the participants which resulted to reduction of anxiety level. The improvement in anxiety level was best explained through the “state of mind” which indicate the exact feelings and thinking state of the participants.

Table 12. State of Mind in terms of per item scale for First visit

Category1	1ST VISIT	
Presence of Anxiety	PRE	POST
S2.I am tense	58 (1.76)	41 (1.24)
S3.I feel upset	53 (1.61)	39 (1.18)
S6.I am worried	70 (2.12)	45 (1.36)
Category2*		
Absence of Anxiety		
S1.I feel calm	75 (2.27)	51 (1.55)
S4.I am relaxed	79 (2.39)	53 (1.61)
S5.I feel content	76 (2.40)	54 (1.64)

Note: Values are presented as total score and mean (mim. 33 - max. 132)

**Reversed scoring interpretation for Category 2*

The survey used to identify the over-all anxiety level was also used in the study to determine the specific “current, at the moment feeling” or the actual “state of mind” of the participants which had two sets of categories. On Category 1 label as “Presence of Anxiety” include statements that determine feelings of being tense, upset and worried while on Category 2 label as “Absence of Anxiety” had statements that conveys feelings of being calm, relaxed and contentment. However, statements in Category 2 like “I feel calm” should not be mistakenly interpreted as what it was.

Reverse scoring interpretation were done in Category 2 which means higher scores implies they are feeling LESS as e.g “LESS calm”, “LESS relaxed”. In Likert scale for Category 2, answers under “VERY MUCH” were scored one (1) while “NOT AT ALL” were scored four (4). This explains why higher scores for statements in Category 2 are equivalent to more presence of anxiety.

On the initial visit prior hemodialysis, the current State of Mind of participants had high scores on Category 2 conveying the opposite on statements of feeling “relaxed” (79), followed by being “contented” (76) and “calm” (75). The statement of being “worried” (70) was also recorded high based on Category 1. Due to high prevalence rate of anxiety among hemodialysis patients, above mentioned statements were expected to gain high scores. Most patients with high anxiety experience low quality of life and impaired disposition in life. They were often subjected to limited recreational activities in daily living, presence of bodily pain and increased isolation due from their condition. Cohen, Cukor, and Kimmel (2016) explained that anxiety disorder experienced by ESRD patients often results to irrational behaviours like irritation, aggression and incomppliance which lead to disagreement between them and their caregivers. These anxiety reactions were reflected on their statements of feeling less relaxed, less contented, and less calm and feeling more worried. It was echoed on their behaviour of agitation and tension towards their caregivers before their hemodialysis treatment.

But after the initiation of VRE intervention during the first visit, a huge reduction was observed on the scores on statements of feeling “relaxed” (53), followed by being “contented” (54) and “calm” (51). A huge difference was also noted on statement of “being worried” (45). It was observed that after VRE, participants “state of mind” had improved and more participants felt “MORE relax, contented and calm” as

represented by their reduce scores. It was because VR exposure intervention used advance and novel approach of visualization that elicit a stimulating yet relaxing 3-dimensional environment. Integration of VRE in their usual care gave participants a different experience from their usual hemodialysis routine providing them a sort of entertainment in combat to boredom and stress. VR videos played throughout intervention contain sceneries of nature and calming music which promotes relaxation. This sort of VRE meditation through the enclosed VR Headgear helped participants to relax, to reflect and to absorbed peacetime as contrast to multiple simultaneous television viewing.

Table 13. State of Mind in terms of per item scale for Second visit

Category1	2nd VISIT	
Presence of Anxiety	PRE	POST
S2.I am tense	51 (1.55)	41 (1.24)
S3.I feel upset	50 (1.52)	41 (1.24)
S6.I am worried	50 (1.52)	41 (1.24)
 Category2*		
Absence of Anxiety		
S1.I feel calm	68 (2.06)	43 (1.30)
S4.I am relaxed	73 (2.21)	41 (1.24)
S5.I feel content	72 (2.18)	54 (1.64)

Note: Values are presented as total score and mean (mim. 33 - max. 132)

**Reversed scoring interpretation for Category 2*

The top high scores for "state of mind" on 2nd visit remained alike on the 1st visit on statements of feeling "relaxed" (73), followed by being "contented" (72) and "calm" (68) on pre-VRE and the reason for these feelings remains the same. Participants still felt agitated because of their condition and one particular participant was noticed to be

less calm as another patient not included in the study, whom she identified as her friend she met on the center, was reportedly expired due to the disease. These experiences that were usually happening inside dialysis centers add to the burden and cause of anxiety especially to that specific participant. The idea of high mortality having ESRD was deemed inevitable that caused anxiety and distressed to her. But despite of this isolated incidence, a reduction in state of mind scores versus 1st visit pre-VRE was still recorded. The score reduction indicate that more patients had felt "more relax, contented and calm" prior hemodialysis/ VRE during the 2nd visit. If also observed on Category 1, the statement of "I feel worried" had the biggest 20-point decreased on score from (70) on 1st visit to (50) during 2nd visit pre-VRE. This result suggested that participants were now less frightened and anxious regarding their hemodialysis treatment.

Meanwhile after the 2nd VRE intervention, the "state of mind" leading scorers for post-VRE were statements on Category 2 "feel contented" (54) and "feel calm" (43). The rest of the statements for "feeling tense, upset, worried" and "feel relaxed" had scores of (41). The above-mentioned scores indicate that every after VRE, participants "state of mind" were improving and more of them had perceived VRE experience as an effective tool in relieving anxiety and stress. This was supported on statements "I feel relaxed" from score of 53 was lessened to 41 while statement of "I feel calm" decreased from 51 to 43, in which more patients had felt "more relax and calm" compared to their 1st post-VR exposure. However, the observed decrease in pre-post anxiety scores and "state of mind" during 2nd visit may be attributed to "Hawthorne effect", a common research bias for pre-post research, especially when the participants were informed about the study. "Hawthorne effect" as explained by Elbourne, McCambridge and Witton (2014) is a type of reactivity where participants

alter their behaviour due to consequent awareness of being observed on which may undermine research integrity and its magnitude to result was still undetermined. To avoid this effect, a follow-up visit was carried out to counterbalance bias and to strengthen the findings that VRE could really improve “state of mind” and reduced anxiety level.

Table 14. State of Mind in terms of per item scale for Third visit

Category1 Presence of		3rd VISIT PRE POST	
Anxiety			
S2.I am tense		52 (1.58)	40 (1.21)
S3.I feel upset		54 (1.64)	43 (1.30)
S6.I am worried		62 (1.88)	41 (1.24)
Category2* Absence of			
Anxiety			
S1.I feel calm		66 (2.00)	49 (1.48)
S4.I am relaxed		57 (1.73)	43 (1.30)
S5.I feel content		63 (1.91)	57 (1.73)

Note: Values are presented as total score and mean (mim. 33 - max. 132)

**Reversed scoring interpretation for Category 2*

During last and 3rd visit, it was noticed there was an increased in scores for statements on Category 1 containing “Presence of anxiety” for pre-VRE as compared to their scores during 2nd visit. Statements on “feel worried” showed a high increase from 50 to 62, “feel upset” from 50 to 54 and “feel tense” from 51 to 52. During the 3rd visit, the news of pandemic that alarmed the whole world had caused extreme anxiety and worries to the participants. As hemodialysis patients were recognized as vulnerable individuals, the patients and their families were noticed to seem more careful on their surroundings making sure that the virus will not hit them. Most

participants were exchanging views about the extra precaution they needed to do and their thoughts about the alarming news on fast progression of the pandemic disease especially to the vulnerable group. These added worries and fear reflect on their “current feelings” as explained on their statement scores. The significant increase on “presence of anxiety” on their “current state of mind” justified the observation that psychosocial problems such as the pandemic disease issue also contributes to internal stress and anxiety symptoms of the participants. Nevertheless, an improved disposition was still noticed among participants based on their scores for “I feel relax” from a high score of 73 on previous visit to 57 on 3rd visit. A huge reduction was also observed on “I feel content” where 72 score was downgraded to 63. Their “state of mind” reflect that although most participants were worried and upset due to the current pandemic issue, they were still feeling optimistic despite of the crisis.

Meanwhile after the last VRE intervention, a huge reduction on statement of “I feel worried” from pre-62 to post-41 was a significant observation since the emotional stability of the vulnerable population amidst pandemic crisis should be considered. In times of health crisis, population with chronic illness like ESRD were prone to developed other mental disorder such as phobias or panic disorders (Cohen, S., et.al, 2016). ESRD patients were likely in developing severe anxiety disorders which result to low perception of life and poor behavioural response (Bezerra et.al, 2018). The benefit of VRE integration in the usual health care routine of hemodialysis patients was given importance in time of present crisis. Relaxation techniques like guided imagery and VRE help patients gain therapeutic outcomes that involve effective sense of control in handling disruptive emotional and psychological disturbances (Hasan and Uzma, 2010).

Table 15. State of Mind in terms of per item scale for Total visits

Category1	Total Visits	
Presence of Anxiety	PRE	POST
S2.I am tense	53.67 (1.63)	40.67 (1.23)
S3.I feel upset	52.33 (1.59)	41 (1.24)
S6.I am worried	60.67 (1.84)	42.33 (1.28)
Category2*		
Absence of Anxiety		
S1.I feel calm	69.67 (2.11)	47.67 (1.44)
S4.I am relaxed	69.67 (2.11)	45.67 (1.38)
S5.I feel content	70.33 (2.13)	55 (1.67)

Note: Values are presented as total score and mean (mim. 33 - max. 132)

**Reversed scoring interpretation for Category 2*

In summary all throughout the three visits, the “state of mind” of participants revealed that ESRD patients felt “less relax, less contented and less calm” followed by “feel of worried, upset and tense” before hemodialysis based on their statements scores. The “state of mind” statements revealed not only the emotional but also the physical journey being experienced by hemodialysis patients. ESRD patients experienced low self-esteem, financial deterioration, and sense of detachment from society because of the limitations from their existing condition (Bezerra et.al., 2018). Participants viewed hemodialysis procedure as an additional burden rather a treatment resulting to increase anxiety before dialysis. It was also observed that aside from day-to-day worries of participants, the over-all experience was sought to be a problem. Based on the survey, participants were not comfortable or satisfied as high scores for “not relax, contented and calm” and “feeling worried” were accounted across their dialysis visits. Observed factors that lead to these responses include

stress and anxiety from the disease, physiologic factors and the additional financial weight associated in their long-time treatment. The high score on statement of “not contented” was leaning more on the fact of having a lifetime treatment due to ESRD and the problem of insufficient kidney donors in the Philippines. Because kidney transplant yielded a higher survival rate, it was perceived as the best treatment option for ESRD patients. However, only an average of 500 kidney transplant procedure was performed annually, out of the 35,000 patients who were medically suitable for a transplant. According to a report by Mayen Jaymalin (2019), there was a recorded increase of dialysis patients, but organ donation remained to be a problem. Participants also expressed disappointment on the cost of their dialysis treatment which was quite expensive in the long run. Although cost for dialysis service in the Philippines was covered by the National Health Insurance or PhilHealth, it only covers 90 days of dialysis per year based on the report of World Health Organization (WHO, 2018). The exceeding days for dialysis would be shouldered by patients along with other charges from dialysis facilities not covered by PhilHealth. During the pre-dialysis assessment, one patient verbalized the “inconvenience of transferring to another dialysis facility because his current dialysis treatment was no longer covered by PhilHealth” and “the cost from his previous dialysis center was expensive that he could no longer afford to stay”. These were just few reasons why participants had high anxiety and low contentment in life because they blame themselves for having the disease which cause additional burden to their families.

Nevertheless, significant reduction in scores for statements of “not relax, contented and calm” and “feeling worried” after VRE trial showed that the approach was effective in reducing anxiety symptoms. The temporary detachment from external stress provides patients the opportunity to internalize, meditate and ignore temporarily

intrusive negative thoughts which lead to a stable blood pressure and respiration. The benefit of VRE in translating negative thoughts to constructive view was observed on the huge reduction on “I feel worried” scores from 60.67 to 42.33 showing that their fears had subside. Relaxation and meditation promote positive thinking that self-help patients to have strong resiliency and improved quality of life. Morgan and Jorm (2016) illustrated that when patients focus their mind and energy on the positive rather than the worse, their body can easily cope up to anxiety and can effectively identify strategies to handle stress. After Virtual Reality Exposure, “state of mind” of participants were clearly improving because of the benefits associated in VRE intervention.

Significance of pre-post VR Measurement Variances

Table 16. Pre-Post VR Exposure Mean Difference in ANOVA

Pre-Post	F	Sig.(p)*
Systolic BP	4.86	.003451
Diastolic BP	3.67	.014859
Heart Rate	2.80	.044052
Respiration	3.77	.013111
Anxiety	23.83	< .00001

*Note: Table shows F value representing the significant differences of variables using ANOVA on degree of freedom of 31. *Significance $p < .05$*

To determine for any significant changes and effect of Virtual Reality Exposure integration or VRE in state of mind and biophysical scores of participants all throughout the visits, a one-way repeated measure ANOVA statistical analysis was used since the VRE took place in different time points. The initial pre-score served as the baseline data and the post measure scores for first to third visit of both biophysical measures

and anxiety were calculated to assess if there is a significant change that happen on all the three time points.

Based on pre-post VR evaluation on repeated measure ANOVA, there is a relatively highly significant difference in the scores for both Systolic pre-post measurement ($f=4.86$, $p=.003451$) and in Diastolic pre-post ($f=3.67$, $p=.014859$). The difference means that VRE had effect on the level of blood pressure measurement of participants when they were subjected in VR intervention. However, the f value for the diastolic level was lower compared to systolic level. This means that although significant difference was noted, the level of variance for diastolic level was close in each time points.

The minimal reduction in diastolic scores brought by relaxation show an effect of close variances in diastolic blood pressure for each visit compared to systolic level which relatively had larger variances. This observation was supported by most studies that observe variation in blood pressure from relaxation therapy had results ranging from small but statistically significant change (Beyer et al., 2008). The studies suggest that although relaxation can decrease blood pressure level, one should not rely on therapeutic approach alone especially for hypertensive patients since there are varied factors that affect blood pressure. Nevertheless, a reduction in SBP and DBP during hemodialysis has main implications in blood pressure variability since it prevents BP from fluctuating, particularly when under anxiety and stress. A controlled BP was extremely important to avoid other complications such as cardiovascular disease where CKD patients was more likely to die than due to kidney failure (Delano et al, 2015).

The same observation was also observed in Heart rate pre-post measurement ($f= 2.80$, $p= .044052$) having a significant difference however with small variances too like the diastolic measurement. Nevertheless, the significant difference in heart rate was explained by the decrease in sympathetic nervous function. Nakao Matsuhiro (2019) argued that this bodily response resulted to slower heart rate and lower blood pressure brought by relaxation was an indication of a normal heart function (Respiration pre-post measurement also obtained a highly significant difference of ($f= 3.77$, $p= .013111$) which further proved that VRE still caused a significant reduction although the decrease was at minimal level. Relaxation promotes effective diaphragmatic breathing and a mind-body meditation that improves both mental and physiologic health (Ma X et al., 2017). Maintaining a stable respiratory rate especially when a person was under pressure or stress revealed that VRE was an effective tool in improving respiration.

A relatively highly significant score of $f=23.83$, $p=< .00001$ with large f variances was noticed on the anxiety level, which showed that VRE had strong implications on the anxiety level. As observed and explained on the previous data, anxiety level every after visits was declining and a radical improvement after VRE intervention was evident based on their total anxiety scores and per item "state of mind" scores. Because of the relaxation effect brought by VRE, anxiety symptoms lessened, and biophysical parameters improved thus anxiety level also reduced throughout the visits. The significant reduction in anxiety level implied that the integration of VRE was helpful in improving cognitive and physiologic state of ESRD patients. Given that, when VRE were to practiced daily or more frequently, it would help the patients to endure the burdens associated with ESRD and would result to a more improved quality of life among them and their caregivers. Bauman, Fang, and Senchak (2019) study showed

that self-help like intervention such as integration of VRE not only during hemodialysis but also in daily life, will likely help the patients with anxiety to have more self-control and management on their anxiety symptoms compared to those who had no intervention at all.

These significant repeated ANOVA statistical results mean that VR exposure does have relatively a significant effect on their pre-VR exposure scores. Specifically, high scores of anxiety and high level of biophysical measures will be reduced when subjected to VR exposure due to its positive effects such as relaxation and positive translation.

State of Mind and Biophysical Profile Correlation

Table 17. STAI-S and Biophysical Profile Correlations

Correlations

	Systolic	Diastolic	Heart rate	Respiration
Anxiety				
Pearson Correlation	.45*	.35*	.39*	.04
Sig. (2-tailed)*	.009	.046	.025	.825
N	33	33	33	33

Note: Table shows value representing the correlation of variables using Pearson Correlation.

**Correlation is significant at the 0.05 level (2-tailed)*

Based on aforementioned studies, it was established that anxiety of ESRD patients have implications on biophysical aspect of patients in terms of their BP level, heart rate, and other measures. To determine the relationship of state of mind and biophysical markers after series of VR exposure integration, total pre-post anxiety mean scores from the initial to last visit were computed and compared to total pre-post biophysical measurements. A mean State of mind of M=32.76 was compared for correlation to biophysical scores (Systolic M=133; Diastolic M=82; Heart rate M=78;

Respiration M=19). Based on Pearson-correlation statistical result, a significant moderate correlation was recorded in systolic scores ($r=.45$, $p=.009$), implying that state of mind had moderate impact on systolic values. However, a significant weak correlation was observed for diastolic ($r=.35$, $p=.046$) and heart rate ($r=.39$, $p=.025$), which demonstrates that diastolic and heart rate values were affected by state of mind but not as strong to significantly cause a drastic change in their levels.

Results showed that there was a correlation between person's state of mind and blood pressure, also with heart rate. When a person is anxious, it increases cardiac output, constrict blood vessels and raise arterial blood pressure. A long-term anxiety affects personal lifestyle leading to adverse behavioural response such as increased eating, smoking and less exercise (Jin et al.,2015). In the study, patients who had higher anxiety score, also exhibit higher values for BP, HR and RR and in contrary, patients who had lesser anxiety score had low-to-normal values for biophysical parameters. The relationship of anxiety and biophysical measure was best observed when a patient experience "white coat" effect or BP rise due to anxiety and stress. A repeated sudden BP rise is as destructive as hypertension thus it is important to maintain a positive state of mind whenever confronted by situations with high anxiety. Correlation of State of anxiety and heart rate variability was also important to be determined as it was also used by doctors in assessing cardiovascular health.

Respiration was also very weakly correlated to state of mind ($r=.04$) but do not denotes significance ($p=.825 > p=0.05$). However, the correlation was very weak that it had no significance observed in the study. Nevertheless, other studies showed that anxiety had correlation on experienced respiratory symptoms. Patients with respiratory diseases like asthma who were experiencing severe anxiety had more nightly symptoms and attack of breathlessness (Andersen et al., 2014). Consequently, ESRD

patients with respiratory diseases should be vigilant whenever confronted by extreme stress and anxiety.

Based on the observed relationship between state of mind and biophysical measures, when a person is less anxious, a reduced level of blood pressure was expected, heart rate was also stable and, in some cases, might as well as respiration. The opposite effect including elevated biophysical measures would be observed when a person experiences high anxiety. The result of this correlation between State of mind and biophysical markers had strong implication in this study towards its objective to integrate VRE during hemodialysis as it was validated based on the results that anxiety level had direct association on physiologic state of ESRD patients.

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

SUMMARY

This study revealed that Virtual Reality Exposure (VRE) intervention through the use of VR headgear technology was effective in reducing anxiety for both pre-dialysis/VR and post-VR exposure by improving biophysical profile and state of mind. Upon observation, anxiety level of research participants was predominantly high before dialysis specifically during the initial visit but anxiety trend began to decline after initiation of VR exposure. Results showed that anxiety level before dialysis discreetly changed from a level of “high presence” of anxiety to “low presence” of anxiety after VRE intervention. The reduced anxiety symptoms and improved “state of mind” during VRE also affect biophysical measures explained through lowering of their blood pressure, heart rate and respiration.

CONCLUSION

In conclusion, VR exposure visualization, as an arm of Cognitive Behavior Therapy, helped ESRD patients changed their perception and thinking pattern thus resulted to improvement in biophysical profile and state of mind. Although inevitable daily concerns and isolated personal conflict arises, the use of VR technology was still determined effective in improving state of mind of ESRD patients to gradually manage and control anxiety symptoms by keeping a calmed and relaxed state all throughout hemodialysis. A maintained anxiety level and improved state of mind allows caregivers to provide a more efficient care without the barriers of anxiety due to positive effects of VRE. Based on the given importance of the study, results and observation of the research had proven that the VR exposure during treatment provided patients a new and exciting experience that they can look forward during hemodialysis visit. An

improved “state of mind” showing an increased in level of contentment and satisfaction after VRE showed a direct improvement on their current feelings which further verified that VRE elevated their hemodialysis experience. It was also proven as an adjunctive intervention to improved health care service in dialysis center facilities. All these research findings could serve as a basis for future researchers to further expound the benefits of VR exposure intervention in the life of chronically ill patients.

RECOMMENDATION

The intervention in the study used brief Cognitive Behavior Therapy and integrates VR exposure within a limited time frame. Though the result found VRE was effective in improving state of mind of ESRD patients and its biophysical parameters, it is recommended for future study to use a long-term trial to further strengthen the research on the benefits of VR exposure in the life and experience of ESRD patients. An adoption of VR exposure or use of VR headgear as an additional alternative source of entertainment aside from televisions in clinical settings is also recommended as a game changer in hemodialysis experience in the Philippines. The researcher also recommended allowing patients who were able to provide to use their own videos, no matter how many, based on their liking and preferences and not only limited on the videos used in the study. It was also recommended to apply VRE on the care plan of other chronic illnesses such as on cancer patients during chemotherapy, on post-Myocardial Infarction and Stroke patients during recovery and on Orthopaedic clients during hospitalization. Furthermore, it is also recommended to expound the use of VR exposure not only on clinical settings but as a form of self-help therapy that can be used at home and to use it as an additional approach in addressing physiologic and psychological health issues in daily living.

REFERENCES

- American Heart Association. (2017). *2017 Guideline for the Prevention, Detection, Evaluation and Management of High Blood Pressure in Adults*.
- Ali, Uzma & Hassan, Shazia. (2010). *The Effectiveness of Relaxation Therapy in the Reduction of Anxiety Related Symptoms (A Case Study)*. International Journal of Psychological Studies vol. 2 no. 2; December 2010/www.ccsenet.org/ijps.
- Andersen A., Franklin, K., Gislason, T., Janson, C., Lampa M., Leander, M. (2014). *Impact of anxiety and depression on respiratory symptoms*.
<https://doi.org/10.1016/j.rmed.2014.09.007>.
- Asnaani, A., Hoffman, S., Litz, B., McLean, C. (2011). *Gender Differences in Anxiety Disorders: Prevalence, Course of Illness, Comorbidity and Burden of Illness*. J Psychiatr Res. 2011 Aug; 45(8): 1027-1035. doi:10.1016/j.jpsychires.2011.03.006.
- Augustyniak-Bartosik H., Karczewski M., Klinger M., Krajewska M., Kuształ M., Madziarska K., Rymaszewska J., Trafidło E., Weyde W. (2015). *Depressive symptoms but not chronic pain have an impact on the survival of patients undergoing maintenance hemodialysis*. Arch Med Sci 2018; 14, 2: 265–275 DOI: 10.5114/aoms.2016.59765 Copyright © 2016 Termedia & Banach.
- Balita, Carl. (2016) *Ultimate Learning Guide*. Manila, Philippines.
- Bauman, JR., Fang, CY., Senchak, JJ. (2019) *Interventions to improve quality of life (QOL) and/or mood in patients with head and neck cancer (HNC): a review of*

the evidence. Cancers Head Neck 4, 2 (2019).

<https://doi.org/10.1186/s41199-019-0041-4>

Beck, A.T., Rush, A.J., Shaw, B.F., & Emery, G. (1979) *Cognitive therapy of depression*. New York: Penguin.

Bekker H. and Marteau TM., (1992). *The development of a six-item short-form of the state scale of the Spielberger State-Trait Anxiety Inventory (STAI)*. British Journal of Clinical Psychology. 1992; **31**:301-306.

Bermudez L, Lerma A, Perez-Grovas H, Lerma C., Peralta-Pedrero ML, Robles-García R. (2017). *Brief cognitive behavioural intervention for depression and anxiety symptoms improves quality of life in chronic haemodialysis patients*. [Psychol Psychother](#). 2017

Beyer, FR., Campbell F., Cook, JV., Dickinson, HO., Ford, GA., Mason J. (2008). *Relaxation for high blood pressure in adults which has no clearly identified cause*. Cochrane Library 23 January 2008.

Bezerra, C., Elias, R., Silva, B. (2018). *Decision-making process in the pre-dialysis CKD patients: do anxiety, stress and depression matter?* BMC Nephrol 19, 98 (2018).
<https://doi.org/10.1186/s12882-018-0896-3>

Blair G., Cole S., Kapil S., Rodriguez S., (2018). *Virtual reality use in adult ICU to mitigate anxiety for a patient on V-V ECMO*. Journal of Clinical Anesthesia 55 (2019) 26-27. www.elsevier.com/locate/jclinane

- Boulos, KM., Grindle, M., Jerdan, SW., van Woerden, HC., (2018). *Head-Mounted Virtual Reality and Mental Health: Critical Review of Current Research*. [JMIR Serious Games](#). 2018 Jul 6;6(3):e14. doi: 10.2196/games.9226
- Bross, R., Feroze, U., Kalantar-Zadeh, K., Kim, J., Kopple, JD, Martin, D., Porszasz, J., Bryan Shapiro B., Upreti, R., Yi-Nan L., Zhang, M. (2016). *Association between quality of life and anxiety, depression, physical activity and physical performance in maintenance hemodialysis patients* *Chronic Diseases and Translational Medicine* 110e119 www.keaipublishing.com/en/journals/cdtm/ www.cdatm.org
- Brown, R., Henriques, J., Tluczek, A. (2009). *Support for the Reliability and Validity of a Six-Item State Anxiety Scale Derived From the State-Trait Anxiety Inventory*. *J Nurs Meas*. 2009; 17(1):19-28. doi:10.1891/1061-3749.17.1.19.
- Chadachan,V., Setia, S., Subramaniam, K., Tay, J., Ye, M. (2018). *Understanding short-term blood-pressure-variability phenotypes: from concept to clinical practice*. *Int J Gen Med*. 2018;11:241-254.doi:10.2147/IJGM.S164903.
- Chirico, A., Cipresso, P., Yaden, D. B., Biassoi, F., Riva, G., and Gaggioli, A. (2017). Clinical Sciences Building, Lee Kong Chian School of Medicine, Nanyang Technological University, 11 Mandalay Road, Singapore.
- Cohen, S., Cukor. D., Kimmel, P. (2016). *Anxiety in Patients Treated with Hemodialysis*. *Clin J Am Soc Nephrol*. 2016 Dec. 7; 11(12):2250 2255. doi:10.2215/CJN.02590316
- Cope H., Tyrant J. and Viczko J., (2018). *Virtual Reality for Anxiety Reduction Demonstrated by Quantitative EEG:A Pilot Study*. NeuroMeditation Institute.

- Delano, G., Friedman E., Mallappallil, M., McFarlane, E., Salifu, M., (2015). *Chronic Kidney Disease in the elderly: evaluation and management*. Clin Pract (Lond.95) 2014; 11(5): 525-535. doi: 10.2217/cpr.14.46.
- Dhonneur, G., Ganry, L., Hersant B., Meningaud, JP., Sidahmed, M., (2017). *Using virtual reality to control preoperative anxiety in ambulatory surgery patients: A pilot study in maxillofacial and plastic surgery* Received 20 November 2017, Accepted 28 December 2017, Available online 6 January 2018 Effectiveness of immersive videos in inducing awe: an experimental study. Sci.Rep. 7:1218. doi: 10.1038/s41598-017-01242-0
- Elbourne,D., McCambridge J., Witton, J., (2014). *Systematic review of the Hawthorne effect: New concepts are needed to study research participation effects*. J Clin Epidemiol. 2014 Mar; 67 (3): 267-277. doi:10.1016/j.jclinepi.2013.08.015.
- Eslam Bani Mohammad and Muayyad Ahmad (2018). *Virtual reality as a distraction technique for pain and anxiety among patients with breast cancer: A randomized control trial*. <https://doi.org/10.1017/S1478951518000639>
- Golmakhani, N., Mazlom, SR., Nahvi, A., Pabarja, F., Rizi, SM., Shourab, NJ., Talebi, M., Zagami, SM. (2016). *Virtual reality and anxiety in primiparous women during episiotomy repair*. Iran J Nurs Midwifery Res. 2016 Sep-Oct; 21(5): 521–526.
- Gopal, K., Nivetida, N., Pravati, P., Shanmugavel,K., Venakata, G. (2013). *The Effects of Short-Term Relaxation Therapy on Indices of Heart Rate Variability and Blood Pressure in Young Adults*. Am J Health Promotion. Sep-Oct 2014; 29(1): 23-8.doi:10.4278/ajhp.130131-QUAN-52.

- Gun Woo K., Jungmin W., and Kyungmin K. (2018). *The Quality of Life of Hemodialysis Patients Is Affected Not Only by Medical but also Psychosocial Factors: a Canonical Correlation Study*. J Korean Med Sci. 2018 Apr 2;33(14):e111
<https://doi.org/10.3346/jkms.2018.33.e111> eISSN 1598-6357·pISSN 1011-8934
- Hong,Y., Jung,YH., Kyeong S., Kim,HE., Kim,JJ., Kim,MK.,(2017). *Effectiveness of self-training using the mobile-based virtual reality program in patients with social anxiety disorder*. Computers in Human Behavior 73 (2017) 614-619.
www.elsevier.com/locate/comphumbeh
- Jaymalin, Mayen, (2019). *Lack of organ donors deprives kidney patients of treatment*. Philstar Global June 6, 2019.
- Jin, Y.,Qi, C.,Ting, A.,Wei, D., Wenpeng, C.,Yu, P. (2015). *Association between anxiety and hypertension: a systematic review and meta-analysis of epidemiological studies*. Neuropsychiatric Dis Treat. 2015; 11: 1121-1130. doi:10.2147/NDT.S77710.
- John Hopkins Medicine. (2020). John Hopkins Health System.
- Kemppainen V., Tossavainen K., Turunen H. (2012). *“Nurses’ roles in health promotion practice: an integrative review”*. Health Promotion International, Vol. 28 No. 4
doi:10.1093. Oxford University Press.
- Konstadina Griva, Kevin F.Y. Lama, Mooppil Nandakumarb, Jo-an H. Nga, Hayley McBain, Stanton P. Newman (2018). *The effect of brief self-management intervention for hemodialysis patients (HED-SMART) on trajectories of depressive and anxious symptoms*. International Journal of Nephrology and Renovascular Disease.

- Kyungmin K., Gun Woo K., Jungmin W. (2018). *The Quality of Life of Hemodialysis Patients Is Affected Not Only by Medical but also Psychosocial Factors: A Canonical Correlation Study*. J Korean Med Sci. 2018 Apr 2;33(14):e111.
<https://doi.org/10.3346/jkms.2018.33.e111> eISSN 1598-6357·pISSN 1011-8934
- Lim, R.I., Reyes L. et.al (2018). *Virtual Reality in Pre-operative Fear Reduction among Filipino Young Adults: A Pilot Research*. Our Lady of Fatima University. Valenzuela City.
- Ma, X., Yue, Z.Q., Gong, Z.Q., Zhang, H., Duan, N.Y., Shi, Y.T., Wei, G.X., & Li, Y.F. (2017). *The Effect of Diaphragmatic Breathing on Attention, Negative Affect and Stress in Healthy Adults*. Frontiers in psychology, 8, 874.
<https://doi.org/10.3389/fpsyg.2017.00874>.
- Magtubo, C. (2017) *The state of kidney disease in the Philippines: Preventable, treatable, but lacking in donors* <https://today.mims.com/the-state-of-kidney-disease-in-the-philippines--preventable--treatable--but-lacking-in-donors> Mar;90(1):105-123. doi: 10.1111/papt.12098. Epub 2016 Jul 20.
- Morgan, A.& Jorm,A. (2016). *Self-help strategies for sub-threshold anxiety: A Delphi consensus study to find messages suitable for population-wide promotion*.
<https://doi.org/10.1016/j.jad.2016.07.024>
- Nadja Ilona Dorig. (2014) *The role of emotional processing in psychotherapy for depression: an integrative neurophysiological-psychological approach*. Zurich Open Repository and Archive. University of Zurich Main Library Strickhofstrasse 39 CH-8057 Zurich. www.zora.uzh.ch

Nakao, Matsuhiro. (2019). *Heart Rate Variability and Perceived Stress as Measurements of Relaxation Response*. J Clin Med. 2019 Oct; 8(10):1704.doi:10.3390/jcm8101704.

National Center for Kidney Disease. nckd.com (2017).

NKTI.(2015). ***Renal Health Plus***. <http://caro.doh.gov.ph/wp-content/uploads/2016/01/ReDCoP-2015-Oct-SitAna-1.pdf>

Spitzer, R. L., Kroenke, K., Williams, J. B., and Löwe, B. (2006). *A brief measure for assessing generalized anxiety disorder the GAD-7*. Arch. Intern. Med. 166, 1092–1097. doi: 10.1001/archinte.166.10.1092

Tacio, Henrilito (2018) *Kidney problems on the rise*. The Philippine Star.

World Health Organization (2018). *The Philippine health system review*. WHO regional office for South East Asia. Health systems in transition. Vol-8, Number 2. ISBN 978-92-9022-673-4.

Zhong Sheng Goh & Konstadina Griva, (2018). *Anxiety and depression in patients with end-stage renal disease: impact and management challenges – a narrative review*. International Journal of Nephrology and Renovascular Disease. Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore

Appendix A

INFORMED CONSENT

University of the Philippines Open University

This informed consent form is for hemodialysis inpatients in private hemodialysis centers in Metro Manila and who I am inviting to participate in my research entitled “The Effect of Virtual Reality on Biophysical Profile and State of Mind among End-Stage Renal Disease Patients undergoing Hemodialysis in Metro Manila.”

Name of Principal Investigator: Ronald Ian T. Lim, RN

Name of Organization: University of the Philippines Open University

Name of Project: Thesis N300

This Informed Consent Form has two parts:

- Information Sheet (to share information about the study with you)
- Certificate of Consent (for signatures if you choose to participate)

Part I: Information Sheet

Introduction (Panimula)

I am Ronald Ian Lim, registered nurse, and taking Masters in Arts in Nursing at UPOU, conducting a research about the Effect of Virtual Reality on Biophysical Profile and State of Mind among End Stage Renal Disease Patients undergoing Hemodialysis in Metro Manila. I am going to give you information and invite you to be part of this research. Before you decide, you can talk to anyone you feel comfortable with about the research. *(Ako po ay si Ronald Ian Lim, isang rehistradong nars at kumukuha ng Masters in Nursing sa Unibersidad ng Pilipinas, at nagsasagawa ng isang pananaliksik ukol sa paggamit ng Virtual Reality box bilang isang pamamaraan upang mapababa ang nararamdamang pagkabalisa ng pasyente tuwing “dialysis”. Ako ay magbibigay ng impormasyon at nais kang imbitahan na sumali sa aming pananaliksik. Bago ka magdesisyon, maaari ka munang makipag-ugnayan sa ibang tao ukol sa pananaliksik.)*

This consent form may contain words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask them of me or another researcher. *(Ang consent form po na ito ay maaaring maglaman ng mga salitang mahirap unawain. Maaari ninyong*

patigilin ang researcher sa pagsasalita at humingi ng mas malalim na paliwanag. Kung kayo ay may mga paglilinaw, maaari ninyong tanungin ang researcher at ang iba pang miyembro.)

Purpose of the research (Layunin ng pananaliksik)

The primary objective of the study is to determine the effect of using Virtual Reality Exposure intervention to manage biophysical profile and state of mind of End-stage renal disease patients during hemodialysis treatment *(Ang pangunahing layunin ng pananaliksik ay malaman ang epekto ng Virtual Reality exposure bilang pamamaraan upang mapababa ang nararamdamang pagkabalisa ng mga pasyente tuwing “hemodialysis”).*

Type of Research Intervention

This research will involve your participation in assessing the effect of Virtual Reality Experience on biophysical profile and state of mind undergoing hemodialysis. *(Ang pananaliksik na ito ay nangangailangan ng inyong partisipasyon upang malaman ang epekto ng “Virtual Reality Experience” sa pagpapababa ng nararamdamang pagkabalisa tuwing “hemodialysis”).*

Participant selection (Seleksyon ng mga kalahok)

We are inviting hemodialysis patients as the subjects for the simple reason that they are aware of their particular anxiety due to their Renal disease. *(Iniimbitahan po namin kayo bilang pasyenteng sasalang sa “hemodialysis” para maging subjects sa simpleng rason na alam po ninyo ang partikular na dahilan ng nararamdaman ninyong pagkabalisa patungkol sa inyong karamdaman.)*

Voluntary Participation (Kusang-loob sa paglahok)

Your participation will remain voluntary until the end of this research study. You will not be forced to continue being a respondent if you no longer want to involve. Refusal to participate will involve no penalty. You have the freedom to discontinue in participating in this study at all times. *(Ang inyo pong desisyon sa pag-lahok sa pagaaral na ito ay mananatiling boluntaryo hanggang matapos ang pananaliksik. Kung nais ninyong mahinto ang inyong partisipasyon sa pagaaral na ito ay hindi po namin kayo pipigilan dahil ang inyong desisyon sa paglahok ay kusang loob. Maaari din po*

kayong umayaw at tumanggi sa pag-aaral na ito na walang kaparusahan. May karapatan po kayong ihinto ang inyong pakikipaglahok sa pananaliksik na ito sa anumang oras.)

Procedures and Protocol (Pamamaraan at Kasunduan)

The researcher is asking you to help us learn to determine the effect of using Virtual Reality Exposure intervention to improve anxiety of End-stage renal disease patients during hemodialysis treatment. The research will cater as many as possible eligible participants based on protocol per dialysis centers. *(Ang mga mananaliksik ay hinihiling ang inyong tulong upang malaman ang bisa ng paggamit ng Virtual Reality exposure bilang isang pamamaraan upang mapababa ang nararamdamang pagkabalisa ng pasyente tuwing "dialysis". Ang mananaliksik ay naglalayong makakuha ng kahit ilang kalahok base sa nakasaad sa protocol sa bawat "dialysis center."Kayo po ay iniimbitahan na sumali sa pananaliksik na ito.)*

If you are willing to be part of this study, the primary investigator (researcher) will asked you to answer a survey form regarding to your feelings about anxiety for the past 2 weeks to determine the anxiety level. The primary investigator will determine if you are qualified based on research criteria. Qualified participants will utilize the Virtual Reality box during hemodialysis. The selected group will undergo the 4 intervention session, and will answer the anxiety scale pre and post VR session. *(Kung kayo po ay pumapayag na lumahok sa pagaaral na ito, kayo po ay pasasagutin sa survey form ukol sa inyong nararanasang pagkabalisa sa nakaraang 2 linggo. Ang napiling grupo ay gagamit ng VR box habang naghehemodialysis. Ang grupo pong ito ay sasalang sa 4 na sesyon ng nasabing pamamaraan at sasagutan ang mga katanungan ukol sa pagkabalisa bago at pagkatapos ng bawat sesyon.*

Duration (Haba ng Pananaliksik)

The Virtual Reality Exposure intervention will have 4 sessions for each participant. Each VR Exposure will last for 15 minutes for answering the questionnaires and video presentation (5-8 minutes per video). The intervention will take place in hemodialysis centers where they are catered. *(Ang "VR exposure intervention" po ay mayroong 4 na sesyon kada kalahok. Ang bawat isang "VR exposure" po ay magtatagal ng 15 minuto kasama ang pagsagot sa mga katanungan at panonood ng mga palabras na tatagal ng 5-8 minuto lamang kada isang*

presentasyon. Mangyayari ang pananaliksik sa mga "hemodialysis center" kung saan nagpapagamot ang mga kalahok.)

Benefits (Pakinabang)

If you participate in this research, you will have the following benefits: for the participants your anxiety will be lessened and your perception about your condition maybe improved that may result to positive outcome in your health. You may also be entertain and feel comfortable after the process. There may not be any benefit to the society at this stage of the research, but future generations are likely to benefit. *(Kung kayo po ay sasali sa pananaliksik na ito, magkakaroon po kayo ng sumusunodna benepisyo: Para sa mga kalahok, ang inyong nararamdamang pagkabalisa ay mababawasan at ang inyong pananaw ukol sa inyong karamadaman ay maaring mapabuti na maaaring magdulot ng magandangepekto sa inyong kalusugan. Maaari rin kayong maaliw at maging komportable pagkatapos ng proseso. Maaaring wala itong pakinabang para sa lipunan sa ngayon, ngunit ang mga susunod na henerasyon ay maaari pong makinabang.)*

Risks (Panganib)

By participating in this research, there is a minimal risk that the video clip may trigger some emotional response to you. A possible physiological discomfort may also happen such as eye strain during and after the process. However, if the following risks arise, the researchers will take full responsibility and will stop the process. *(Sa pagsali ninyo sa pananaliksik na ito, may maliit posibilidad na magdulot ang video clip ng pagiging emosyonal. Maaari rin po na magdulot ito ng masamang epekto tulad ng pagkapagod ng mata habang sumasailalim sa proseso at pagkatapos ng proseso. Gayunman, kung ang mga panganib na ito ay makita, ang mga mananaliksik po ay aakuin ang buong responsibilidad at ititigil ang proseso.)*

Confidentiality (Paglilihim)

The information gathered will be secured and will remain confidential throughout the course of this study. The data that will be gathered will be accessible to the researcher only. There will be no identifications of names on the survey that will be given. Personal information will not be published in this study. All documents and information used in the study will be kept in a sealed envelope and will be opened only after the data

collection period has ended. If the participant wished to know their scores and evaluation, they may opt to put their name for proper identification. The result of their assessment will be sent either through letter, electronic mail or personal if they wished to. Otherwise indicated, data and information of each participant will be treated secured and cannot be viewed without proper authorization by the participant. In a same manner of securing the data, all gathered information and files used in the study that concerns the participants will be shredded and disposed until the research has been finally analysed and concluded not limited to hard and soft copy of files. The protocol will follow all the provisions stated in the Data Privacy Act of 2012. *(Ang makukuha pong impormasyon ay mananatiling ligtas at lihim sa buong panahon ng pananaliksik. Ang mga mananaliksik lamang ang makakaalam ng mga impormasyon na makakalap. Walang pagkakakilanlan ng pangalan na ilalagay sa papel pangsiyasat na ibibigay. Ang mga personal na impormasyon ay hindi ilalathala sa pagaaral. Lahat po ng dokumento at impormasyon ay itatago sa isang selyadong envelope at bubuksan lamang pagkatapos ng koleksyon ng mga resulta. Kung nais po ninyong makita ang resulta ng inyong paglahok, maari po ninyong ilagay ang inyong pangalan at pagkakakilanlan. Ito po ay ipapadala sa pamamagitan ng liham o email. Lahat po ng impormasyon ay mananatiling pribado at hindi maaring makita o makuha ng walang pahintulot. Ang mga impormasyon at mga resulta na makukuha po sa pagaaral na ito ay sisirain at itatapon pagkatapos ng pagaaral. Lahat ng nasasaad sa Data Privacy Act of 2012 ay susundin ng mga mananaliksik.)*

Right to Refuse or Withdraw (Karapatang tumanggi o umurong)

You do not have to take part in this research if you do not wish to do so. You may also stop participating in the research at any time you choose. It is your choice and all of your rights will still be respected. *(Hindi po ninyo kailangan sumali sa pananaliksik na ito kung hindi ayon sa inyong kagustuhan. Maaari po ninyong itigil ang inyong pakikipaglahok sa pananaliksik anumang oras. Ito po ay inyong desisyon at ang inyong karapatan ay aming gagalangin.)*

Who to Contact

If you have any questions, you can ask them now or later. If you wish to ask questions later, you may contact any of the following: [Ronald Ian Lim, 09168532863].

(Kung kayo po ay may katanungan, maari po ninyong kontakin o tawagan ang pangalanat numero na nakasaad sa itaas.)

This proposal has been reviewed and approved by UPOU ERB, which is a committee whose task it is to make sure that research participants are protected from harm. *(Ang pananaliksik na ito ay napagalaran at aprubado ng "Ethics Review Board.")*.

Part II: Certificate of Consent

I have been invited to participate in research about The Effect of Virtual Reality on Biophysical Profile and State of Mind among End-Stage Renal Disease Patients undergoing Hemodialysis in Metro Manila. I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study.

Print Name of Participant: _____

Signature of Participant: _____

Date: _____

Statement by the researcher/person taking consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands that the following will be done:

1. _Participation in Virtual Reality Exposure Intervention
2. _Monitoring of Patients Biophysical Profile and Anxiety Level

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Signature of Researcher /person taking the consent: _____

Date: _____

Part II: Certificate of Consent (For Senior Citizen)

I have been invited to participate in research about The Effect of Virtual Reality on Biophysical Profile and State of Mind among End-Stage Renal Disease Patients undergoing Hemodialysis in Metro Manila. I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study.

Print Name of Participant: _____
Signature of Participant: _____
Date: _____

Thumb print of participant



Statement by the researcher/person taking consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands that the following will be done:

1. _Participation in Virtual Reality Exposure Intervention
2. _Monitoring of Patients Biophysical Profile and Anxiety Level

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Signature of Researcher /person taking the consent: _____
Date: _____

Part II: Certificate of Consent (For Minor Participants)

The participant (minor) has been invited to participate in research about The Effect of Virtual Reality on Biophysical Profile and State of Mind among End-Stage Renal Disease Patients undergoing Hemodialysis in Metro Manila.

I had read and understand the consent form to the potential minor participant, and I had the opportunity to ask questions. I confirm that I had given my consent freely for the participation of my assent as the Parent / Legal Authorized Representative (Guardian).

Print name of participant (assent)

Print name of Parent / Legal Authorized Representative (Guardian)

Signature of Parent / Legal Authorized Representative (Guardian)

Date _____
Day/month/year

Statement by the researcher/person taking consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands that the following will be done:

- 1._Participation in Virtual Reality Exposure Intervention
- 2._Monitoring of Patients Biophysical Profile and Anxiety Level

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Signature of Researcher /person taking the consent:_____

Date: _____

Appendix B

SURVEY QUESTIONNAIRE

Thank you for agreeing to take part in this research study for helping us determine the effect of Virtual Reality on biophysical profile and state of mind among end-stage renal disease patients undergoing hemodialysis. This survey would only take 5-7 minutes of your time. Rest assured that all information will be treated confidential and private, and this will only be used for research study purposes. *(Maraming salamat sa pag-papaunlak upang maging bahagi ng pananaliksik upang malaman ang epekto ng "Virtual Reality exposure" sa pagpapababa ng nararamdamang pagkabalisa ng mga pasyente tuwing "hemodialysis". Ang suvey na ito ay maglalan lamang ng 5-7 minuto sa inyong oras. Maging panatag na lahat ng impormasyong maibabahagi ay ituturing kompidensyal at pribado at gagamitin lamang para sa pananaliksik na ito.)*

Direction: Kindly check the box that corresponds to your answer for each question
(Panuto: Lgayang ng tsek ang kahon na magalalan ng inyong kasagutan sa bawat katanungan.)

PERSONAL INFORMATION

Name(optional): _____

Gender (Kasarian): ☐ Male ☐ Female

Age:

☐ 12-18 ☐ 18-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55-60 ☐ 60 above

Educational Attainment:

- ☐ Elementary
- ☐ High school
- ☐ Undergraduate
- ☐ Associate/ Bachelor's degree
- ☐ Master's degree
- ☐ Doctorate's degree

Co-Morbidities:

- ☐ Hypertension
- ☐ Diabetes
- ☐ Stroke
- ☐ Others pls specify: _____

Directions: Please put a check (✓) to your corresponding responses.
(Lagyan ng tsek (✓) na angkop sa iyong kasagutan.)

Over the last 2 weeks, how often have you been bothered by the following problems?	Not at all sure	Several days	Over half	Nearly every day
--	-----------------	--------------	-----------	------------------

<i>(Sa nakaraang 2 linggo, gaano kalimit kang binabagabag ng mga sumusunod na problema?)</i>	<i>(Hindi ako sigurado)</i>	<i>(Mga ilang araw)</i>	the days <i>(Kada-isang araw)</i>	<i>(Halos araw-araw)</i>
1. Feeling nervous, anxious, or on edge <i>(Kabado o pagkabalisa)</i>				
2. Not being able to stop or control worrying <i>(Hindi maiwasan na mag-alala)</i>				
3. Worrying too much about different things <i>(Sobrang pag-aalala sa iba't-ibang bagay)</i>				
4. Trouble relaxing <i>(Nahihirapang magpahinga)</i>				
5. Being so restless that it's hard to sit still <i>(Nahihirapang kumalma)</i>				
6. Becoming easily annoyed or irritable <i>(Madaling maging irritable)</i>				
7. Feeling afraid as if something awful might happen <i>(Natatakot na may mangyaring hindi maganda)</i>				
TOTAL SCORES <i>(Kabuuan Bilang)</i>				

8. If you checked off any problems, how difficulty have these made it for you to do your work, take care of things at home, or get along with other people? *(Kung may nasagutan kang ilan sa mga problema, gaano ito nagpapahirap sa iyong trabaho, gawaing bahay at pakikitungo sa mga tao?)*

Not difficult at all *(Hindi mahirap)* _____
 Somewhat difficult *(Di gaanong mahirap)* _____
 Very Difficult *(Sobrang hirap)* _____
 Extremely Difficult *(Ubod ng hirap)* _____

Source: Spitzer RL, Kroenke K, Williams JBW, Lowe B. A brief measure for assessing generalized anxiety disorder. Arch Intern Med. 2006;166:1092-1097.

Part II: Spielberger State-Trait Anxiety Inventory (STAI: Y-6 item)

Name Date

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the most appropriate number to the right of the statement to indicate how you **feel right now, at this moment**. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best. (Ang mga sumusunod na pahayag ay ginamit upang ilarawan ang kanilang sarili na makikita sa ibaba. Basahin ang bawat pahayag at bilugan ang numerong naayon sa iyong **nararamdaman sa kasalukuyan**. Walang tama o maling sagot. Huwag maglaan ng mahabang panahon sa pagsagot sa bawat pahayag, datapwat ay ibigay ang iyong kasagutan base sa tunay mong nararamdaman sa kasalukuyan).

	Not at all (Hindi kailanman)	Somewhat (Paminsan -mins)	Moderately (Bahagya)	Very much (Tunay o Madalas)
1. I feel calm (Ako ay kalmado).....	1	2	3	4
2. I am tense (Ako ay tensyonado)..	1	2	3	4
3. I feel upset (Ako ay dismayado)..	1	2	3	4
4. I am relaxed (Ako ay hindi balisa).....	1	2	3	4
5. I feel content (Ako ay kontento)..	1	2	3	4
6. I am worried (Ako ay nagaalala)..	1	2	3	4

Source: Marteau TM and Bekker H. The development of a six-item short-form of the state scale of the Spielberger State-Trait Anxiety Inventory (STAI). *British Journal of Clinical Psychology*. 1992;**31**:301-306.

Appendix C DOCUMENTATION



Appendix D

CURRICULUM VITAE

Ronald Ian T. Lim, R.N.

E-mail: limronaldian@gmail.com

Phone:

Home Address: Blk 7 Lot 35 Unit F,
Camella 4-A, Pamplona 3, Las Pinas City



WORK EXPERIENCE

- ✓ Universal College of Paranaque June 2019 – Present
 - Clinical Instructor / Faculty
- ✓ Our Lady of Fatima University January 2018 – January 2020
 - American Heart Association – Basic Life Support Instructor
 - American Heart Association – Advanced Cardiovascular Life Support Instructor
- ✓ Our Lady of Fatima University July 2016 – April 2019
 - Clinical Instructor / Lecturer / Reviewer
- ✓ Rachell Allen Reviewers USA April 2015 – April 2019
 - Academic Coach / Reviewer
- ✓ Honda Cars Kalookan Inc. February 2014- July 2016
 - Welfare Team Leader / Company Nurse
- ✓ Las Piñas Doctors Hospital July 2013 – January 2014
 - Nurse Resident – Medicine Ward
- ✓ Golden Acres Hospital January – July 2013
 - Nurse Resident – Ward

EDUCATION

University of the Philippines Open University June 2013 – Present

Ongoing graduate study program (**30/36 units**) under Faculty of Management and Development Studies taking up Master of Arts in Nursing Major in Adult Health Nursing.

Our Lady of Fatima University – Quezon City June 2008 – March 2012

AWARDS & RECOGNITIONS

- ✓ **Outstanding Reviewer, Faculty Member and Clinical Instructor - (2016 - 2019)**
- ✓ **Coach / Adviser**
 - 8th Intercollegiate Quiz – N (CEU-MANILA)
 - 1st Runner Up
- ✓ **Resource Speaker**
 - Safety and Standard First Aid Training
 - Our Lady of Fatima University - Valenzuela
- ✓ **Resource Speaker**
 - Disaster Management
 - Our Lady of Fatima University - Valenzuela
- ✓ **Resource Speaker**

- Reproductive Health: Family Planning Responsible Parenthood
- Department of Social Welfare and Development (DSWD-NCR)
- ✓ **Coach / Adviser**
 - 7th Intercollegiate Quiz – N (CEU-MANILA)
 - 2nd Runner Up
- ✓ **Resource Speaker**
 - Nurses Week: Resiliency among Nurses
 - VRP Hospital and Medical Center

TRAININGS AND SEMINARS ATTENDED

AMERICAN HEART ASSOCIATION - ADVANCED CARDIOVASCULAR LIFE SUPPORT (ACLS) INSTRUCTOR
 AMERICAN HEART ASSOCIATION - BASIC LIFE SUPPORT (BLS) AND AED INSTRUCTOR
 BASIC ECG COURSE AND ARRHYTHMIA RECOGNITION
 PHILIPPINE HEART ASSOCIATION / PHILIPPINE COLLEGE OF CARDIOLOGY - BASIC LIFE SUPPORT (BLS)
 CLINICAL SPECIALIZATION: WHAT'S IN IT FOR US
 ENTERING THE DOORS: A NURSE'S PERSPECTIVE INSIDE THE EMERGENCY ROOM
 AUSTRALIAN CERTIFICATION - A SYSTEMATIC APPROACH FOR COLLECTION OF STUDENT EVIDENCE
 CLINICAL RESEARCH LEADERSHIP FROM PAPER TO PRACTICE
 OUTCOMES BASED EDUCATION (OBE): A BLUEPRINT OF ESSENTIAL ELEMENTS
 SEXUAL HARASSMENT IN THE WORKPLACE - (DOH – EAMC)
 CLINICAL ENHANCEMENT TRAINING - (AFPMC)
 INTRAVENOUS THERAPY
 USAPANG GINOO OF THE YGC FAMILY HEALTH SERIES
 ASSESSMENT OF COMPETENCIES AND TRAITS TRAINING (ACT)
 CONTINUING LABOR EDUCATION (DOLE – NCR).
 - BASIC OCCUPATIONAL SAFETY AND HEALTH
 - DRUG FREE WORKPLACE PROGRAM
 - FAMILY WELFARE PROGRAM
 - GOVERNMENT STATUTORY BENEFITS
 - RULES ON LABOR LAWS COMPLIANCE SYSTEM AND LABOR STANDARDS
 - RECOGNITION AND CONTROL OF WORKPLACE HAZARDS
 - ADDRESSING SEXUAL HARASSMENT IN THE WORKPLACE
 - SAFETY PROGRAMMING

PERSONAL DATA

Birth date: December 15, 1991

Birth place: Manila

Civil Status: Married

Citizenship: Filipino

Religion: Roman Catholic

Age: 28 y/o

Sex: Male

Height: 5'6

Weight: 78 kgs.

