EVALUATING THE RESILIENCE LEVEL AMONG NURSING STUDENTS IN USM AND ITS ASSOCIATION TO PSYCHOLOGICAL PARAMETERS.

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by

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"Great teachers emanate out knowledge, passion and compassion"

~A..P. J. Abdul Kalam ~

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LIST OF ABBREVIATIONS

95% CI   95% Confidence Interval

CD-RISC 25   Connor Davidson Resilience Scale 25

GHQ-28   General Health Questionnaire -28

SD   Standard Deviation

SPSS   Statistical Package for the Social Sciences,

USM   Universiti Sains Malaysia

COVID 19   Coronavirus disease 19

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PENILAIAN TAHAP RESILIENSI DI KALANGAN PELAJAR KEJURURAWATAN DI USM DAN KATANNYA DENGAN PARAMETER PSIKOLOGI.

ABSTRAK

Tahap resiliensi di kalangan jururawat dan pelajar kejururawatn didapati tinggi pada peringkat global dan juga di negara kita, Malaysia. Resiliensi dikaitkan dengan banyak faktor psikosocial dan psikologi, terutamanya tekanan, kemurungan dan kecemasan dalam kalangan jururawat dan pelajar kejururawatan. Kajian ini bertujuan untuk menilai tahap resiliensi dalam kalangan pelajar kejururawatan di Universiti Sains Malaysia (USM) dan kaitannya dengan parameter psikologi.

Secramai 240 pelajar kejururawatan di Pusat Pengajian Sains Kesihatan, USM telah dipelawa mengambil bahagian dalam kajian ini. Pelajar-pelajar dari tahun satu hingga tahun empat dipilih sebagai sampel untuk kajian ini. Kajiselidik atas talian dengan menggunakan Google Form yang terdiri daripada data demografi, Skala Connor-Davidson 25(CD-RISC 25) dan Soalan Kesihatan Umum (GHQ-28) telah dihantar menggunakan aplikasi talian WhatsApp. Data demografi termasuk jantina, umur, tahun pengajian dan tahap pendidikan. Keputusan kajian selidik diperoleh bagi melihat tahap resiliensi di mana ia dikategorikan kepada tahap resiliensi yang signifikan dan tidak penting berdasarkan skor CD-RISC 25. Setiap domain resiliensi dianalisis menggunakan analisis statistik yang sesuai.

Tahap jantina dan pendidikan dianalisis menggunakan *independent t-test*. Seterusnya, tahun-tahun kajian dan umur dianalisis menggunakan *One way ANOVA test*. Seramai 186 pelajar

kejururawatan USM menjawab kajian selidik tersebut. Kadar respons ialah 77.5 peratus. Pembahagian pelajar kejururawatan yang dijawab adalah mengikut peratusan semasa mengikut jantina, umur, tahap pendidikan dan tahun pengajian. Faktor yang tertinggi di antara lima bidang skala resiliensi adalah pengurusan emosi negatif atau tekanan dengan ~~markah purata~~ :3.621(SD:V

Terdapat perkaitan negatif antara jantina dan umur dalam kajian selidik ini dan ia adalah signifikan secara statistik ($P < 0.001$). Tahap resiliensi atau ketahanan dikaitkan secara ketara dengan tahap pendidikan dan umur. Selain itu, hubungan tahap resiliensi dan parameter psikologi dianalisa menggunakan *multiple linear regression*. Antara faktor yang dikaitkan dengan skala ketahanan dan skor psikologi ialah gejala somatic, keresahan dan insomnia. Sebagai kesimpulan, terdapat resiliensi tinggi dalam kalangan pelajar kejururawatan di USM dan tahap ketahanan dikaitkan dengan parameter psikologi. Oleh itu, langkah-langkah perlu diambil untuk meningkatkan ketahanan atau resiliensi dalam kalangan pelajar kejururawatan untuk mengatasi kesukaran psikologi secara akademik dan klinikal. Resiliensi harus dimiliki oleh pelajar kejururawatan untuk mengatasi cabaran psikologi.

Kata Kunci: Resiliensi, pelajar kejururawatan, tekanan, parameter psikologi

EVALUATING THE RESILIENCE LEVEL AMONG NURSING STUDENTS IN USM AND ITS ASSOCIATION TO PSYCHOLOGICAL PARAMETERS.

ABSTRACT

The level of resilience among nurses and nursing students is known to be high globally and also in our country, Malaysia. Resilience is associated with many psychosocial and psychological factors especially stress, depression and anxiety among nurses and nursing students. The study aimed to evaluate the resilience level among nursing students in USM and its association to psychological parameters.

A total of 240 nursing students at the School of Health Sciences USM were invited to participate in the study. The students were from year one to year four selected using purposive sampling . An online Google Form questionnaire consisting of demographic data, Connor-Davidson Resiliency Scale 25 (CD-RISC 25)and the General Health Questionnaire (GHQ-28) was distributed using WhatsApp application. Demographic data included gender, age, years of study and educational level. The outcome was in the form of level of resilience in which was categorised into significant and non-significant resilience level based on the CD-RISC 25 score. Each domain of resilience was analysed using appropriate statistical analysis.

Gender and educational level were analysed using an independent t-test. Next, years of study and age were analysed using One way ANOVA test. A total of 186 USM nursing students responded. The response rate was 77.5%. The distribution of nursing students responded was according to the current proportion by gender, age, educational level and year of study. The highest mean among five domains of resilience scale was management of negative emotions or stress with Mean:3.621(SD:0.68).

There was a negative correlation between gender and years of study in domains of resilience scale and it was statistically significant (P< 0.001). Resilience level was significantly associated level of education and age. In addition, association of level of resilience and psychological parameters was analysed using multiple linear regression test. There were association of domains of resilience scale associated with parameters of psychological score which are somatic symptoms and anxiety and insomnia. As a conclusion, there was high resilience among nursing students in USM and the level of resilience was associated with psychological parameters. Hence, measures need to be taken to enhance resilience among nursing students to overcome psychological distress academically and clinically. Resilience should be possessed by nursing students to overcome psychological challenges.

Keywords: Resilience, nursing students, stress, psychological parameters

CHAPTER 1

INTRODUCTION

1.1 Title

Evaluating the resilience level among nursing students in USM and its association to psychological parameters.

1.2 Background of the study

Nowadays, nurses are facing increase number of patients with various diseases and conditions that requires challenging treatments for recovery whereas nursing students are experiencing various challenges in undergoing the academic sessions together during clinical placements in healthcare system. According to Yilmaz (2017), the intense pressure or tension due to the increase of patients with difficult diagnosis, can lead to work related problems such as stress, facing traumatic experiences and burnout. Following to the same article, the author mentioned that nursing students andto nurses acquiring resilience will allow them to endure with their work surrounding and this will lead in sustaining of a healthy and stable psychological work life (Yılmaz, 2017).

Besides that, a study shows that increase level of stress among nurses occur due to physiological and psychological illness, low job satisfaction, poor occupational performance, high burnout, marital conflict and turnover which lead to reduction of quality of care among patients by nurses and reduces patients' satisfaction level (Salem, et al., 2022). Thus, author also highlighted that one of the main factors to overcome the above situations is by nurses having resilience.

On the other hand, based on one of the population growth models by World Health Organization in year 2014, the prediction was that there will be an increase level of global deficit from 7.2 million skilled health professionals to 12.9 million by year 2035 (Yu, et al., 2019). This

high turnover of nurses in future may cause nurses shortage in healthcare systems which will create a biggest impact on healthcare organizations and management especially financial problems following with an increase level of stress or burnout among employed nurses (Yu, et al., 2019).

Relatively, stress and burnout experienced by nurses in healthcare system and the nursing students from universities or colleges. According to Hussien (2022), resilience defines as the ability to manage and face hardships and it's a skill that allow an individual to endure problems and challenges. Therefore, it is significant for nurses to acquire maximum level of resilience to succeed psychological stability and to overcome workplace stressors (Salem, et al., 2022).

1.3 Justification of study

Nurses are known to be one of the significant healthcare providers in health care network. Similarly, nursing students who will be the new graduate registered nurses after completion of their training and education from the nursing schools also equally significant as they are the main source of nursing organization in view of high turnover of nurses in healthcare system (Wah See, et al., 2023). However, currently in a global level, healthcare system is facing lack of nurses. Many earlier studies have expressed that lack of nurses in healthcare structure could create an exceedingly stressful environment due to poor trait in handling conflict situations and inability to cope psychological condition such as stress or depression (Alkaissi, et al., 2021). In addition, nursing students who are experiencing transition from academic education to clinical placement facing high pressure especially causing an effect to their mental well-being (Aryuwat, et al., 2022). Furthermore, nursing students who are graduated from nursing schools' experiences more emotional tiredness, stress and burnout in their first three years of posting in a healthcare system where 30% of the fresh graduates' nurses resigning their job in their first year of employment (Wah See, et al., 2023). Hence, one of the main qualities that allow nurses or nursing students to overcome obstacles and challenges that they face in their education and working environment is resilience (Chow, et al., 2020). Moreover, trait of resilience is required among undergraduate and graduate nursing students to

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recover from burnout and psychological distress together to enhance their standard of life (Aryuwat, et al., 2022).

1.4 Problem Statement

Nursing is a noble profession where nursing students grow to become nurses who possess the most significant positions or job in a healthcare system to build a successful organization. It is vital to acknowledge the challenges face by both nursing students and nurses in the healthcare system that influences their resilience level as nurses generally progressed from being nursing students at earlier stage. According to Abdollahi, et. al, (2021), perceived stress due to work related stressors such as prolonged working hours, shortage of nurses, workplace violence, conflict among peers and lack of financial and emotional support lead to nurses experiencing burnout. Therefore, one of the psychological aspects that plays an important role in resolving both perceived stress and job burnout is self-compassion which encompasses with resilience, self-kindness, humanity and mindfulness (Abdollahi, et al., 2021).

A part from that, a study was conducted to investigate the burnout level of nurses in Malaysia which shows one out of four nurses facing burnout in their workplace especially nurses who are young and working in shifts (Zakaria, et al., 2022). Relatively, Alameddine, et. al, (2021) mentioned that there are evidences reflects the enhancement of nurses' resilience level can minimize the risk of burnout among nurses and increases the job satisfaction together reduces the idea for turnover among nurses.

Besides that, a study was performed among final year nursing students in a few medical institutes from multiple zones in Malaysia to identify the factors that associate with stress and its coping mechanism where the results show that the maximum nursing students has high level of stress associated with strong level of resilience with moderate level of self-efficacy

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(Nasir, 2023). Nasir (2023) has concluded in his study that the nursing students who practices good coping mechanisms face stress during academic and clinical sessions.

Additionally, a study was conducted among undergraduate nursing students in University Malaysia Sabah to examine their resilience level and its associated factors where the result shows that majority nursing students has good coping mechanism as they face many psychosocial challenges such as burnout and depression (Musa, et al., 2020). However, in the similar study, there were a small group of nursing students expressed low trait of resilience because they were influenced by depression, burnout and have a high risk to poor academic achievement and there is an increased risk of drop out (Musa, et al., 2020)

Moreover, the relationship between burnouts and resilience among nurses shows that the trait of resilience among nurses aid them to overcome and mitigate psychological stress and burnout in workplace (Majrabi, 2022). In addition, based on several studies, nursing profession stress level differs in different degree of work and work location where emergency department is known as one of the highest stress level workplaces compare to other units in a healthcare system (Pragholapati & Yosep, 2020). The author also explains that nurses with resilience able to overcome the challenges in various working environment and resilience act as a universal capacity to minimize burdens and prevent errors in the workplace (Pragholapati & Yosep, 2020).

Figure 1.1 below shows evidence from a study conducted in a hospital at Iran during COVID 19 pandemic. In the figure, the total resilience of nurses is at moderate level were the dimension of 'trust in individual instincts' was at unfavourable level (Yusefi, et al., 2021).
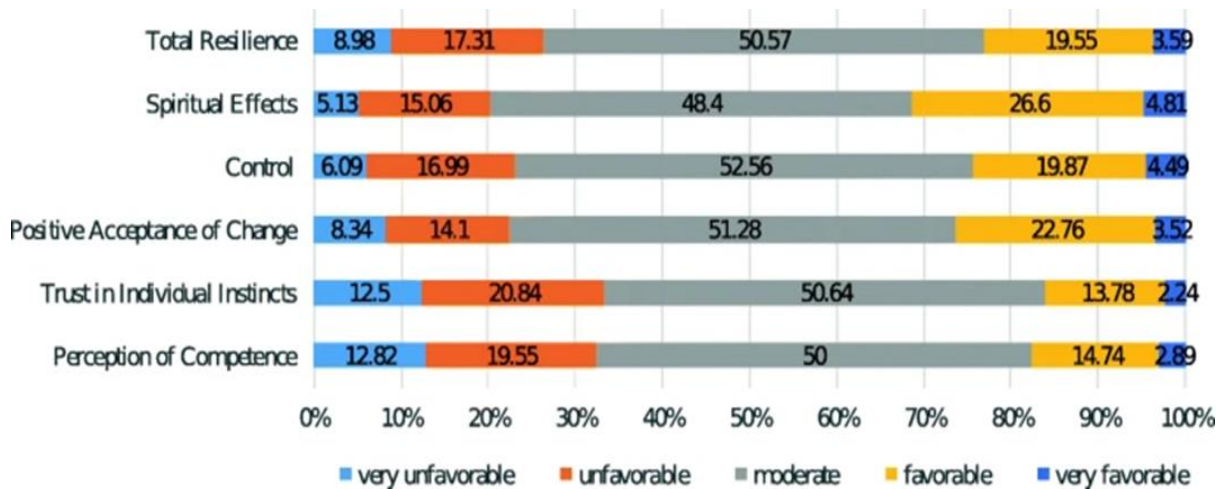
Figure 1.1 Total resilience of nurses during COVID 19 pandemic in a hospital at Iran.

Relatively, a study was conducted in a psychiatric mental health hospital in Egypt where the finding shows evidence that the total resilience level is high among nurses with a moderate professional quality of life and a moderate burnout in working environment as shown Figure 1.2 below (Abdel-Aziz & Adam, 2020).
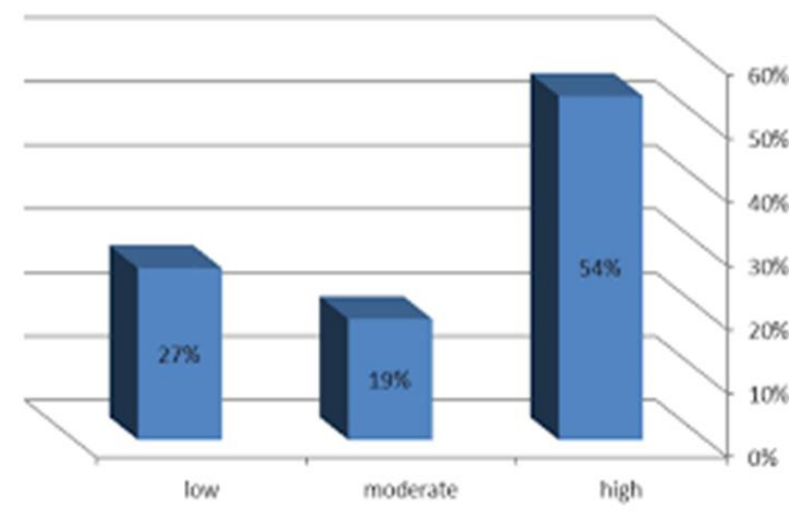
Figure 1.2 Total resilience of nurses in a psychiatric mental health hospital in Egypt

1.5 Research Questions

1. What is the level of resilience among USM nursing students?

2. Is there any association between level of resilience with gender, years of study, education level and age in USM nursing students?

3. Is there any association between resilience level and psychological parameters among USM nursing students?

1.6 Research Objectives

1.6.1 General objective

To evaluate the resilience level among nursing students in USM and its association to psychological parameters and demographic factors.

1.6.2 Specific objectives

 1. To determine the resilience level among USM nursing students.

2. To investigate the association between resilience level with gender, years of study, education level and age in USM nursing students.

3. To determine the psychological parameters and its association to resilience level among USM nursing students.

1.7 Research Hypotheses

1. There is high level of resilience among USM nursing students.

2. There is a significant association between level of resilience with age, gender, educational years and years of study among USM nursing students.

3. There is a significant association between resilience level and psychological parameters among USM nursing students.

1.8 Operational Definition

a) Resilience

Resilience is defined as the process of acclimating well in the face of difficulty, trauma, catastrophe, threats or even significant sources of stress (American Psychological Association ,2014).

b) Psychological parameters

Psychological parameters mean the inclusion of individual-level processes and meaning which affects and influences the mental states. Occasionally, these words will be combined with social as psychosocial which defines as the impact of social processes which are facilitated through psychological understanding (Stansfeld & Rasul, 2007).

c) Nursing students

Nursing students known to be the secondary healthcare personnel receiving training besides registered nurses and they upgrade and share their knowledge level on evidence-based practice to enhance their clinical education together allow nurses to analyse and reflect on their self-professional enhancement (Fernandez-Feito, et al., 2023).

CHAPTER 2
LITERATURE REVIEW

2.1 Definition of resilience

The word resilience inherited from a Latin term resilire which defines as to rebound or leap back (Vella, et al., 2019). Based on American Psychological Association 2014, resilience derives as the method of adapting well in the appearance of adversity, trauma, catastrophe, threats or even significant sources of stress (Southwick, et al., 2014). However, back before the 20th century, the verb resilience was referred in three terms as i) good enhancement products in spite of the high-risk status, ii) conservation of competency skills under stress and iii) process of recovery from trauma (Fleming & Ledogar, 2008). Hence, the latest meaning of resilience in healthcare system shows that healthcare professionals deliver high quality care consistently, able to endure unsettling situations and possess continuity to adapt, learn and improve in any situations (Wiig, et al., 2020).

Nurses and healthcare professionals also face many challenges and stress which includes emotional and physical distress in clinical placement and also academically. Thus, the capability to endure the psychological and physical stress together acquire the knowledge from the experience is known as resilience (CHOW, et al., 2018). Resilience is essential not only for healthcare professionals that are already in hands on practice where is much needed for medical students or nursing students as well. This has been emphasized by an author especially among nursing students that resilience trait is sognificant among nursing students as to endure adversity and to motivate them in taking up the role as working nurses post graduation (CHOW, et al., 2018).

According to The American Psychological Association 2014, resilience is defined as the process of familiarising well to the environment with adversity, trauma, disaster, pressures or any significant sources of stress (Southwick, et al., 2014). The elements of resilience are host of biological, psychological, cultural and social factors that correlates with one to another to identify on how an individual reacts to a stressful experiences (Southwick, et al., 2014).

On the other hand, resilience is also defined as a developmental process of an individual where he or she possess an ability to manage stress and it provides a positive impact for recovering from any traumatic experience (Yılmaz, 2017). Additionally, resilience is also characterized as the capability to acclimatize the face of difficulty even though an individual has already experienced challenges, adversity and negative impacts in their life (Sohail, et al., 2022). Therefore, resilience is an important trait that is required among nurses in order to improve job performances and eliminate negative impacts.

2.2 Concept of resilience in healthcare

Trait of resilience is vital in healthcare system among healthcare professionals especially nurses. Resilience in healthcare system is important in establishing quality in healthcare provision and it encompasses of utilization of internal and external resources to overcome challenges successfully and adapting to daily functioning of the system (Aase, et al., 2020). The concept of resilience varies in different perspectives and theories. In psycological point of view, the concept of resilience focuses on a healthcare personnel's psychological dimensions to overcome threats and trauma (Aase, et al., 2020).

Besides that, a conceptual model of resilience among nursing students explains that it is an ongoing process of growing success in facing adversity which allow a nursing student to improve his or her well being (CHOW, et al., 2018). The above concept also known that nursing students being contact to stressors will lead to deprived well-being, decreases the job satisfaction level and also causes nursing students to have lack of motivation to take up clinical posting after graduation ceremony (CHOW, et al., 2018).

2.3 Psychological parameters

Generally, nurses face psychological distress in their workplace compare to other healthcare personnel such as doctors, pharmacists and many more (Dong, et al., 2022). Dong, et. al,(2022) highlighted in his article that nurses in various countries such as Singapore, Vietnam, India, Malaysia and Indonesia had expressed many psychological responses such anxiety, stress, high level of depression, intrusion, avoidance and symptoms of hyperarousal. Relatively, nurses who are have no ability to overcome stress, may experience somatic symptoms such as fatigue, palpitations, lack of sleep, reduction in appetite and gastrointestinal disorders like feeling of fullness in stomach or abdominal bloating (Gandhi, et al., 2014).

Nursing students also inhibits high level of stress and emotional disturbances in both academically and clinically that causes them to indulge in negative habits such alcoholism, substance abuse and causes sleep disorders (Salvarani , et al., 2020). Therefore, psychological distress is defining as an emotional challenge categorized by parameters such as depression, anxiety and stress which can be used by one of the tools named General health Questionnaire -28 (Kayaroganam, et al., 2022). Kayaroganam, et. al, (2020) mentioned in his article that the psychological characters were developed due to many factors such as high workload, peer pressure, fatigue, job dissatisfaction and many more that leads to many complications such as cardiovascular diseases, causes high medical error and mental health problems.

Similarly, during COVID 19 pandemic, most of the nursing students in three universities in Yogyakarta, Indonesia had psychological distress from mild to severe and there was an inverse correlation between psychological distress with self-efficacy among the nursing students (Fitriawan, et al., 2023). Hence, the following study shows the nursing students with high psychological distress will have low level of self-efficacy (Fitriawan, et al., 2023).

2.4 The relationship of stress, burnout and psychological distress with resilience

Nursing is challenging profession where the nurses and also nursing students face maximum level of stress in various situations and environment in a healthcare system. There many types of stressors present in the nursing profession. According to Chang, et. al (2021), nurses have many stressors at work such as heavy workloads, rotation of shifts, conflicts in role, interpersonal relationships, threat or violence at workplace, lack of readiness and incompetence in nursing skills due to lack to training or guidance. Relatively, the stressors that face by the nurses academically and clinically can cause them to experience mental health problems which can influence the decision-making process and reduces the strength to face the challenges (Dahka, et al., 2022).

During COVID -19 pandemic, a study among Malaysian healthcare workers to determine the relationship between burnout, resilience and life quality and the findings shows that the healthcare workers experience moderate degree of working exhaustion with poor psychological health was seen among healthcare workers who worked more than 10 hours daily (Marzo, et al., 2022). Relatively, in the similar study the author has emphasized that the psychological and physical well-being is significant among healthcare workers to improve the quality of their life (Marzo, et al., 2022)

There was a study that has carried out to determine the stress level among nursing students and the result shows that the senior year students or most experienced nursing students experiencing higher levels of anxiety and stress (Onieva-Zafra,, et al., 2020). In addition, a study has been performed to see the difference in stress level among both gender nurses in a healthcare system in Indonesia. The outcome of the study was the female nurses has higher stress level at working environment compare to male nurses (Puspitasari, et al., 2020).

Therefore, resilience is significant in nursing profession to overcome the stress, burnout or any psychological threats faced in a healthcare system. The higher the level of resilience among nurses, the easier for nurses to adapt to the adversity and challenging environment. An article

published in Journal of Psychiatry Nursing highlighted that the risk factors that affects nurses' resilience are the inability to cope with stress, psychological distress and burnout which lead to turnover of nurses in a healthcare system (Cam & Buyukbayram, 2017). Furthermore, there was a study conducted among Mexican nurses to examine the resilience level associated with mental health and socio demographic factors where the result shows the nurses with somatic symptoms such as anxiety-insomnia, depression and social dysfunction have the lowest resilience level (Martínez Arriaga, et al., 2021).

2.5 Importance of resilience among nurses and nursing students

Son, et. al, (2022) mentioned in his article that poor resilience level causes lack of mental health and lead to psychological distress such as stress, depression and anxiety. Relatively, there are previous studies among healthcare workers which was conducted during COVID 19 pandemic that shows psychological resilience is a key factor to protect an individual from depression, perceived stress and burnout (Son, et al., 2022). On the other hand, another study was conducted during COVID pandemic phase among healthcare workers to examine the role of defence mechanism incorporated with stress, burnout and resilience (Di Giuseppe, et al., 2021).

The findings of the study above provide an empirical proof on how the epidemic influences psychological functioning of healthcare workers and it is reported that healthcare workers who are fail to possess a maturity defensive functioning will face a great distress and minimizes their resilience level (Di Giuseppe, et al., 2021).

2.6 Outcomes of resilience among nurses to mental well being

It is vital for nurses to create personal resilience in order to overcome or cope their high level of stress due to poorly equipped with resources in working facilities, to sustain job satisfaction

and enable to recognize work related problems (Henshall, et al., 2020). Nevertheless, the same article has explained there are many interventions has been taken to enhance the resilience level among nurses such as conduct resilience-enhancement programmes, employed nurses provide training to student nurses and organize resilience courses (Henshall, et al., 2020). A study has also been carried out in exploring nurses' perceptions and experiences in applying resilience in their profession (Kim & Chang, 2022). Thus, the findings shows that nurses show resilience when they are facing difficult situations and they attempt to identify and accept the situation as process ahead for problem solving (Kim & Chang, 2022).

2.7 Theoretical framework of resilience

There are six key theorists in the search of resilience that has provided the basic understanding of resilience such as Michael Rutter, Norman Garmezy, Emmy Werner, Suniya Luthar, and Michael Ungar (Shean, 2015). The Table 1 below shows six key theorists of resilience.

Table 2.1 Concept of resilience by six key theorists.

Theorist	The definition or concept of resilience
Betty Neuman (1982)	It is known as an essential trait for professionals who are working in the nursing profession due the stressors involved in the field. The Neuman Systems Model was introduced to focus on stress factors that related to the profession (Hannoodee & Dhamoon, 2023).
Emmy Werner (1982)	The skill to cope proficiently with the internal stresses of their vulnerabilities and external stresses (Shean, 2015).

Norman Garmezy (1991)	It is formed to redirect the capacity for recovery and sustained adaptive traits that may follow preliminary retreat or incapability upon commencing a high-pressure event (Shean, 2015).
Suniya Luthar (2000)	A dynamic method which consists of positive adaptation within the context of important adversity (Shean, 2015).
Michael Ungar (2004)	The product from discussions between individuals and their surroundings for the resources to define themselves as fit and suitable among conditions collectively viewed as adverse (Shean, 2015).
Michael Rutter (2006)	An interactive concept that composed of blended serious risk experiences and a positive psychological result produced through the experiences (Shean, 2015).

2.8 Conceptual Framework using Neuman's System Model

The conceptual framework I have used to determine nurse resilience and its associated factors is the Neuman's System Model by Betty Neuman which has been published in year 1982 (Alligood, 2021). The ~~Neumans~~Neuman's System Model was developed to define an individual in a system that responds to environmental stressors such as physiological, psychological, sociocultural, developmental, and spiritual variables (Nimako & Basatan , 2022). Thus, in the context of this study, Neuman's Systems Model is a suitable framework to be used to explain the association between the nursing student's individual trait of resilience with the environmental stressors such as psychological parameters.

In this Neuman's System Model, the central core represents of USM nursing students as the client system. The dotted lines or also known to be the lines of resistance represent the resilience level that protect the client from the interference of demographic and psychological factors which has not been restricted by normal line of defense. This shows what has the client has evolved over time. When the resilience level is unproductive due to influence of either one of the factors, it causes a reaction in the client's system.

There are elements in both lines of resistance and in defense (x), such as high turnover, marital conflict, poor quality care for patients and many more which may show the response of the client to the psychological and demographical factors. The outer dotted line (y) represents the flexible line of defense, which will act as a system buffer or as the interventions. Figure 2.1 below shows the conceptual framework of this research study using Neuman's System Model.
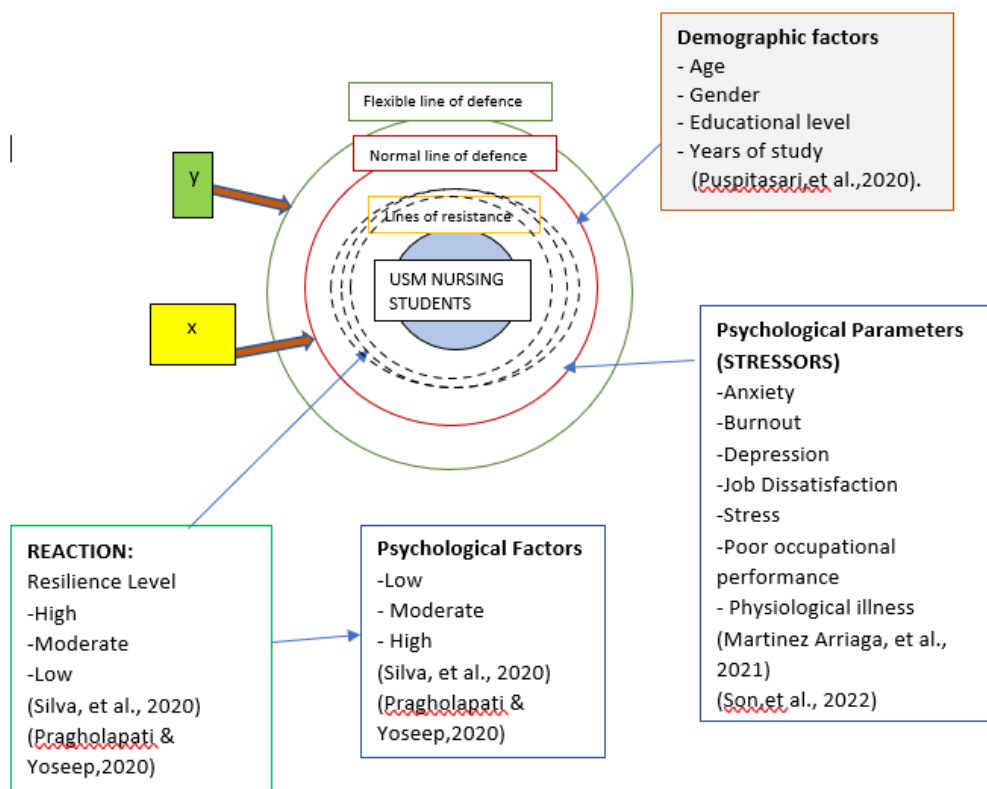
Figure 2.1 Conceptual Framework using Neuman's System Model.

CHAPTER 3

METHODOLOGY

3.1 Research Design

A cross-sectional quantitative research design.

3.2 Study Area

School of Health Sciences, Universiti Sains Malaysia (USM)

3.3 Study Population

The target study population of the study are nursing students from diploma and degree program of Universiti Sains Malaysia. The sampling group was 1st year to 3rd year diploma nursing students and from 1st year to 4th year of degree nursing students in USM.

3.4 Subject Criteria

3.4.1 Inclusion criteria:

1. Diploma USM nursing students from first year until third year.

2. Degree USM nursing students from first year until fourth year.

3.4.2 Exclusion criteria:

1. Diploma and degree USM nursing students who are unable to participate due to other personal or health problems.~~Postgraduate or Masters USM nursing students.~~

2. Diploma and degree USM nursing students with history of psychological distress or illness.

3.5 Sample size estimation

The sample size estimation has been done based on each specific objective as shown in the Table 3.1 below. In order to calculate the sample size, the formula has been used is the sample size calculator by Ariffin, W. N. (2023)

Table 3.1 Sample size calculation according to the hypothesis of the study.

Hypothesis	Parameters for calculation	Technique	Estimated sample size
There is high resilience level among USM nursing students. (Alkaisi, et al, 2021)	Mean: 134.1 SD: 12.8 Precision :1.473	Using single mean formula	290
There is a significant association between resilience level with gender, years of study, education level and age in USM nursing students. (Alkaisi, et al, 2021)	**Gender (Male (M), Female (F)** Mean: 133.4 (M), 134.7 (F) SD : 13.1 (M), 12.5 (F) n: 146 (M), 144 (F) Precision : 1.508	Using comparison two means formula:	289

	Years of study : 1st Year (1st), 2nd Year (2nd) 137.5 (1st), 131.5 (2nd) SD : 12.2 (1st), 12.7 (2nd) n: 124 (1st), 166 (2nd) Precision: 1.433	Using comparison two means formula:	290
	Mean Age : >20 year (A), <20 year (B) 134.4 (A), 133.8 (B) SD : 12.6 (A), 13.0 (B) n: 109 (A), 181(B) Precision : 1.473	Using comparison two means formula:	290
There is a significant association between resilience level and psychological factors among USM nursing students.	Using G Power calculator for sample size calculation (Buchner, et al., 2024) Input Parameters Determine => Effect size f² 0.15 α err prob 0.05 Power (1−β err prob) 0.95 Number of predictors 2 Output Parameters Noncentrality parameter λ 16.0500000 Critical F 3.0837059 Numerator df 2 Denominator df 104 Total sample size 107 Actual power 0.9518556		

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(Hussien, 2022)	

In order to calculate the sample size, the formula has been used is the sample size calculator by Arifin, W. N. (2023). Table 3.1 shows the sample size calculation of the study based on the hypothesis of the study using single mean formula, two means formula and G Power formula. The estimation of the sample size population as per Table 3.1. However, the total population of nursing students in USM is only at 240 including diploma and degree students. The sample size is insufficient to the sample size calculation. Therefore, the purposive sampling method was used whereby we sampled most or all of the diploma and degree nursing students' population in USM.

3.6 Sampling Method

The total population of undergraduate USM nursing students are 240 including diploma and degree nursing students. The sample size is insufficient as per the sample size calculation. Therefore, as mentioned earlier, we sampled most or all of the diploma and degree nursing students' population in USM.

3.7 Research tools~~Tools~~

In this study, the questionnaire adopted are categorized into three which are Section A is demographic, Section B is by Connor-Davidson Resiliency Scale (CD-RISC) and Section C is by using General Health Questionnaire (GHQ-28). Firstly, Section A consist of a comprehensive information on a range of demographic items, including their age, gender, years of study, and education level. The GHQ-28 is attached in Appendix B.~~??~~

Next, the Connor-Davidson Resiliency Scale (CD-RISC) is known to be a valid tool to measure the resilience level among healthcare groups (Nia, et al., 2023). In Section B, CD-RISC consist of 25 items with scoring on a five-point Likert scale and range from 0 ("Not true at all") to 4 ("True nearly all the time"). The questionnaire score ranges from 0 (lower degree of resilience) to 100 (greater degree of resilience). The CD-RISC is attached in Appendix A.~~??~~

Items are incorporated with five domains which are self-competency (item 1- 8), management of negative emotions or stress (items 9 -15), positive reaction upon to change (items 16 -20), reflection of perceived control (items 21-23) and self-spirituality (items 24-25) (Velickovic, et al., 2020). The Cronbach's alpha coefficient of the Resilience Scale is 0.956 (Khordeh, et al., 2022).

Lastly, Section C encompasses of General Health Questionnaire (GHQ-28) which is known to be one of the widely used tool in measuring or make assessment on an individual's self-perceived mental wellness and to explore on the individuals who are most likely to experience psychological distress (Reverté-Villarroya, et al., 2021). GHQ-28 consists of 28 items where each question rated using 4-point Likert scales ranging from 0 to 3 (Sokratis, et al., 2023).

The GHQ-28 items have been categorized into four subscales of psychological factors which are (A) Somatic symptoms, (B) Anxiety and Insomnia, (C) Social dysfunction and (D) Depression (Reverté-Villarroya, et al., 2021). The possible answers for each item are "much worse than usual", "worse than usual", "same as usual", and "better than usual" (Reverté-Villarroya, et al., 2021). The probability of scores is with range between 0 to 3 for each item with a total minimum score of 0 and a total maximum score of 84 (Reverté-Villarroya, et al., 2021).

The items of the questionnaire have been evaluated for internal consistency through ~~Cronbarch's~~Cronbach's alpha coefficient with the value of 0.766 (Reverté-Villarroya, et al., 2021).

3.8 Data Collection Method

The process of data collection was taken place after receiving approval from the ethics committees of the university. The duration for data collection from the participants were within two months after ethics approval and obtaining consent from the nursing faculty. WhatsApp group was created for USM Diploma and Degree Nursing Students for briefing after selecting the suitable

participants after completing a survey on availability and any history of psychological illness via Google Form. The participants were provided with a consent form prior data collection and briefing was given on the purpose of the study through an information sheet via WhatsApp which was shared by the team leader of each semester in the semester WhatsApp group. The consent for is attached as in Appendix F. ??

The team leaders are the group leader from each semester. The group leaders were briefed via online platform such as text messages, phone call and WhatsApp messages by the researcher prior to distributing the questionnaire with team members. The questionnaire and consent form were provided to the participants via Google form by maintaining per entry an individual to avoid from multiple entry or personal bias.

Reminders were sent to the team leaders of each semester to invite nursing students to participate in the study. The participants' identity and personal information were remained confidential. The duration of time required to complete the questionnaires was approximately about 15 minutes.

3.9 Data Analysis

The data which has been collected was entered and analysed using the Statistical Package for the Social Sciences (SPSS) Version 28. The descriptive data was displayed as frequency, mean and standard deviation. This enabled the researcher to conduct a differentiation between variables in the study and measurement in connection with key variables. Independent t -test was to for demographic factors such as gender and educational level whereas One way ANOVA test was used for years of study and age. The Pearson correlation coefficient test was used to analyse the correlations between the resilience level with demographic variables. Multiple linear regression was done to recognize the psychological factors that affected the resilience level. Table 3.2 below shows the statistical analysis of my research study.

Table 3.2 Statistical analysis based on hypothesis of the study.

Hypothesis	Variables	Statistical Analysis
There is high resilience level among USM nursing students.	1) Demographic data 2) CDRISC- 25 scores 3) GHQ-28 score	Descriptive analysis: 1) Mean 2)Standard Deviation 3) Frequency
There is a significant association between resilience level with gender, years of study, education level and age in USM nursing students.	1) Gender and educational level 2) Years of study and age 3) Demographic variables and resilience level (CDRISC-25)	1) Independent t -test 2) One way ANOVA test 3) Pearson correlation test
There is a significant association between resilience level and psychological parameters among USM nursing students.	1) GHQ-28 scores with CDRISC-25 scores	1) Multiple linear regression.

3.10 Ethical Consideration

Ethical approval was obtained from ' Jawatankuasa Etika Penyelidikan Manusia (JEPEM) Universiti Sains Malaysia (USM) and also permission from The Dean of School of Health Sciences, USM on January 2024. The study was conducted in accordance to the guidelines and regulations declared by both departments. The approval letter is attached as Appendix D.??

3.10.1 Vulnerability of subject or participant

Participants were properly informed of the potential risks that will be faced by in this research. The participants were presented with accurate and sufficient information which can be utilized by individuals to make judgement whether to participate or not in the study. Therefore, a requirement was established to ensure the selected participants can understand the risks and consequences in participating the study in order to provide a valid consent.

3.10.2 Declaration of conflict of interest

As a researcher of this study, I have no conflicts to declare the study. There is no financial interest to report in this study.

3.10.3 Handling privacy and confidentiality issue

All answered questionnaire entry were maintained as anonymous and was entered into SPSS software. The data can only be assessed by the research team members to prevent breaching of data. The collected data was displayed in a grouped form and no responders will be identified individually.

3.10.4 Community sensitivities and benefits

The results of this study might authenticate previous studies on resilience among nurses that nurse's trait of resilience can be enhanced and encouraged among undergraduate nursing students. The trait of resilience is significant among nursing students to achieve success academically and clinically in their nursing career that will provide benefits to the educational organizations.

3.10.5 Honorarium and incentive

There is an honorarium as this primary data in USM and no incentive is required for the study as it is only a descriptive study.

3.10.6 Other ethical review board approval

There is no requirement for other ethical board approval as the study is only conducted among nursing students in USM.