Mental Well-Being, Lifestyle, Genomics Health-Related Literacy on the Quality of Life among Individuals with Non-Communicable Diseases

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DOI: https://doi.org/10.51244/IJRSI.2024.1109083

Received: 26 September 2024; Accepted: 30 September 2024; Published: 15 October 2024

ABSTRACT

This study explored the predictability of quality of life (QoL) based on mental well-being, lifestyle (physical activity and smoking behavior), and genomics health-related literacy among 349 individuals with non-communicable diseases in Malaybalay City, Bukidnon, in early 2024. Using a descriptive, correlational (predictive) design, data were collected via the Warwick-Edinburgh Mental Well-being Scale, Lifestyle Questionnaire (DLBQ), Genomic Health-Related Literacy Questionnaire (UNC-GKS), and WHOQOL-BREF. Findings revealed moderate levels of mental well-being, physical activity, smoking behavior, genomics literacy, and overall QoL. Correlation analyses showed that mental well-being was significantly associated with physical activity, while smoking behavior and genomics literacy were correlated with QoL. However, mental well-being did not predict QoL, which was instead predicted by lifestyle factors and genomics health literacy. These findings informed the development of a theoretical framework and enhancement plan to improve QoL in this population.

Keywords: Genomics health-related literacy; Individuals with non-communicable disease; Lifestyle; Mental well-being; and Quality of life.

INTRODUCTION

Non-communicable diseases (NCDs) cause most premature deaths worldwide. NCDs cause nearly 15 million premature deaths worldwide, making sustainable development difficult in the 21st century. About 85 percent of premature deaths in low- and middle-income countries are preventable (World Health Organization [WHO], 2020). Since several NCDs have no cure, interest in chronically ill patients' health-related quality of life (HRQoL) as a critical health outcome indicator has grown in recent decades, shifting from problem-oriented to goal-oriented care. Many studies found that NCD patients had lower HRQoL and predicted morbidity and mortality. Slow progression, remission, exacerbation, and no cure characterize NCDs (Rodriguez et al., 2017). NCD patients may have poor physical and emotional health, affecting their quality of life. These diseases require users to consider each subject's context (Tonini et al., 2019), coping, and how these affect their routine to expand health actions and improve quality of life (QoL).

Global non-communicable disease reduction depends on mental health and well-being. Positive life thoughts and feelings are psychological well-being. It includes satisfaction, positive emotion, optimism, and emotional vitality, not just health. In a recent review, emotional vitality, a whole-hearted love of life, the ability to regulate emotions, and optimism, a tendency to expect good things to happen, were consistently linked to lower cardiovascular disease (CVD) risk. After controlling conventional risk factors, emotional vitality and optimism reduced coronary heart disease risk by 15 percent. Emotional vitality and optimism about hypertension, a CVD risk factor, and crucial outcomes, are poorly studied (Katsi et al., 2017).

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue IX September 2024

Lifestyle disease prevention and treatment are difficult to personalize. As known, knowledge is necessary but does not change behavior. A rational approach to lifestyle-related diseases is to address harmful lifestyle practices with evidence-based therapies. A predominantly whole food, plant-based diet, regular physical activity, adequate sleep, stress management, avoidance of risky substance use, and other non-drug modalities that promote health and prevent disease can heal and regenerate the body. Lifestyle medicine acknowledges conventional therapy but addresses disease causes (Glass, 2021).

For those who may miss personalized preventive care, genomics literacy must be improved. Genomic literacy is especially important when linked to disease risk because patients may miss preventive interventions. Genomics and health literacy are similar. Mikkelsen et al. (2019) found health literacy predicts genomic literacy. The ability to read and write, collect and critically interpret health information, use health or social services, and get health help are indicators of health literacy. Poor health has been linked to lower health literacy for decades (Geobers et al., 2014). It supports a current intervention that educates or counsels high-risk people at health checkups about non-communicable diseases and improves lifestyles or health outcomes (Ko et al., 2014). Rose et al. (2015) found most subjects had good life quality. Most participants felt neutral about health. Psychology has a low quality of life, while the environment is high. Diabetes improves quality of life more than asthma, hypertension, and both.

The WHO's Quality-of-Life Group defines QoL as an individual's life perspective in light of his values, goals, expectations, and concerns (Marinho et al., 2017). This concept includes physical health, psychological state, functionality, sociability, and environmental factors, according to Santana et al. (2019). NCDs modify QoL, so measuring these aspects is important because chronic patients have physical, social, psychological, and spiritual symptoms related to disease progression and side effects.

A significant empirical gap exists in Bukidnon, Philippines, despite the growing body of literature on NCD quality of life determinants. The relationship between mental well-being, lifestyle, genomic health-related literacy, and quality of life in NCD patients in this region is poorly studied. The synergistic effects of these variables are rarely studied because most research focuses on individual factors. Understanding the interactions between mental well-being, lifestyle choices, genomic health-related literacy, and quality of life in Bukidnon is essential to developing targeted interventions and public health policies that meet local needs. These variables will illuminate Bukidnon NCD patients' health disparities and challenges, helping healthcare providers and policymakers close these gaps. The researcher aims to improve NCD patients' quality of life by identifying modifiable factors like lifestyle and mental health that can be targeted for interventions. Given the growing importance of genomic information in healthcare, genomic health-related literacy is crucial to assessing population readiness for personalized medicine and genetic health interventions.

Research in Bukidnon, Philippines, has focused on individual aspects of non-communicable diseases (NCDs) and their impact on quality of life. These include disease prevalence, healthcare access, and treatment outcomes. There are few comprehensive studies on how mental well-being, lifestyle, genomic health-related literacy, and overall quality of life affect NCD patients in the region. Bukidnon has a diverse culture, socioeconomic conditions, and rural and urban areas. It also faces unique health issues, such as rising NCD rates. Bukidnon's NCD rate is rising. Local populations are increasingly affected by diabetes, hypertension, and cardiovascular disease. NCDs impose a heavy cost on healthcare and individuals. Bukidnon's population ranges from urbanites with modern amenities to ruralites with limited healthcare and diverse cultural practices. Lifestyle and healthcare access affect disease management and outcomes. This region underreports and undertreats mental health issues. Mental well-being's impact on NCD management and quality of life is poorly understood. With the rise of personalized medicine and genomics, local populations' readiness for genomic health interventions must be assessed. Genomic health literacy in Bukidnon, a diverse and potentially underserved population, is unknown. Socioeconomic, cultural, and healthcare access may affect NCD patients' quality of life. Understanding these disparities' causes is essential for tailoring interventions.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue IX September 2024

In Bukidnon, a study on mental well-being, lifestyle, genomic health-related literacy, and quality of life for NCD patients is necessary. The study can bridge the empirical gap and reveal the unique challenges and opportunities for improving NCD patients' well-being in this region. This research can inform Bukidnon-specific policies and interventions that address the diverse needs of the population, improving NCD patients' quality of life.

Correlating mental well-being, lifestyle, genomic health-related literacy, and quality of life in Bukidnon, Philippines, addresses a methodological gap and stabilizes local baseline data. This research can explain the complex relationships between these variables in a unique and diverse population by establishing these correlations. This locally tailored approach ensures that policies and interventions address Bukidnon NCD patients' unique challenges. It can also lay the groundwork for targeted healthcare strategies, preventive measures, and genomic health literacy, which can stabilize the local healthcare landscape and improve the well-being and quality of life for NCD patients in the region.

The study assesses the correlations between mental well-being, lifestyle, genomic health-related literacy, and quality of life to improve the well-being and health outcomes of people with NCDs in Bukidnon, Philippines, under Sustainable Development Goals (SDG) 3 (Good Health and Well-Being). This research fills a knowledge gap and addresses local challenges to tailor healthcare interventions. The study's potential to inform targeted public health policies and interventions to improve NCD management, reduce healthcare disparities, and promote overall well-being benefits the local healthcare system by improving healthcare delivery, resource allocation, and patient outcomes and quality of life for Bukidnon NCD patients.

Consider Maria, a 56-year-old woman living in a rural area of Bukidnon, Philippines, who had been diagnosed with diabetes. She struggled with her mental well-being due to the stress of managing her condition in a resource-limited environment. Maria's lifestyle had been significantly affected by her diagnosis as she faced challenges in accessing healthy food options and healthcare services. Additionally, Maria had limited knowledge about the genetic factors influencing her condition and the available genomic health interventions. Her overall quality of life is compromised as a result of these factors, leaving her with a pressing need for comprehensive support and interventions tailored to her specific situation. In this scenario, Maria's experience with diabetes exemplifies the real-life challenges faced by individuals with non-communicable diseases in Bukidnon. Understanding the correlations between her mental well-being, lifestyle, genomic health-related literacy, and quality of life is critical to develop targeted strategies that can alleviate her struggles and improve her overall well-being and health outcomes. Numerous studies have examined how NCDs affect quality of life across populations. These studies consistently show that NCD patients have a lower quality of life. These conditions affect physical health, emotional well-being, social interactions, and daily activities. Healthcare and public health professionals recognize NCDs' impact on quality of life (WHO, 2021).

This study examines how mental well-being, lifestyle, and genomic health-related literacy affect NCD patients' quality of life in Bukidnon, Philippines. Mental health, including anxiety, depression, and stress, can greatly affect quality of life. Diet, exercise, and substance use affect physical quality of life. In the age of personalized medicine, genomic health literacy is crucial for making informed treatment and risk reduction decisions. This study seeks to illuminate Bukidnon NCD patients' unique challenges and develop tailored interventions to improve their quality of life by examining these variables. Healthcare management must understand these relationships to improve patient-centered care and NCD-affected population health.

RESEARCH OBJECTIVES

The main purpose of the study was to assess whether mental well-being, lifestyle (physical activity and smoking behavior), and genomics health-related literacy predicted quality of life among individuals with non-communicable diseases in Malaybalay city Bukidnon, in the first half of 2024.

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Specifically, this sought to answer the following questions:

1. What was the level of well-being among individuals with NCDs?
2. What is the extent of lifestyle among the respondents in terms of:
    2.1 physical activity; and
    2.2 smoking behavior?
3. What is the level of genomics health-related literacy among individuals with NCDs?
4. What is the quality of life among individuals with non-communicable diseases in terms of:
    4.1 physical health;
    4.2 psychological health;
    4.3 social health; and
    4.4 environmental health?
5. Was there a significant interrelationship among mental well-being, lifestyle, genomics health-related literacy, and quality of life?
6. Did mental well-being, lifestyle, genomics health-related literacy predict quality of life?
7. What quality of life model for individuals with non-communicable disease was developed based on the findings of the study?
8. What quality of life enhancement plan was proposed based on the findings of the study?

Statement Null of Hypothesis

Ho1: There was no significant relationship between mental well-being and lifestyle-physical activity.

Ho2: There was no significant relationship between mental well-being and lifestyle-smoking behavior.

Ho3: There was no significant relationship between mental well-being and genomic health-related literacy.

Ho4: There was no significant relationship between mental well-being and quality of life.

Ho5: There was no significant relationship between lifestyle-physical activity and genomic health-related literacy.

Ho5: There was no significant relationship between lifestyle-physical activity and quality of life.

Ho6: There was no significant relationship between lifestyle-smoking behavior and genomic health-related literacy.

Ho7: There was no significant relationship between lifestyle-smoking behavior and quality of life.

Ho8: There was no significant relationship between genomic health-related literacy and quality of life.

Ho9: Mental well-being, lifestyle, genomics health-related literacy did not predict quality of life

REVIEW OF RELATED LITERATURE AND STUDIES

Mental Well-being

People with physical non-communicable diseases (NCDs) have a two to three times increased risk of depression (Lloyd et al., 2018; Mendenhall et al., 2014). Depression and NCDs have a bidirectional relationship with shared biological and environmental determinants (Singer et al., 2017); each condition adversely affects outcomes for the other. Conversely, NCDs, like other stressors, may trigger depression,

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue IX September 2024

post-traumatic stress disorder, and other common mental disorders. In addition, mechanisms involved in the onset of cardiovascular diseases, diabetes, cancer, and respiratory disease may also contribute to mental disorders (Stein et al., 2019).

The study of Ramesh et al. (2023) revealed that the overall prevalence of depression was high, anxiety was moderate, and stress was moderate among the study participants. The findings of the study show that there is a statistically significant association, the odds of diabetes were 2 times higher, the presence of hypertension was nearly 4.1 times higher and the odds of the presence of visual impairment were nearly 1.8 times higher in developing the symptoms of depression. According to a study, people with diabetes are two to three times more likely to have depression than people without diabetes. Diabetes distress is an emotional response to living with diabetes, the burden of relentless daily self-management, and the prospect of its long-term complications. It can also arise from the social impact of diabetes and the financial implications of the condition. It is estimated that 33 to 50 percent of people with diabetes will experience diabetes distress at some point (Kalra et al., 2018).

Diabetes distress can look like depression or anxiety, but it cannot be treated effectively with medicine. Instead, these approaches have been shown to help: improve diabetes management to reduce stress, talk therapy, and support groups. Psychological distress is an independent risk factor for type 2 diabetes mellitus (T2DM). Depression is linked to impaired glucose control, end-organ problems, and death. Anxiety is connected with decreased adherence to therapy. However, higher levels of emotional vitality and life satisfaction were connected prospectively with a decreased risk of T2DM. People who already have diabetes and have higher levels of optimism, resilience, self-efficacy, and positive affect had better glycemic control, higher levels of health behavior adherence, and lower mortality (Bassi et al.,2021).

Positive psychology (PP) interventions, which are a subset of well-being interventions, make use of activities that are intended to boost optimism, positive affect, and resilience. These therapies have been shown to improve well-being and reduce depression in a recent meta-analysis involving over 5000 healthy participants. PP programs have also been shown to enhance psychological and health outcomes in patients with chronic medical diseases such as heart disease, hypertension, and HIV. Mindfulness-based therapies have also been shown to have consistent benefits for anxiety, depression, and stress (Li et al., 2017).

Although many people with diabetes can cope well and live healthy lives, several studies, including The Diabetes Attitudes, Wishes, and Needs study, have emphasized that psychological support in this group of patients is under-resourced and inadequate, resulting in poor quality of life and reduced general well-being. The majority of the guidelines on diabetes care focus on the medical aspects of initial management without addressing the psychological needs of the patient. Although many people with diabetes can cope well and live. Furthermore, patients with T2DM also have a twofold greater risk for comorbid depression compared to healthy controls, which hinders the quality of life of patients. Research also indicates that patients with diabetes suffer from high levels of diabetes-specific emotional stress. This is associated with functional impairment, poor adherence to exercise, diet, and medications, and inadequate glycemic control (Sridhar et al.,2019).

In light of this, given the complexity of the emotional and psychological needs of persons living with diabetes, it is essential to have a comprehensive understanding of the whole spectrum of psychological issues that can affect any patient population or individual. The NHS Diabetes and Diabetes UK's summary of psychological needs in diabetes group advocated a tiered model of emotional and psychological support known as the "pyramid of psychological need. This "pyramid model" illustrates the diversity of needs as well as the broadly inverse relationship between prevalence and severity of need, both of which can have a profound effect on the quality of life and psychological well-being of a patient (Fisher, et al., 2017).

There is evidence that suggests that psychological stress plays a primary role in the development of

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psychosomatic diseases. A stress response can be defined as a cognitive, emotional, physical, or behavioral level that can have serious, negative consequences on the body upon long-term activation. It is interesting to note that stress has long been suspected of having important effects on the development of diabetes through a variety of different mechanisms (Nguyen et al., 2019).

On the other hand, physiological emotional stress is associated with long-term activation of the hypothalamic-pituitary-adrenal axis and the sympathetic nervous system, resulting in chronic stress reactions such as depression, anxiety, mood disorders, and insomnia. Behavior induced emotional stress was associated with unhealthy lifestyle behaviors such as inadequate eating behaviors in terms of quality and quantity of food, low exercise levels, smoking, and alcohol abuse. High levels of DD are relatively frequent but should not be confused with clinical depression. The DD screening test is a one-of-a-kind survey consisting of 17 questions that is used to evaluate the emotional burden, bodily associated distress, routine related discomfort, and interpersonal distress of a person. When it comes to the overall care of diabetes, a tool like this is highly helpful in recognizing the emotional needs of patients (Torbjornsen et al., 2018).

There are multiple factors at play in the relationship between diabetes and psychosocial illnesses. Controlling glucose levels, practicing self-care, and quality of life can all be influenced by their coexistence. The emotional and psychological requirements of diabetic patients are frequently compromised when the individuals' efforts to address the challenges associated with their condition are unsuccessful, which results in an increased risk of problems related to diabetes. These problems result in a decrease in quality of life (QoL), an increase in mortality, a rise in the expenses of health care, and a loss in productivity. By addressing the patient's psychosocial requirements, the psychological barrier associated with adherence and self-care could be removed, leading to longer-term advantages in the form of improved health outcomes and glycemic control. So, having a greater grasp of the psychological elements of the diabetic patient would enable doctors to create strategies focused on the improvement of diabetes outcomes and the decrease of the disease burden (Fealy et al., 2019).

The influence that diabetes has on a person's psychological well-being (PWB) has been a concern for medical professionals working to develop better standards of care for the management of diabetes. PWB has been generally acknowledged as an important component of one's overall health, and evidence has shown that it helps enhance the quality of life, improve glucose management, minimize the burden of disease, increase work productivity, and lower mortality. Recent findings from a comprehensive review also suggested that a better knowledge of PWB therapies and the factors connected to them held great potential for improving health outcomes in individuals suffering from T2DM. PWB can be affected by a wide range of factors, including medication, nutrition, physical activity (PA), blood glucose level, comorbidity, and associated diabetic problems. Related mechanisms can be triggered by these circumstances. Although the effects of these factors on PWB have been investigated independently in other studies, only a small number of studies have simultaneously evaluated the impacts of these factors on PWB in patients who have T2DM (Tran et al., 2018).

Despite the significance of PWB, there is still a dearth of research concerning the factors that are associated with PWB in individuals who have type 2 diabetes. Previous research conducted on diabetic patients indicated that although glycemic control did not have any significant associations with PWB, diabetic complications, and comorbidities could alter the perception of PWB in type 2 diabetes. In addition, recent research has shown that understanding the factors connected to PWB may hold promise for the improvement of health outcomes in T2DM. However, there is not currently any evidence that can be considered conclusive about the specific components that can be connected to an improvement in PWB in individuals who have type 2 diabetes (Economides et al., 2019).

Lifestyle-Physical Activity and Smoking Behavior

Anyone who wishes to feel their best and maintain their health as they become older should make it a

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue IX September 2024

priority to have a healthy lifestyle. On the other hand, because one is exposed to such a vast quantity of guidance on a daily basis, it can be difficult to determine what information is most beneficial with regard to one's health, and the subject of preventative healthcare can be quite perplexing. It might be difficult to determine which piece of advice to follow when it comes to health because multiple messages are communicated. Nevertheless, leading a healthy lifestyle does not have to be difficult to accomplish (Ayres, 2024).

Physical Activity. The results of the study by Nurhasan et al. (2020) showed that the level of physical activity in the light category was few, the moderate category was almost half, and the high category was over one-third. Physical fitness showed musculoskeletal fitness in male and cardiorespiratory fitness in female need to be improved.

In the study of Alhammad et al. (2023) physical activity prevalence was over fifty percent, with walking being the most common activity. Lack of time was the primary reason for inactivity. On average, students engaged in 1.5 hours/day of vigorous-intensity activities and 1.3 hours/day of vigorous-intensity sports and fitness activities at work. Sedentary behavior, characterized by continuous sitting, averaged 5.37 hours per day. Approximately half of the respondents were physically active, while few relied solely on short walks due to time constraints, limited activity hours, or sedentary habits. A lack of time was cited as the primary reason for inactivity by most respondents.

Smoking Behavior. A new cohort study has provided compelling evidence that quitting smoking can lead to improved mental health outcomes among people with and without mental health disorders, alleviating concerns raised by both clinicians and smokers (Wu et al., 2023). In the study of Pierce (2022), among participants who had ever smoked, over half reported that they had already quit, and the mean age of quitting was 38 years. Quitting smoking before age 44 years was associated with a reduction in mortality that was almost a quarter higher than that associated with never smoking, and this was consistent across all sociodemographic groups studied. For smokers who quit between ages 45 and 54 years, the smoking-associated mortality rate was 47 percent higher than that among never smokers. Quitting at these ages was associated with a substantial benefit compared with continuing smoking.

The importance of a healthy lifestyle (HL) to NCD prevention (primordial and primary prevention) and management (secondary prevention) is already well established (Allen et al., 2021). A healthier lifestyle can prevent, manage, or reverse the aforementioned modifiable risk factors. Several doctors are now classifying NCDs as "lifestyle linked diseases" (LRDs). However, a lot of effort is required to genuinely alter global behavior. Only 47% of low- and middle-income WHO member nations were found to have documented strategies to tackle NCDs in a recent study (WHO,2021).

HL activities, such as healthy food availability and choices and PA, should be at the heart of any strategy to address NCDs. To accomplish global transformation, a new approach to NCD prevention and treatment is needed. At the level of the individual or family to that of the global community, the significance of promoting and leading an HL must take on a far more prominent role, capitalizing on all forms of prevention strategies (i.e., primordial, primary, secondary). For HL projects to be successful, we need to think outside of the box of conventional medicine (i.e., hospitals and clinics). Stakeholders must be able to communicate effectively and form meaningful partnerships (Sridhar et al 2019).

Risk factors for HTN include lifestyle choices such as eating a diet high in salt and fat, eating too few fruits and vegetables, drinking too much alcohol, not getting enough exercise, and not properly managing stress. Socioeconomic status (income, education, and housing), genetics, preeclampsia in pregnant women, unplanned rapid urbanization, and advanced age are also risk factors for hypertension. Those who are overweight, diabetic, have a family history of HTN, or are older than the average population in a specific area are more likely to develop the disease (Fisher et al 2017).

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Some studies show that doctors do not provide their patients enough advice on how to live a healthy lifestyle, and most patients do not know what they are doing wrong. Simple methods exist for identifying and managing hypertension. When measured with a certified auscultatory or oscillometric semiautomatic or automatic sphygmomanometer in the Out-patient Department (OPD), hypertension is defined as systolic blood pressure (SBP) values of 140 mmHg and/or diastolic blood pressure (DBP) values of 90 mmHg. Nonetheless, a nutritious diet, stress management, regular exercise, reduction of excessive alcohol consumption, and smoking cessation are all frequent ways to control HTN.

HTN problems are reduced when patients have a positive rapport with their healthcare providers (particularly nurses and doctors). Motivational interviews, which emphasize the need to change bad lifestyle changes alongside medication, are another risk aversion technique for reducing the likelihood of hypertension and its sequelae. Patients are given a forum in which to voice objections to the intended course of action and subsequent compliance through the use of motivational interviewing. Modifying one's way of life is one form of treatment for hypertension that does not include drugs. It is the foundation of encouraging people with hypertension to adopt healthy routines. Family, friends, social networks, schools, workplaces, communities, and policies all play a role in shaping individuals' health-related behaviors and decisions. It is not always up to the individual to make a healthy choice, and it is not always their responsibility. To address this complex network of factors, health promoters must work together. Hence, a healthy lifestyle has numerous variable components of HTN. For those with hypertension, cutting back on salt intake is one way to lower blood pressure. There is a strong correlation between respondents' level of knowledge and the availability of information about how to live a healthier life (WHO, 2021).

Only over one-third of the participants in an assessment of the hypertension patients' knowledge regarding acceptable lifestyle practices scored above 75 percent. Just over half of these individuals had an adequate understanding of lifestyle practices related to their chronic conditions. Similar findings were found in a study from Nigeria, which found that over one-third of respondents had strong knowledge, over one-third had moderate knowledge, and one-third had inadequate knowledge.

Intriguingly, ninety-nine percent of participants in the Nigerian study reported a positive attitude toward lifestyle modification in the management of HTN, and a similar percentage agreed that HTN is a serious ailment, implying health-seeking behavior among the populations covered by the study area. Almost thirteen percent of Black Americans in research published in the United States refused to change their eating habits from those centered on saturated fat to those based on vegetables and fruits. Successful therapy and efforts to control HTN require a solid understanding of salt use, alcohol intake, and the influence of smoking. Ninety-four-point six percent, eighty-three-point-eight percent, and fifty-nine-point-nine percent, respectively, of 130 participants had unhealthful knowledge regarding their salt intake, alcohol usage, and smoking control. Furthermore, just over one-third of them understood the significance of maintaining a healthy diet. However, their resolve to cut down on salt intake and quit smoking was 94.6 percent and 98.5 percent, respectively (Ogunfowokan et al., 2018)

Research conducted in Botswana found that over half of the population followed reduced salt and fat diets, however only one-third of the population was used to eating normally. However, a survey by Jimma found that only very few of the participants routinely consumed prepared food with salt, whereas the vast majority committed to omitting salt from their dishes. Both systolic and diastolic blood pressure decrease by 5-10 mmHg with regular exercise. Many hospital-based studies have found that hypertension patients who exercise regularly and consume an appropriate number of calories have an easier time staying at a healthy weight. Patients have even said that yoga and meditation are the most effective methods for dealing with stress and hypertension. Yet, the vast majority of participants in a study conducted in Nigeria could not tell the difference between routine activities and exercise. Only a few of Jimma residents reported being committed to regular physical activity in cross-sectional research. Higher levels of physical activity among

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the general population have been shown to reduce mortality from cardiovascular diseases by nearly 80% in another study. In particular, one exercises at least three times each week for at least 30 minutes each time, one meets the minimum criteria. The majority of people surveyed in one African country said they regularly engaged in some type of physical activity; the most common activities mentioned were walking and jogging. Similarly, majority of study participants understood the importance of exercise in lowering HBP (Pires et al., 2018). Interestingly, people with RH have not been subjected to more rigorous evaluations of lifestyle adjustment. Several studies suggested that dietary and physical activity changes could significantly reduce BP in this population. However, these studies were small, treatment lasted as little as one week dietary modification was delivered in a clinical research unit rather than a real-world setting, and exercise and diet were studied independently. Recent reviews of the management of RH have noted that the efficacy of these lifestyle modifications in RH patients has not been established.

Lifestyle modifications, including both exercise training and dietary modification, are of proven efficacy in lowering BP in unmedicated patients with hypertension and are often recommended as the first step in treating high BP. It is debatable whether lifestyle changes would help people who are resistant to drugs that are beneficial for the vast majority of patients with hypertension. By contrasting a four month combined diet and exercise intervention delivered in a cardiac rehabilitation setting with a single educational session providing the same lifestyle prescription along with written guidelines to achieve specified exercise, weight loss, and nutritional goals, the TRIUMPH randomized clinical trial (Treating Resistant Hypertension Using Lifestyle Modification to Promote Health) (Carey et al., 2018).

Genomics Health-Related Literacy

The path analysis, which was done by creating a path diagram revealing the relationship of the three components with risk and benefit perception, revealed that genetic and genomic knowledge and interactive and critical health literacy affected the respondents' intention to undergo genetic testing via recognition of the benefits of such testing (Miyoshi & Watanabe, 2023).

According to Sabatello et al. (2019), genomic literacy among children and young people, especially adolescents, is of increasing importance. The ever-expanding prevalence of genetics in everyday life includes ancestry testing; the increasing number of clinical genetic tests; the rise of research endeavors that utilize genome and exome sequencing, enroll pediatric participants, and offer families genetic results; and the professional opportunities in genomics that increasingly are available for adolescents as they train to enter the workforce (e.g., bioinformatics, genetic counseling).

The results of the study by Donovan et al. (2020), demonstrated that students with higher genomics literacy (relative to those with lower genomics literacy) exhibited greater reductions in the perception of racial differences and greater reductions in belief in genetic essentialism after learning how patterns of human genetic variation refute genetic essentialism. These results suggested that genetics education can protect respondents from developing a belief in genetic essentialism when it provides them with opportunities to learn multifactorial genetics and population thinking in conjunction with how these concepts refute essentialist thinking.

Recent advances in genomic research (Chen et al., 2021) have boosted hopes for the creation of tailored preventative medicine, yet patients will need to be well-versed in genomics in order for this to be successful. Because of the importance of individualized preventative treatment, it is essential to improve genomics-related literacy, and this is especially true for those with low genomics-related literacy. This is especially important if a lack of genomics-related literacy is linked to increased disease risk, as patients may not receive the additional advantages of preventative measures if they do not understand the link. Using propensity score matching, the study analyzed data from 4646 people to determine whether or not there was an association between genomes literacy, measured by the genomics literacy score (GLS), and the prevalence of non-

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communicable diseases. The GLS group with scores below the median had a significantly higher risk of hypertension and obesity than the GLS group with scores above the median. Their findings indicate that a lack of knowledge about genomics may be a contributor to the development of hypertension and obesity. Assessing people's knowledge of genomics could help health and education professionals target the right people.

In the era of personalized medicine, education to enhance genomic literacy will be necessary. Health literacy can be evaluated based on the ability to read and write, collect and critically interpret information related to health, and use health or social services, as well as the availability of assistance when the individual faces health problems. This requires not only health literacy skills but also extensive knowledge of genetics and genomics (that is, basic knowledge of genes, genomes, and general genomic science, as well as knowledge of science in general). Throughout the past few decades, researchers have found that health literacy is linked to health status; specifically, that low health status is related to low health literacy (WHO, 2021). The study's findings show that people with low levels of genetic literacy may be more likely to be overweight or hypertensive. This lends credence to the concept that a lack of genetic literacy is associated with worse health. Poor genomic literacy may contribute to an increased risk of noncommunicable diseases due to patients' unfavorable health behaviors, as low health literacy (which includes genomic literacy) has been linked to poor health status due to unhealthy behavior. A lack of genetic literacy has been linked to an increase in risk factors for diseases, such as obesity and hypertension, due to behaviors such as overeating and drinking excessive amounts of soda. Reducing the confounding bias of variables like socioeconomic level with propensity score matching, however, revealed that genetic literacy might be an individual characteristic connected to poor health status.

An understanding of biology, inheritance as the etiology of hereditary diseases, and the concept of personal data management are necessary for "genomic literacy," which is defined as "the capacity to obtain, process, understand, and use genomic information for Health-related decision-making" (Whitley et al., 2020; Stern & Kampourakis, 2017; Jackson et al., 2018; Hulsen et al., 2019; Youssef et al., 2019).

The first step in educating a group on one of these objectively difficult subjects is to bring the material down to their level of complexity. For instance, different approaches are required for doctors and patients when discussing topics like customized treatment for complicated disorders and the genetics of rare diseases (Bennett et al., 2017; Goetz and Schork, 2018; Stoller, 2018; Ferreira, 2019; Ramalle-Gómara et al., 2020). Similarly, the social, legal, and ethical considerations surrounding genomics can be tailored to a variety of groups (Taneri, 2011; Callier et al., 2016; Hartman et al., 2020; Wolf et al., 2020).

The increasing prevalence of direct-to-consumer tests, the incorporation of genomic medicine into routine healthcare, and the need for public support of genomic research have all highlighted the importance of genomic literacy as a precondition for the successful rollout of personalized medicine, which has already revolutionized the diagnosis and treatment of patients with rare diseases and cancer (Dressler et al., 2014; ACMG Board of Directors, 2016; Brittain et al., 2017).

Numerous governmental, non-governmental, and international organizations currently contribute to genomic education through initiatives like integrating genomics into traditional curricula, providing financial support for educational institutions, incorporating and establishing training programs for genomic professionals, making online resources available to the public and professionals, addressing the public through media engagement, etc. (Bennett et al., 2017; Goetz & Schork, 2018; Hyland & Dasgupta, 2019; Sabatello et al., 2019; Whitley et al., 2020).

Various nations have formed national genomic programs with varying aims to expedite the introduction of customized medicine (Kovanda et al., 2021). Improving genomic literacy among the public, patients, and professionals on relevant scientific and ethical issues is essential if the main goals of genomic projects are to

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be realized, including identifying normal and pathological genomic variation, bolstering infrastructure, and, ultimately, implementing personalized medicine (Bennett et al., 2017; Nakamura et al., 2017; Goetz & Schork, 2018; Ha et al., 2018; Hyland & Dasgupta, 2019; Sabatello et al., 2019; Wright et al., 2019; Whitley et al., 2020).

The ability to "obtain, process, understand, and use genomic information for health-related decision making" (Whitley et al., 2020) necessitates familiarity with fundamentals in biology, inheritance as the etiology of hereditary diseases, and the concept of personal data management (Stern & Kampourakis, 2017; Jackson et al., 2018; Hulsen et al., 2019; Youssef et al., 2019).

Before teaching can begin, these objectively complicated issues must be simplified to the level of understanding of the intended audience. Personalized medicine for complicated disorders and the genetics of rare diseases are two examples of areas that require separate adaptations for doctors and patients (Bennett et al., 2017; Goetz & Schork, 2018; Stoller, 2018; Ferreira, 2019; Ramalle-Gómara et al., 2020). The moral, societal, and legal implications of genomics can also be adapted to suit a variety of audiences (Callier et al., 2016; Hartman et al., 2020; Wolf et al., 2020).

A prerequisite for the effective implementation of personalized medicine, which has already altered the diagnostics and treatment of patients with rare diseases and cancer, is genomic literacy, which is becoming increasingly important as a result of the rising popularity of direct-to-consumer tests, implementation of genomic medicine in routine healthcare, and the necessity of public support for genomic research (Dressler et al., 2014; ACMG Board of Directors, 2016; Brittain et al., 2017).

There are currently many government, non-government, and international organizations that contribute to genomic education through means such as incorporating genomic topics into formal education, funding educational institutions, incorporating and establishing training programs for genomic professionals, providing online provisions for the public and professionals, engaging the public through media engagement, etc (Bennett et al., 2017; Goetz & Schork, 2018; Hyland & Dasgupta, 2019; Sabatello et al., 2019; Whitley et al., 2020).

Various nations have formed national genomic programs with varying aims to expedite the introduction of customized medicine (Kovanda et al., 2021). It is crucial to increase genomic literacy among the public, patients, and professionals on relevant scientific and ethical issues in order to achieve the main aims of genomic projects, such as determining normal and pathological genomic variation, improving infrastructure, and finally implementing personalized medicine (Bennett et al., 2017; Nakamura et al., 2017; Goetz & Schork, 2018; Ha et al., 2018; Hyland & Dasgupta, 2019; Sabatello et al., 2019; Wright et al., 2019; Whitley et al., 2020). As a result, national genomic programs greatly assist genomics' entry into the public consciousness and existing educational infrastructures' pursuit of genomic literacy by tackling their primary objective of promoting customized medicine.

Quality of Life

According to the results of the study of Vakili et al. (2012), the physical domain is only significant between the two groups. Furthermore, the study indicates QOL is in the middle level for all respondents. The study of Dalia and Ruzevicius (2007) enabled to find out that employees are more satisfied with the quality of life than the quality of working life. The respondents are least satisfied with their material state. Quality of life directly correlates with quality of working life. Employees' quality of working life value and their seven factors have a moderately correlation. While the quality of life highly correlates with physical state and material state. Social–demographic elements have less influence on the quality of life and quality of working life estimation

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The psychological and social QoL scores were lower than the non-pandemic norms of the general population, while the physical health and environmental QoL scores were comparable. After adjusting for relevant demographic, personal, and clinical variables, religious coping, the greater number of hours of online classes attended, and greater social support from family, friends, and significant others were significantly associated with higher QoL among the participants (Leong Bin Abdullah et al., 2021). In the study of Hassan et al. (2022), patients with NCDs experienced a lower quality of life in the psychological, social, and environmental domains of QoL. Results from the multivariate regression analysis showed that female gender, psychological QoL, social QoL, and environmental QoL significantly relate to adherence to healthcare.

Results in the study of Witts et al. (2022) revealed that those living with comorbidities were less likely to report a high index for HRQOL. However, respondents diagnosed with CKD, diabetes, hypertension, and stroke were more likely to report a higher index than those diagnosed with cancer. In the present study of Vishwaraj and Algoodkar (2020), out of 200 patients with NCDs, a quarter reported poor QoL, and very few reported very poor QoL, among them few had DM, few had HTN and had both DM and HTN. With an increase in NCD prevalence, the QoL decreases. Results in the study of Pasquetti et al. (2021) revealed that quality of life with lower mean in the physical domain and higher in the psychological domain. Results with statistical differences for age group in the physical, psychological, and environment domains, and with the variables color and profession in the environment domain.

Quality of life is described by the World Health Organization as individuals' assessments of their place in life in the context of the culture and value systems in which they live, as well as in connection to their goals, expectations, standards, and worries. Another definition of QoL refers to it as a global personal assessment of a single dimension that may be causally responsive to several other unique dimensions that span the complete spectrum of human experience, states, perceptions, and realms of thought. When people's QoL is researched under specific health situations, it is referred to as health-related QoL. (HRQoL).

Noncommunicable diseases cause 74 percent of global deaths and have caused major impairments, lowering HRQoL. Poor medication adherence, social support, patient-physician connection, and health literacy all reduce HRQoL in NCDs. Regrettably, there is a paucity of research on the determinants of HRQoL among patients with various forms of NCDs. AlNoumani et al. (2022) sought to investigate the predictors of Health-Related Quality of Life in patients with NCDs, such as health literacy, social support, patient-physician interaction, and medication adherence. The average age of the participants was 56 years. More medication adherence was associated with improved physical and role functioning and mental health. Physical, social, role, and mental functioning were all independent predictors of social support. Patients with high health literacy performed better in terms of social and role functioning. The findings have implications for future efforts to deploy therapies that improve HRQoL. The study found that health literacy, social support, and medication adherence are significant predictors of HRQoL in individuals with NCDs, favorably influencing physical functioning, social functioning, role functioning, and mental health dimensions.

Many studies have been undertaken in Ethiopia to assess the HRQoL of patients with type 2 diabetes mellitus. However, a study from Addis Abeba found that diabetic nephropathic pain impacted HRQoL. Evidence on HRQoL or global quality of life (GQoL) of T2DM and hypertension patients with or without simultaneous occurrence is limited. Furthermore, the available research used a diverse sample size, only examining T2DM for many, and a separate instrument applied to a single health institution, which may make drawing generalizations problematic (Asmelash et al., 2021; Kassahunet al., 2021; Mancia et al., 2018).

Diabetic patients are concerned about their blood glucose levels and the problems that may or may not arise. Furthermore, ongoing care and lifestyle changes, such as dietary changes and exercise, have an impact on patients' HRQoL (physical, emotional, and social well-being). Diabetes has been proven in several research

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to have an effect on HRQoL and to impair the physical, psychological, environmental, and social domains of health. Diabetes patients have significantly lower HRQoL compared to non-diabetic patients. Diabetes physiological derangement and degree of deterioration can be identified by health specialists. Yet, an individual patient's views of health and well-being are not immediately related to symptoms and functional limits, which are not directly proportional to physiological and anatomic abnormalities. As a result, the effects of biological abnormalities on HRQoL are mediated and influenced by psychological, social, and cultural variables. However, in our country, including the current study area, studies focus solely on the impact of diabetes in terms of morbidity and mortality (Gebremichael et al., 2021).

Diabetes imposes a significant burden on the healthcare system and individuals' quality of life due to its existing high prevalence and projected trends of diabetes. Diabetes literature abounds with studies on the impact of diabetes on cardiovascular disease, renal illness, retinopathy, foot ulcers, sexual dysfunction, and depression (Trikkalinou et al., 2017). Yet, general health associated with functional mental diseases, such as social dysfunction, anxiety, and confidence, as well as other related characteristics, is underreported. Few research has looked at diabetics' quality of life in terms of sleep, social support, and depression (Semenkovich et al., 2015; Trikkalinou et al., 2017).

Diabetes' rising incidence has a negative impact on quality of life, causing more psychosocial issues. Hence, in the last decade, there has been an increasing need to examine psychosocial and mental health among patients with life-long chronic conditions, which has become critical. This is critical in identifying essential psychological components that are most affected. It can also aid in the modification of intervention and treatment requirements in order to improve and manage the illness, as well as tackle the underlying psychological concerns (Trikkalinou et al., 2017). Many studies have utilized different psychometric instruments to examine the quality of life among diabetic patients and found that they have higher levels of anxiety and depression than non-diabetic people or people who have not yet been diagnosed with diabetes (Al-Aboudi et al., 2015).

Diabetes is one of the most common chronic diseases affecting children, young people, and the elderly in Saudi Arabia. According to recent studies, the prevalence of diabetes and prediabetes in women is 3.8 and 18.8%, respectively, and 9.2 and 27.6 percent in males (Aldossari et al., 2018; Al-Zahrani et al., 2019). Several community-based research revealed a nine percent age and gender-standardized prevalence of prediabetes among adults and a 12.1 percent prevalence of diabetes (Bahijri et al., 2016). There are numerous techniques available for assessing people's mental and psychological well-being. GHQ, on the other hand, is regarded as a very trustworthy and standard evaluation tool for psychiatric illnesses in primary care settings.

Also, in Saudi Arabia, the Heath Related Quality of Life tool was used to assess quality of life (Al-Aboudi et al., 2015; 2016). The general health questionnaire (GHQ) has not before been used to assess psychological disorder and strain scores in diabetes and prediabetic individuals. The GHQ has been recognized as an effective and validated measure for assessing general health among the Saudi population (El-Metwally et al., 2018). Because this questionnaire tool is very simple to use and only takes 10 minutes to complete, it is a very efficient and unique self-reported questionnaire to utilize in an outpatient context. Furthermore, the adjusted analysis revealed that diabetes patients were more psychologically upset than their counterparts. Similarly, in terms of gender, we discovered that women were more psychologically upset than men. Interestingly, after controlling for sociodemographic characteristics, unemployed people were found to be more psychologically distressed than employed people.

A population-based prospective cohort study in Taiwan tracked patients for up to 14 years. Depression was linked to an elevated risk of macrovascular complications and all-cause death in the diabetic population, according to the study (Wu et al., 2020). The association between depression and the frequency of

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macrovascular problems is a complex multifactorial process with unclear underlying mechanisms, and only a few studies have revealed certain common processes.

Depressive persons, for example, are more likely to live an unhealthy lifestyle, smoke cigarettes, engage in insufficient physical exercise, and consume an unhealthy diet, according to one study (Deschênes et al., 2017). Depression is usually associated with behavioral changes such as poor self-care and non-adherence to treatments. These behaviors in diabetic patients result in poor glucose control, which is associated with an increased risk of complications (Nouwen et al., 2019). This evidence, together with the substantial link between diabetes and bad psychological outcomes found in our study, calls for immediate secondary prevention measures for diabetics to prevent problems in the short and long term.

Similarly, our findings addressing the association between women and poor psychological outcomes based on GHQ score are consistent with previous research, namely, that women are more depressed than males (Albert, 2015). These findings that women are more affected by poor psychological outcomes are based on biological sex differences rather than external influences such as culture, food habits, level of education, and a variety of other theoretically confusing social and economic factors. Yet, it has been discovered that this unbalanced ratio of unfavorable psychological diseases predominates mostly in childhood and fades with maturity.

The exposure of women to diverse reproductive periods of life could be one explanation for this discovery (Albert & Newhouse, 2019). This, in turn, is tied to hormonal changes, implying that women are more vulnerable to unfavorable psychological effects as a result of hormonal changes throughout puberty, after getting pregnant, and around menopause. This could imply that hormonal alterations are to blame for women's bad psychological results (Albert & Newhouse, 2019). The study did not rule out this possibility, but the present evidence was sufficient to explain such findings. Regardless of the underlying mechanisms or reasons for the bad effects, women are more vulnerable and should be given greater attention to avoid a deterioration in their quality of life.

Interrelationship among Mental Well-being, Lifestyle, Genomics Health-related Literacy, and Quality of Life

Mental Well-being and Lifestyle. Research shows that people who exercise regularly have better mental health and emotional well-being, and lower rates of mental illness. Taking up exercise seems to reduce the risk of developing mental illness. It also seems to help in treating some mental health conditions, like depression and anxiety (Better Health Channel, 2021). According to Patcha (2024), numerous studies have shown that engaging in physical exercise has a direct influence on the control of mood, the reduction of stress, and the treatment of disorders such as anxiety and depression. These results have ramifications for a wide range of age groups and demographics, including adolescents, adults, and the elderly, among others.

According to Mahindru et al. (2023), regular physical activity improves the functioning of the hypothalamus-pituitary-adrenal axis. Depression and anxiety appear to be influenced by physical exercise but to a smaller extent in the population than in clinical patients. Numerous hypotheses attempt to explain the connection between physical fitness and mental wellness. Physical activity was shown to help with sleep and improve various psychiatric disorders. Exercise in general is associated with a better mood and improved quality of life. Physical exercise and yoga may help in the management of cravings for substances, especially in people who may not have access to other forms of therapy. Evidence suggests that increased physical activity can help attenuate some psychotic symptoms and treat medical comorbidities that accompany psychotic disorders.

According to the National Health Service (2024), when people stop smoking, studies show anxiety, depression, and stress levels are lower; quality of life and positive mood improve; the dosage of some

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medicines used to treat mental health problems can be reduced. According to the study of Taylor et al. (2021), for all primary outcomes, smoking cessation was associated with an improvement in mental health symptoms compared with continuing to smoke: anxiety symptoms; depression symptoms; mixed anxiety and depression symptoms.

According to the results of a recent systematic review, quitting smoking may produce positive health effects in a matter of weeks. The review found that people who quit smoking had a greater reduction in anxiety, depression, and symptoms of stress than people who did not. If accurate, these findings could help motivate millions of people looking for more reasons to quit smoking or avoid stopping for fears of negative mental health or social effects (Huizen, 2021).

Mental Well-being and Genomics Health-related Literacy. In multivariable models, limited health literacy was associated with lower genetic knowledge, lower awareness of family health history (FHH), greater perceived importance of genetic information but lower perceived importance of FHH information, and more frequent communication with a doctor about FHH. The findings highlight the importance of considering domains of genomics-related health literacy (e.g., knowledge, oral literacy) in developing educational strategies for genomic information. Health literacy research is essential to avoid increasing disparities in information and health outcomes as genomic information reaches more patients.

According to the study of Huan Xu et al. (2023), the higher the level of eHealth Literacy (eHL), the better the well-being of the participants. The mental health-seeking attitude is also positively correlated with mental well-being, indicating that the more positive attitude toward seeking mental health services, the better the well-being participants reported. The higher level of eHL is significantly associated with a more positive attitude toward seeking mental health services.

Mental Well-being and Quality of Life. According to First Light Recovery (2024), those dealing with poor mental health also report having a low quality of life. Their mental health prevents them from doing many of their daily tasks, leading to a decline in self-sufficiency, if not altogether. They suffer from low self-confidence and low self-esteem as a result of this. They struggle with isolation and feel like they are not a worthy or contributing part of society. They feel alienated and apathetic. Hobbies and activities they once loved hold no interest for them anymore and relationships dwindle.

In the study of Bastaminia et al. (2016), participants perceived their quality of life (QOL) to be highest in the physical health dimension and lowest in the environmental dimension. It was observed that there was a significant inverse bivariate correlation between the mean score of physical health, psychological health, and total QoL with the total mental health score. Multiple linear regression showed that total mental health score is significantly correlated with physical health, social relationships, and environment dimensions of QoL, and also gender and number of available rooms. According to the study of Phan et al. (2022), there was a relationship between mental health and the health-related quality of life among healthcare workers. Integration of healthy lifestyles and psychological support can help improve mental health and quality of life for healthcare workers.

In the study of Ausin et al. (2020), the variables that have the greatest impact on quality of life are as follows: a greater number of physical and psychological symptoms, experiencing financial difficulties, and the presence of a psychological disorder, while continuing to work has a positive effect on QoL. Physical and mental disorders have a similar impact on QoL. The presence of a greater number of psychological symptoms (without necessarily fulfilling the criteria of a mental disorder) is a predictive variable of worse QoL. Mental health has a burden on the QoL of people over 65 years of age which is as powerful as physical health.

The results of the study of AhmadiGatab et al. (2011) showed that there was a significant relationship

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between psychological health, happiness, and life quality. The respondents whose psychological health was higher were happier and had higher life quality. The result of the study of Singh et al. (2021) showed that there is a significant impact on quality of life which shows poor well-being/QoL that is affected by the indicators of mental health.

Lifestyle and Quality of Life. According to Better Health Channel (2023), physical activity or exercise can improve health and reduce the risk of developing several diseases like type 2 diabetes, cancer, and cardiovascular disease. Physical activity and exercise can have immediate and long-term health benefits. Most importantly, regular activity can improve quality of life. Also, in the study of Gill et al. (2013), findings suggest that physical activity contributes to multiple aspects of quality of life, that social and emotional benefits are primary motivators and outcomes for participants, and that the meaning of quality of life and physical activity benefits is subjective and contextualized, varying across individuals and settings.

In the study of Piper et al. (2012), compared to continuing smokers, quitters showed improved global quality of life, health-related quality of life, and affect at years 1 and 3 and fewer stressors by year 3. Successful quitters, in contrast to continuing smokers, reported improved subjective well-being, which could be used to motivate quit attempts by individuals with concerns about what life would be like without cigarettes.

Lifestyle and Genomics Health-related Literacy. According to the study of Zangger et al. (2024), higher digital health literacy is positively associated with higher physical activity levels. This highlights the importance of screening and promoting digital health literacy in managing digital health and digital physical activity interventions. The study of Jayakumar et al. (2023) revealed that the health literacy was good, though the physical activity scores indicated more inactive people. Majority had normal muscle strength and average to above average level of flexibility, but muscle endurance was greatly affected owing to an unacceptable physical fitness index. The study demonstrates significant association between health literacy, physical activity, and physical fitness level among adults.

According to the study of Sun et al. (2023), after adjusting for other influences, smokers with lower health literacy were less likely to have intention to quit. And the association between knowledge about smoking hazards and whether smokers have the intention to quit is no longer significant, but it significantly affects the intensity of the intention to quit among smokers who already have the intention. In the study of de Viron et al. (2012) revealed a significant impact of genetic notification on smoking cessation in comparison to controls (clinical risk notification or no intervention) in short term follow-up less than six months.

Genomics Health-related Literacy and Quality of Life. In the study of Li et al. (2024) the mean health literacy level of older adults in nursing homes was relatively low. Health-related quality of life scores were moderate. There were statistically significant differences in the effects of health literacy, education level, former occupation (professional), marital status (widowed), and race on health-related quality of life. The study of Couture et al. (2017) suggested that there is no relationship between health literacy and the physical and mental components of quality of life among frequent users of health care services.

Synthesis

This synthesis of literature explores the relationship between well-being, lifestyle, genomics health-related literacy, and its impact on the quality of life among individuals with NCDs. Non-communicable diseases, such as diabetes, cardiovascular diseases, cancer, and respiratory illnesses, have become significant health challenges worldwide. Understanding the factors that influence the quality of life in people with NCDs is crucial for developing effective interventions and improving patient outcomes. This study reviews and synthesizes existing literature on the subject to construct a causal model that illustrates the interplay between well-being, lifestyle, genomics health-related literacy, and the quality of life in this specific population.

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Non-communicable diseases are chronic conditions that are generally not infectious and can be influenced by various factors, including lifestyle choices, genetic predisposition, and health-related literacy. Research has shown that these factors can significantly impact the quality of life of individuals living with NCDs. Therefore, investigating the connections between well-being, lifestyle, genomics health-related literacy, and quality of life in this context is of utmost importance for better patient care and management.

The literature review includes a comprehensive analysis of relevant studies exploring the relationship between mental well-being, lifestyle, genomics health-related literacy, and the quality of life among people with NCDs. Studies from diverse populations and geographical regions will be considered to provide a more comprehensive understanding of the subject.

The synthesis of relevant literature and studies reveals a scarcity of research, especially at the local level, pertaining to the interplay of mental well-being, lifestyle, genomic health-related literacy, and their combined influence on the quality of life among individuals with Non-Communicable Diseases. This scarcity is particularly evident in the context of Bukidnon, Philippines. While extensive research has been conducted on each of these variables independently, few studies have examined their intricate relationships and cumulative impact on NCD patients, especially in this specific geographic area. Numerous international studies have explored mental well-being, focusing on emotional regulation, self-efficacy, and coping strategies among individuals with chronic illnesses. However, there is a paucity of local research that delves into the unique psychological needs and experiences of NCD patients in Bukidnon.

Extensive research on lifestyle choices and their effects on health outcomes is available in the global literature. Nevertheless, there is a limited body of research that accounts for the cultural, economic, and social nuances of the Bukidnon population concerning lifestyle and NCD management. Genomic literacy has been examined in numerous studies, but it is seldom localized to the Bukidnon context. The scarcity of research on the genomic health-related literacy of NCD patients within this region hinders the development of tailored interventions. Research on the quality of life among NCD patients is prevalent globally, with validated tools such as the WHOQOL-BREF widely used. Nevertheless, there is a gap in understanding how the unique variables within the local context of Bukidnon collectively affect the quality of life of NCD patients.

The existing gap in the literature underscores the need for the current study in Bukidnon, Philippines. This research aims to fill the void by providing a localized, comprehensive examination of the interrelationships between these variables and their combined impact on the well-being of NCD patients. The findings will not only contribute to the understanding of NCD management but will also provide valuable insights for healthcare professionals, policymakers, and the local community in developing targeted strategies to improve the quality of life among individuals managing NCDs in Bukidnon. This study serves as an essential step toward addressing the scarcity of local research in this critical area of public health.

RESEARCH METHODOLOGY

Design. This study employed a descriptive, correlational (predictive) research design.

Environment. The study took place within the Bukidnon Provincial Medical Center (BPMC), situated in Casisang City, Malaybalay, Bukidnon, Philippines.

Respondents. The participants of the study were 349 people who are 18 years old - 59 years old with non-communicable diseases.

Sampling Design. Purposive quota sampling was employed to identify the sample size.

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Inclusion and Exclusion Criteria. Included in the study who were: (a) above 18 to 59 years, focusing on adults facing non-communicable diseases (NCDs); (b) must have a formal diagnosis of NCDs like cancer, cardiovascular diseases, diabetes (type 1 or 2), or chronic lung diseases; and (c) residents of Malaybalay City, Bukidnon, during the first and second quarters of 2024.

Exclusion Criteria. Excluded in the study who were: (a) under 18 or over 59 years old; (b) those without a confirmed NCD diagnosis; (c) non-residents of Malaybalay City during the third quarter of 2023; (d) with severe cognitive impairments or terminal illnesses, or those receiving palliative care; (e) facing language barriers hindering communication; and (f) pregnant individuals due to specific health considerations.

Instruments. For this study, a set of carefully selected instruments and questionnaires were employed to capture data on key variables of interest. These instruments were designed to provide a comprehensive understanding of the mental well-being, lifestyle, genomic health-related literacy, and quality of life of individuals with non-communicable diseases (NCDs) in Bukidnon, Philippines. Mental Well-Being Questionnaire (Warwick-Edinburgh Mental Well-being Scale) by Tennant et al. (2007) was adopted to measure the mental well-being of the participants. This questionnaire, consisting of 14 items, is a valuable tool to assess mental well-being. Participants rated their well-being experiences on a scale that ranges from 1 (none of the time) to 5 (all of the time). The reliability of this questionnaire, which measures internal consistency among its items, can be assessed using statistical measures like Cronbach's alpha. A higher total score on this questionnaire indicates better mental well-being. The Likert scale represents a score for each item from 1 to 5 respectively, giving a minimum score of 14 and a maximum score of 70. All items are scored positively. The overall score for the WEMWBS is calculated by totaling the scores for each item, with equal weights. A higher WEMWBS score therefore indicates a higher level of mental well-being. A score of mild, moderate, and high. WEMWBS showed good content validity. Confirmatory factor analysis supported the single factor hypothesis. A Cronbach's alpha score of 0.89 (student sample) and 0.91 (population sample) suggests some item redundancy in the scale. WEMWBS showed high correlations with other mental health and well-being scales and lower correlations with scales measuring overall health. Its distribution was near normal and the scale did not show ceiling effects in a population sample. It discriminated between population groups in a way that is largely consistent with the results of other population surveys. Test-retest reliability at one week was high (0.83) (Tennat et al., 2007). A score of 14 – 33 is low/mild, 34 to 52 is moderate, and 53 to 70 is high. Part two of the questionnaire is an adopted instrument called the Lifestyle Questionnaire (DLBQ - Physical Activity and Smoking Behavior) by Lakerveld et al. (2011). The Lifestyle Questionnaire delved into various aspects of lifestyle, including dietary habits, physical activity, and smoking. Each section may encompass items related to attitudes, subjective norms, perceived behavioral control, and intentions. For physical activity, Confirmatory factor analysis showed that one item about cognitive attitude towards being more physically active overlapped with perceived difficulty, which is theoretically plausible (item 6: 'In my opinion, being more physically active is difficult/easy') Therefore we allowed that item to load on both factors. The outcome of the SEM supported the theoretical pre-categorization of all items, and all of the items for the scales were retained for further analysis. The fit indices of the measurement model were: RMSEA = 0.054, CFI = 0.994, and TLI = 0.992. For smoking behavior, the final model remained moderate, possibly due to the relatively small sample size: RMSEA 0.088, CFI = 0.950, and TLI = 0.962. Forty-five percent of the variance in intention to stop smoking was identified (n = 128). Subjective norm ($\beta = 0.38$) and cognitive attitude ($\beta = 0.35$) had the highest association with smoking cessation intention (Lakerveld et al., 2011). For both physical activity and smoking behavior, a score of 1.00 – 1.80 is Very poor (totally disagree), 1.81 – 2.60 is Poor (partially disagree), 2.61 – 3.40 is Fair (neither agree nor disagree), 3.41 – 4.20 is High (partially agree), and 4.21 – 5.00 is Very high (totally agree). Part three of the instrument is an adopted instrument called the Genomic Health-Related Literacy Questionnaire (UNC-GKS) by Lange et al. (2017). The UNC-GKS is designed to assess genomic knowledge using a true or false format, comprising 19 items and providing an option for

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participants to mark "not sure/don't know." Answers for items 1, 2, 3, 5, 6, 7, 10, 11, 15, and 19 are true and answers for items 4, 8, 9, 12, 13, 14, 15, 16, 17, and 18 are false. Scored correct responses as 1 and incorrect responses and not sure/do not know responses as 0. The reliability of this questionnaire can be measured with Cronbach's alpha or similar methods to assess internal consistency. Internal consistency reliability was high (Cronbach's a = 0.86) for the 19-item. While the data collected is typically categorical, some parametric analysis may be possible based on data usage. Interpretation of the UNC-GKS involves calculating the percentage of correct responses to gauge participants' genomic knowledge. Raw scores were transformed into scores. Please refer to the appendix for the raw score transformation. A score of 21.9 – 36.6 is low, 36.7 – 50. 7 is moderate, and 50.8 – 65 is high. A score of 21.9 – 36.6 is low, 36.7 – 50. 7 is moderate, and 50.8 – 65 is high. Part four of the instrument is an adopted instrument called the WHOQOL-BREF is a 26-item instrument consisting of four domains: physical health (7 items (1, 4, 10, 15, 16, 17, & 18)), psychological health (6 items (5, 6, 7, 11, 19, & 26)), social relationships (3 items (20, 21, & 22)), and environmental health (8 items (8, 9, 12, 13, 14, 23, 24, & 25)); it also contains QOL and general health items. Items 3, 4, and 26 are to be reversely scored. Items 1 and 2 are for quality of life and satisfaction with life. Each individual item of the WHOQOL-BREF is scored from 1 to 5 on a response scale, which is stipulated as a five-point ordinal scale. The scores are then transformed linearly to a 0–100 scale (Skevington & Tucker, 1999; Harper & Power, 1999). The quality of life will be used as one concept where all the domains will be added as one. Cronbach's alpha values for physical health, psychological health, social relationships, and environmental health were 0.65, 0.77, 0.52, and 0.79, respectively. The mean item-to-total correlations were 0.76, 0.73, 0.62, and 0.78 for physical health, psychological health, social relationships, and environmental health, respectively. For each WHOQOL-BREF, the factor analysis resulted in only one factor. Taken together, these findings support the unidimensionality of the four scales and the local independence of the items in each scale (Vahedi, 2010). A score of 0 – 20 is very low QOL, 21 – 40 is low QOL, 41 – 60 is moderate WOL, 61 – 80 is high QOL, and 81 – 100 is very high QOL.

Data Gathering Procedures. The Dean of the College of Allied Health Sciences, Graduate Studies, received a letter requesting permission to proceed with the project. After that, the study was presented into a design hearing that was conducted by a group of specialists. There was a search for ethical approval. Following the issuance of the notice to continue, the beginning of the recruitment procedure signified the beginning of the process. The criteria for inclusion and exclusion, as well as the sampling strategy, served as the guiding principles for recruitment. The researcher employed a multi-faceted data collection approach, allowing participants to choose between face-to-face methods or structured surveys, covering aspects such as well-being, lifestyle, genomic health literacy, and quality of life. Genomic health literacy was assessed through educational materials and questions evaluating participants' understanding of genetic factors related to their non-communicable diseases (NCDs). Quality of life was measured using standardized tools, and quality control measures, including data validation, ensured accuracy. After data collection, the information was cleaned, coded, and analyzed using statistical techniques, with participant confidentiality safeguarded. The findings were interpreted through rigorous analysis, identifying significant relationships and patterns to address the research questions.

Statistical Treatment of Data. The study made use of both descriptive and inferential statistics were used in the study: Summation, Mean Score and Standard Deviation, Summation and Multiplication, Pearson r and Multiple Linear Regression

Ethical Considerations. The study was submitted for ethical approval. During the course of the implementation of the study, ethical principles were strictly adhered to in order to ensure the well-being of the individuals who participated in the research. Prior to the collection of data, the study made an effort to obtain approval from the ethics committee.

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RESULTS AND DISCUSSION

Table 1. Level of Mental Well-being of the People with Non-communicable Diseases

Mental Well-being	Average Score	*f*	*%*
Low	28.19	16	4.57
Moderate	45.45	150	42.86
High	60.33	184	52.57
Average Score	52.40	Moderate	

Note: n=350.

Legend: 14 to 33 is low, 34 to 54 is moderate, and 56 to 70 is high.

The table shows that in general the respondents had moderate mental well-being with over half of them having a high level of mental well-being. Also, almost half had high mental well-being while very few had low mental well-being. This is a clear indication that these individuals are moderately valuing the importance of mental well-being. The pandemic had been a wake-up call for everybody. Mental health issues had sparked at the time of the pandemic because of the measures being implemented. Mental health has become a center of concern not just for healthcare providers but also for everyone as well. People tend to become so concerned about their mental health that they search online about how to maintain mental well-being. Further, these individuals had been diagnosed with communicable diseases, and perhaps during their visits with their physicians for a time they may have been advised on taking care of their mental health. However, this finding may also be viewed as negative such that, if nothing is done then this would go in the direction of having a low mental well-being. Thus, this will be addressed in the output plan of the study. However, the moderate finding requires reinforcement to bring improvements to the mental health of these individuals.

People with physical non-communicable diseases (NCDs) have a two to three times increased risk of depression (Lloyd et al., 2018; Mendenhall et al., 2014). Depression and NCDs have a bidirectional relationship with shared biological and environmental determinants (Singer et al., 2017); each condition adversely affects outcomes for the other. Conversely, NCDs, like other stressors, may trigger depression, post-traumatic stress disorder, and other common mental disorders. In addition, mechanisms involved in the onset of cardiovascular diseases, diabetes, cancer, and respiratory disease may also contribute to mental disorders (Stein et al., 2019).

The study of Ramesh et al. (2023) revealed that the overall prevalence of depression was high, anxiety was moderate, and stress was moderate among the study participants. The findings of the study show that there is a statistically significant association, the odds of diabetes were 2 times higher, the presence of hypertension was nearly 4.1 times higher and the odds of the presence of visual impairment were nearly 1.8 times higher in developing the symptoms of depression.

The findings are important concerning healthcare as in most cases, patients are treated in terms of the non-communicable disease that they have. Very often, mental well-being is forgotten. Thus, this finding will be very helpful in the development of the quality of life enhancement plan.

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Table 2. Extent of Lifestyle in terms of Physical Activity

Items	Mean score	SD	Interpretation
1. In my opinion, being more physically active is unpleasant or pleasant	1.97	.183	Partially unpleasant
2. In my opinion, being more physically active is frustrating or satisfactory	1.94	.250	Partially frustrating
3. In my opinion, being more physically active is bad or good	1.98	.159	Partially bad
4. In my opinion, being more physically active is unimportant or important	1.98	.168	Partially unimportant
5. In my opinion, being more physically active is undesirable and desirable	1.91	.313	Partially undesirable
6. In my opinion, being more physically active is difficult or easy	1.61	.522	Difficult
7. My partner thinks that I should be more physically active	3.74	1.57	Partially agree
8. My family thinks that I should be more physically active	4.15	1.21	Partially agree
9. My friends think that I should be more physically active	3.93	1.28	Partially agree
10. I am able to be more physically active under normal circumstances	3.95	1.26	Partially agree
11. I am able to be more physically active, even when I am busy or on holidays	3.62	1.33	Partially agree
12. I find it difficult to be more physically active under normal circumstances*	3.57	1.35	Partially agree
13. I find it difficult to be more physically active when I am busy*	3.71	1.39	Partially agree
14. When I have not been able to be physically active for a while (e.g., because of illness) it is hard for me to start again*	3.68	1.44	Partially agree
15. I intend to be more physically active within two months	3.58	1.41	Partially agree
Grand mean	3.02	.446	Fair

Note: n=350. *- Reversely Scored

Legend: A score of 1.00 – 1.80 is Very poor (totally disagree), 1.81 – 2.60 is Poor (partially disagree), 2.61 – 3.40 is Fair (neither agree nor disagree), 3.41 – 4.20 is High (partially agree), and 4.21 – 5.00 is Very high (totally agree).

The table shows that the lifestyle in terms of physical activity of the respondents was moderate. Specifically, they believe that it is partially unpleasant, partially frustrating, partially bad, partially unimportant, partially undesirable, and partially difficult to be more physically active. Further, the respondents only partially agree that their partner, their family, and their friends think that they should be more physically active. Also, they partially agreed and reported feeling able to maintain physical activity even when busy or on holiday, while others indicated difficulty staying active under normal circumstances and during busy periods. Lastly, they partially agree that when they have not been able to be physically active for a while it is hard for them to start again; and they intend to be more physically active within two months.

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A moderate finding can be both positive and negative as it is in the middle grounds. It becomes positive as it has the possibility of becoming high. And this can only happen if something is being done to improve the lifestyle. More health teachings should be imparted to the respondents, as part of the health teachings provided by their doctors is perhaps about healthy lifestyles to promote health as they have non-communicable diseases. Maybe in one of their visits with their doctors, part of the teachings provided are about a healthy lifestyle. Further, it is negative because of the possibility of going to a low lifestyle. By becoming lax and unconcerned. Thus, this finding shall also be noted and be addressed in the output plan of the study. The results of the study by Nurhasan et al. (2020) showed that the level of physical activity in the light category was few, the moderate category was almost half, and the high category was over one third. Physical fitness showed musculoskeletal fitness in male and cardiorespiratory fitness in female need to be improved.

In the study of Alhammad et al. (2023) physical activity prevalence was over fifty percent, with walking being the most common activity. Lack of time was the primary reason for inactivity. On average, students engaged in 1.5 hours/day of vigorous-intensity activities and 1.3 hours/day of vigorous-intensity sports and fitness activities at work. Sedentary behavior, characterized by continuous sitting, averaged 5.37 hours per day. Approximately half of the respondents were physically active, while few relied solely on short walks due to time constraints, limited activity hours, or sedentary habits. A lack of time was cited as the primary reason for inactivity by most respondents.

For individuals with non-communicable disease, it is important to establish physical activity as may be recommended by their physicians. These will promote physical well-being and can contribute to quality of life in general. The findings are significant in the context of healthcare because, in the majority of cases, patients are treated within the framework of the non-communicable ailment that they are suffering from. That is why the findings are significant. When it comes to counseling and health education, it is quite uncommon for there is a lack of emphasis placed on the modification of lifestyle choices. Consequently, this discovery will prove to be of tremendous aid in the process of designing the plan for enhancing the quality of life, which will ultimately result in enhanced quality of life. A person who suffers from a non-communicable disease can make significant improvements to their health and well-being by making changes to their lifestyle, such as engaging in physical activities.

Table 3. Extent of Lifestyle in terms of Smoking Behavior

Items	Mean score	SD	Interpretation
1. In my opinion, to stop smoking is unpleasant or pleasant	1.89	.312	Partially unpleasant
2. In my opinion, to stop smoking is frustrating or satisfactory	1.90	.313	Partially frustrating
3. In my opinion, to stop smoking is bad or good	1.90	.310	Partially bad
4. In my opinion, to stop smoking is unimportant or important	1.90	.313	Partially unimportant
5. In my opinion, to stop smoking is undesirable or desirable	1.88	.334	Partially undesirable
6. In my opinion, to stop smoking is difficult or easy*	1.55	.503	Difficult
7. My partner thinks that I should stop smoking	3.92	1.41	Partially agree
8. My family thinks that I should stop smoking	4.13	1.24	Partially agree
9. My friends think that I should stop smoking	4.06	1.22	Partially agree
10. I am able to smoke less under normal circumstances	3.33	1.42	Neither agree nor disagree
11. I am able to stop smoking under normal circumstances	3.73	1.27	Partially agree
12. I am able to refrain from smoking even when others offer me a cigarette/cigar	3.84	1.34	Partially agree

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13. I am able to refrain from smoking when others around me are smoking	3.96	1.31	Partially agree
14. I am able to refrain from smoking under stressful circumstances	3.87	1.35	Partially agree
15. I find it difficult to smoke less under normal circumstances	3.19	1.56	Neither agree nor disagree
16. I find it difficult not to smoke when others around me are smoking*	2.94	1.58	Neither agree nor disagree
17. I find it difficult not to smoke when others insist or offer me a cigarette*	2.95	1.59	Neither agree nor disagree
18. I find it difficult not to smoke under stressful circumstances*	3.01	1.55	Neither agree nor disagree
19. I think that I will stop smoking within the next two months	3.17	1.58	Neither agree nor disagree
20. I intend to stop smoking within a year	3.28	1.48	Neither agree nor disagree
21. I do not intend to stop smoking	2.79	1.54	Neither agree nor disagree
Grand mean	3.01	.593	Fair

Note: n=350. * Reversely Scored.

Legend: A score of 1.00 – 1.80 is Very poor (totally disagree), 1.81 – 2.60 is Poor (partially disagree), 2.61 – 3.40 is Fair (neither agree nor disagree), 3.41 – 4.20 is High (partially agree), and 4.21 – 5.00 is Very high (totally agree).

The table shows that respondents had a moderate lifestyle on smoking behaviors. They believe that stopping smoking was partially unpleasant, partially frustrating, partially bad, partially unimportant, partially undesirable, and difficult. They partially agree that their partners, their family, and their friends think that they should stop smoking, they can stop smoking under normal circumstances, and they can refrain from smoking even when others offer them a cigarette/cigar, others around me are smoking, and under stressful circumstances. However, they neither agree nor disagree that they can smoke less under normal circumstances, they find it difficult to smoke less under normal circumstances, and they find it difficult not to smoke when others around them are smoking. Also, they neither agree nor disagree that they find it difficult not to smoke when others insist or offer them a cigarette and under stressful circumstances. Lastly, they neither agree nor disagree that they think that they will stop smoking within the next two months, they intend to stop smoking within a year, and they do not intend to stop smoking. A new cohort study has provided compelling evidence that quitting smoking can lead to improved mental health outcomes among people with and without mental health disorders, alleviating concerns raised by both clinicians and smokers (Wu et al., 2023).

In the study of Pierce (2022), among the participants who had ever smoked, over half reported that they had already quit, and the mean age of quitting was 38 years. Quitting smoking before age 44 years was associated with a reduction in mortality that was almost a quarter higher than that associated with never smoking, and this was consistent across all sociodemographic groups studied. For smokers who quit between ages 45 and 54 years, the smoking-associated mortality rate was 47 percent higher than that among never smokers. Quitting at these ages was associated with a substantial benefit compared with continuing smoking.

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Engagement in smoking makes it more harmful to individuals with non-communicable diseases. It is recommended that smoking be eliminated as a behavioral modification. The findings are significant in the context of healthcare since, in the majority of instances, patients are treated within the context of the non-communicable condition that they are suffering from. It is fairly uncommon for counseling and health education to not place a significant amount of emphasis on the change of lifestyle choices. As a result, this discovery will prove to be of great assistance in the process of formulating the strategy for improving the quality of life. Modifying lifestyle in terms of engagement and avoiding smoking can greatly contribute to the health and wellness of a person with non-communicable disease.

Table 4 Level of Genomics Health-related Literacy among individuals with NCDs

Literacy	Average Score	*f*	%
Low	34.02	5	1.43
Moderate	44.22	328	93.71
High	54.02	17	4.86
Average Score	44.55	Moderate	

Note: n=350.

Legend: A score of 21.9 – 36.6 is low, 36.7 – 50. 7 is moderate, and 50.8 – 65 is high.

The table shows that the genomics health-related literacy was moderate. Specifically, almost all of the respondents had moderate literacy. Very few had high and low literacy. The literacy of the respondents was based on the fact that they know that genes are made of DNA, that genes affect health by influencing the proteins our bodies make, and that all of a person's genetic information is called his or her genome. Further, they know that the DNA in a gene is made of four building blocks (A, C, T, and G) and that everyone has about 20,000 to 25,000 genes. Furthermore, they also know that gene variants can have positive effects, harmful effects, or no effects on health and some gene variants have a large effect on health while others have a small effect. Lastly, participants have some understanding of genomics. They recognize that certain gene variations can decrease the likelihood of developing a disorder. Additionally, they seem aware that if a parent carries a particular gene variant, there's a possibility their siblings might inherit it as well.

However, they know that a person's genes do not change completely every seven years, that most gene variants do not affect a person's health, that everyone who has a harmful gene variant will not have symptoms, that two unrelated people with the same genetic variant do not always have the same symptoms, and those genetic disorders are not always inherited from a parent. Also, they know that if only one person in the family has a disorder it can be genetic, that everyone has a chance to have a child without a genetic disorder, that a girl does not inherit most of her genes from her mother while a boy does not inherit most of his genes from his father, that a mother and daughter who do not look alike are more genetically similar than a mother and daughter who look alike, and that if a parent has a harmful gene variant, not all of his or her children will inherit it.

Similarly, the path analysis, which was done by creating a path diagram revealing the relationship of the three components with risk and benefit perception, revealed that genetic and genomic knowledge and interactive and critical health literacy affected the respondents' intention to undergo genetic testing via recognition of the benefits of such testing (Miyoshi & Watanabe, 2023).

According to Sabatello et al. (2019), genomic literacy among children and young people, especially adolescents, is of increasing importance. The ever-expanding prevalence of genetics in everyday life

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includes ancestry testing; the increasing number of clinical genetic tests; the rise of research endeavors that utilize genome and exome sequencing, enroll pediatric participants, and offer families genetic results; and the professional opportunities in genomics that increasingly are available for adolescents as they train to enter the workforce (e.g., bioinformatics, genetic counseling).

The results of the study Donovan et al. (2020), demonstrated that students with higher genomics literacy (relative to those with lower genomics literacy) exhibited greater reductions in the perception of racial differences and greater reductions in belief in genetic essentialism after learning how patterns of human genetic variation refute genetic essentialism. These results suggested that genetics education can protect respondents from developing a belief in genetic essentialism when it provides them with opportunities to learn multifactorial genetics and population thinking in conjunction with how these concepts refute essentialist thinking.

Literacy in genomics may not be something new to the respondents. They may have initiated surfing the internet especially when they have non-communicable diseases that are hereditary. This could have prompted them to research about genomics. In this age of technology. Access to this information is a click away. Though it is only moderate, for it to reach high, something should be done, perhaps specific activities to improve literacy should be pointed out in the output plan of the study. The finding is important for health care because most non-communicable diseases are hereditary. Patients must learn about a disease's etiology to better grasp it.

Table 5. Quality of Life among Individuals with NCDs

Physical Health	Average Score	*f*	%
Very Low	11.80	5	1.43
Low	34.76	17	4.86
Moderate	52.10	143	40.86
High	66.91	169	48.29
Very High	85.75	16	4.57
Average Score	59.37	Moderate	
Psychological Health			
Very Low	6.00	4	1.14
Low	32.47	15	4.29
Moderate	52.26	101	28.86
High	69.15	159	45.43
Very High	83.11	71	20.29
Average Score	64.81	Moderate	
Social Relations			
Very Low	12.5	10	2.86
Low	27.67	27	7.71
Moderate	51.67	104	29.71
High	73.35	124	35.43
Very High	92.79	85	24.29
Average Score	66.37	Moderate	
Environmental Health			
Very Low	20	3	0.86

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Low	28.27	15	4.29
Moderate	51.81	96	27.43
High	68.79	172	49.14
Very High	86.56	64	18.29
Average Score	65.23	Moderate	
Overall Quality of Life			
Very Low	16.5	4	1.14
Low	37.71	13	3.71
Moderate	52.31	113	32.29
High	70.44	190	54.29
Very High	84.33	30	8.57
Average Score	63.95	Moderate	

Note: n=350.

Legend: A score of 0 – 20 is very low QOL, 21 – 40 is low QOL, 41 – 60 is moderate WOL, 61 – 80 is high QOL, and 81 – 100 is very high QOL.

Physical Health. The respondents had a moderate level of physical health. In detail, almost half of the respondents had high while over one third had moderate. Few had very high, low, and very low physical health. This implies that they experience moderate physical pain preventing them from doing what they need to do and that they need moderate medical treatment to function in their daily lives. Also, the data suggests they have enough energy for most activities and can get around reasonably well. Furthermore, their responses indicate a neutral perception of their sleep quality, ability to perform daily tasks, and work capacity. This finding is both positive and negative, the respondents for a time had been able to seek consultation with a physician as they have been diagnosed to have a non-communicable disease, and part of the health counseling that physicians provide is staying healthy. To further heighten this, respondents can easily access information about physical activities online. It is just a click away. Somehow, this is a personal responsibility. Taking action is the key to gaining high levels of physical health to gain high levels of quality of life. Reinforcing physical activities is a plan that will be included in the output plan. Supporting the finding, according to the results of the study of Vakili et al. (2012), the physical domain is only significant between the two groups. Furthermore, the study indicates QoL is in the middle level for all respondents.

Psychological Health. The respondents had a moderate level of psychological health. Diving deeper, over half of the respondents scored high in QoL for psychological health while almost half of them scored high in positive affect on QoL. Almost a quarter reported very high scores in this domain, and very few respondents fell into low or very low psychological health. This implies that they moderately enjoy life, they moderately feel their life to be meaningful and they were moderately able to concentrate. Also, they moderately were able to accept their bodily appearance. Further, they were neither satisfied nor dissatisfied with themselves and moderately they had negative feelings, such as blue mood, despair, anxiety, and depression. Respondents should have known better: advent of the pandemic has greatly influenced everybody in taking mental health a priority. This is something that people learned from the pandemic. Though the respondents had only a moderate level of psychological health which means that there is a need to reinforce information or activities that would lift psychological health as a means of achieving quality of life. Thu, this will be addressed also in the output plan as both a responsibility of the healthcare providers and as a personal responsibility of the patient.

Contrary to the findings, the psychological and social QoL scores were lower than the non-pandemic norms of the general population, while the physical health and environmental QoL scores were comparable. After adjusting for relevant demographic, personal, and clinical variables, religious coping, the greater number of

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hours of online classes attended, and greater social support from family, friends, and significant others were significantly associated with higher QoL among the participants (Leong Bin Abdullah et al., 2021).

Social Relations. The data suggest respondents had a moderate level of social relations. A closer look reveals that over one third of the respondents score high in social support indicating they have a strong social relationship with people they can rely on. Additionally, over a quarter scored moderate in social support. While the data showed some participants with very high social relations (almost a quarter), it is important to note that very few fell into the low or very low social relations. This suggests that the respondents were neither satisfied nor dissatisfied with their relationships, with their sex life, and with the support they get from their friends. It could be that their relationship with family, friends, and relatives may have been affected because of the nature of their non-communicable disease. For example, diabetes and hypertension may greatly affect sex life. Issues relating to impotence may be triggered. Also, at some point, the diagnosis of their illness may cause some depression that they tend to not communicate. Again, this factor requires to be addressed in the output plan to be increased. The individual with a non-communicable disease must get all the support he or she needs and establishing good relationships with family, friends, and relatives are very essential.

Contrary to the finding, results in the study of Pasquetti et al. (2021) revealed that quality of life with lower mean in the physical domain and higher in the psychological domain. Results with statistical differences for age group in the physical, psychological, and environment domains, and with the variables color and profession in the environment domain.

Environmental Health. The respondents had a moderate level of environmental health. In detail, almost half of the respondents had high while over a quarter had moderate. Few had very high and very few had low and very low levels of environmental health. This implies that the respondents were moderately safe in their daily life and their physical environment. Lastly, they had enough money to meet their needs, information that they needed in their day-to-day life was moderately available, and they had the opportunity for leisure activities. Furthermore, they were neither satisfied nor dissatisfied with the conditions of their living place, with their access to health services, and with their mode of transportation. Environmental health is almost always neglected to affect quality of life. Individuals should be able to take full responsibility for the environment to positively impact their lives. Because they have non-communicable diseases they may have a hard time making their environment healthy. There might be difficulties in financial resources at their illnesses entail check-ups and maintenance medications. Nevertheless, environmental health will be emphasized in the output plan as well as this also impacts quality of life. Contrary to the findings, in the present study of Vishwaraj and Algoodkar (2020), out of 200 patients with NCDs, a quarter reported poor QoL, and very few reported very poor QoL, among few had DM, few had HTN and had both DM and HTN. With an increase in NCD prevalence, the QoL decreases.

Overall Quality of Life. The respondents had a moderate level of quality of life. A breakdown of the scores reveals, majority of the respondents had a high quality of life and over one third had moderate QoL. Very few participants fell into the very high or very low quality of life. Contrary to the finding, in the study of Hassan et al. (2022), patients with NCDs experienced a lower quality of life in the psychological, social, and environmental domains of QoL. Results from the multivariate regression analysis showed that female gender, psychological QoL, social QoL, and environmental QoL significantly relate to adherence to healthcare.

The fact that they are suffering from a non-communicable disease may have contributed to this finding. It would seem that they gave in to the illness and that they are being defeated to submit to a non-active life and assume the role of the sick. Thus, these individuals must be empowered and be given information that being sick with a non-communicable disease is not a death sentence and that a high quality of life can still be achieved with modifications in life. Looking into the quality of life of individuals having a non-communicable disease is a concern of health care. This should also be a component of care as this is an important information on how well are individuals coping with their diseases.

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Table 6 Interrelationship between Mental Well-being, Lifestyle, Genomics Health-related Literacy, and Quality of life

Variables	r value	*p* value	Decision	Interpretation
Mental Well-being vs. Lifestyle (Physical Activity)	.147	.006	Reject Ho	Significant
Mental Well-being vs. Lifestyle (Smoking behavior)	-.075	.160	Failed to reject Ho	Not significant
Mental Well-being vs. Genomics Health-related Literacy	-.093	.082	Failed to reject Ho	Not significant
Mental Well-being vs. Quality of life	-.076	.158	Failed to reject Ho	Not significant
Lifestyle (Physical Activity) vs. Genomics Health-related Literacy	-.068	.205	Failed to reject Ho	Not significant
Lifestyle (Physical Activity) vs. Quality of Life	.087	.104	Failed to reject Ho	Not significant
Lifestyle (Smoking Behavior) vs. Genomics Health-related Literacy	.070	.191	Failed to reject Ho	Not significant
Lifestyle (Smoking behavior) vs. Quality of Life	.354	.000	Reject Ho	Significant
Genomics Health-related Literacy vs. Quality of life	.893	.000	Reject Ho	Significant

Legend: Significant if *p* value is $\leq .05$. Pearson r interpretation: A value greater than .5 is strong (positive), between .3 and .5 is moderate (positive), between 0 and .3 is weak (positive), 0 is none, between 0 and –.3 is weak (negative), between –.3 and –.5 is moderate (negative), and less than –.5 is strong (negative).

The table shows that the *p* values for the correlation between Mental Well-being vs. Lifestyle (Physical Activity), Lifestyle (Smoking behavior) vs. Quality of Life, and Genomics Health-related Literacy vs. Quality of life were lesser than the significant value of .05. These values were interpreted as significant, leading to the decision of rejecting the null hypothesis. Thus, mental well-being was significantly correlated with lifestyle (physical activity). When a person is mentally well, he can engage in almost all activities. He can participate or engage in physical activities well. Thus, being mentally healthy affects being physically active or healthy as well.

Supporting the findings, research shows that people who exercise regularly have better mental health and emotional well-being, and lower rates of mental illness. Taking up exercise seems to reduce the risk of developing mental illness. It also seems to help in treating some mental health conditions, like depression and anxiety (Better Health Channel, 2021). According to Patcha (2024), numerous studies have shown that engaging in physical exercise has a direct influence on the control of mood, the reduction of stress, and the treatment of disorders such as anxiety and depression. These results have ramifications for a wide range of age groups and demographics, including adolescents, adults, and the elderly, among others.

Further, lifestyle (smoking behavior) was significantly correlated with quality of life. Smoking has a lot of negative effects, but by avoiding smoking one becomes healthy and does not suffer any smoking-related illnesses thus, achieving a high level of quality of life as well. Supporting the finding, according to the study of Taylor et al. (2021), for all primary outcomes, smoking cessation was associated with an improvement in mental health symptoms compared with continuing to smoke: anxiety symptoms; depression symptoms; mixed anxiety and depression symptoms.

According to the results of a recent systematic review, quitting smoking may produce positive health effects in a matter of weeks. The review found that people who quit smoking had a greater reduction in anxiety, depression, and symptoms of stress than people who did not. If accurate, these findings could help motivate

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millions of people looking for more reasons to quit smoking or avoid stopping for fears of negative mental health or social effects (Huizen, 2021).

Furthermore, genomics health-related literacy was significantly correlated with quality of life. Gaining high levels of health-related information is always positive as this information can be used positively as well. This information will positively influence practicing activities that allow the person to gain wellness. Being healthy will influence the quality of life. Similarly, in the study relating to health literacy, in the study of Li et al. (2024) the mean health literacy level of older adults in nursing homes was relatively low. Health-related quality of life scores were moderate. There were statistically significant differences in the effects of health literacy, education level, former occupation (professional), marital status (widowed), and race on health-related quality of life.

However, the *p* values for the correlations between Mental Well-being vs. Lifestyle (Smoking behavior), Mental Well-being vs. Genomics Health-related Literacy, Mental Well-being vs. Quality of life, Lifestyle (Physical Activity) vs. Genomics Health-related Literacy, Lifestyle (Physical Activity) vs. Quality of Life, and Lifestyle (Smoking Behavior) vs. Genomics Health-related Literacy were greater than the significant value of .05 which led to the decision of failing to reject the null hypothesis. Thus, mental well-being did not correlate with lifestyle (smoking behavior) and genomics health-related literacy. This implies that a high level of lifestyle (smoking behavior) and genomics health-related literacy can be achieved despite low mental well-being.

Contrary to the findings, according to the National Health Service (2024), when people stop smoking, studies show anxiety, depression, and stress levels are lower; quality of life and positive mood improve; the dosage of some medicines used to treat mental health problems can be reduced.

Also, in multivariable models, limited health literacy was associated with lower genetic knowledge, lower awareness of family health history (FHH), greater perceived importance of genetic information but lower perceived importance of FHH information, and more frequent communication with a doctor about FHH. The findings highlight the importance of considering domains of genomics-related health literacy (e.g., knowledge, oral literacy) in developing educational strategies for genomic information. Health literacy research is essential to avoid increasing disparities in information and health outcomes as genomic information reaches more patients.

Further mental well-being did not correlate with quality of life and lifestyle (physical activity) did not also correlate with genomics health-related literacy. In the same way, a high level of quality of life can be achieved despite low levels of mental well-being and low levels of lifestyle (physical activity). Contrary to the findings, the result of the study of Singh et al. (2021) showed that there is a significant impact on quality of life which shows poor well-being/QoL that is affected by the indicators of mental health.

Also, contrary to the findings, according to Mahindru et al. (2023) regular physical activity improves the functioning of the hypothalamus pituitary adrenal axis. Depression and anxiety appear to be influenced by physical exercise but to a smaller extent in the population than in clinical patients. Numerous hypotheses attempt to explain the connection between physical fitness and mental wellness. Physical activity was shown to help with sleep and improve various psychiatric disorders. Exercise in general is associated with a better mood and improved quality of life. Physical exercise and yoga may help in the management of cravings for substances, especially in people who may not have access to other forms of therapy. Evidence suggests that increased physical activity can help attenuate some psychotic symptoms and treat medical comorbidities that accompany psychotic disorders.

Furthermore, lifestyle (physical activity) did not correlate with quality of life, and lifestyle (smoking behavior) did not correlate with genomics health-related literacy. Also, a high level of genomics health-related literacy can be achieved despite a low level of lifestyle (physical activity) and lifestyle (smoking behavior).

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According to the study of Zangger et al. (2024), higher digital health literacy is positively associated with higher physical activity levels. This highlights the importance of screening and promoting digital health literacy in managing digital health and digital physical activity interventions.

By analogy, the study of Jayakumar et al. (2023) revealed that health literacy was good, though the physical activity scores indicated more inactive people. Majority had normal muscle strength and average to above average level of flexibility, but muscle endurance was greatly affected owing to an unacceptable physical fitness index. The study demonstrates a significant association between health literacy, physical activity, and physical fitness level among adults.

According to the study of Sun et al. (2023), after adjusting for other influences, smokers with lower health literacy were less likely to have intention to quit. And the association between knowledge about smoking hazards and whether smokers have the intention to quit is no longer significant, but it significantly affects the intensity of the intention to quit among smokers who already have the intention.

The interrelationships among the variables are important factors when one is developing a plan of care for the individuals. These areas should also be assessed and addressed in providing health teaching and counseling to these individuals as they affect their quality of life.

Table 7 Mental Well-being, Lifestyle, Genomics Health-related Literacy Predicting Quality of Life

Variables	B	Std Error	Beta	t	*p* value	Decision	Interpretation
(Constant)	-.053	.303		-.176	.860		
Mental Well-being	.001	.002	.011	.607	.545	Failed to reject Ho	Not significant
Lifestyle (Physical activity)	.300	.047	.114	6.412	.000	Reject Ho	Significant
Lifestyle (Smoking Behavior)	.555	.035	.280	15.863	.000	Reject Ho	Significant
Genomics Health-related Literacy	.254	.005	.882	50.195	.000	Reject Ho	Significant

Legend: Significant if *p* value is $\leq$ .05. If R-squared value < 0.3 is None or Very weak effect size, if R-squared value 0.3 < r < 0.5 is Weak or low effect size, if R-squared value 0.5 < r < 0.7 is Moderate effect size, and if R-squared value r > 0.7 is Strong effect size.

The table shows that the *p* values for lifestyle on physical activity, lifestyle on smoking behavior, and genomics health-related literacy were lesser than the significant value of .05. These values were interpreted as significant, leading to the decision to reject the null hypothesis. Thus, lifestyle on physical activity, lifestyle on smoking behavior, and genomics health-related literacy predicted quality of life.

Firstly, engaging in physical exercise indeed is one key factor in attaining quality of life. Physical exercise promotes health and wellness. When a person is healthy ultimately, he will also gain high levels of quality of life as he can do almost anything in life. According to Better Health Channel (2023), physical activity or exercise can improve health and reduce the risk of developing several diseases like T2D, cancer, and cardiovascular disease. Physical activity and exercise can have immediate and long-term health benefits. Most importantly, regular activity can improve quality of life. Also, in the study of Gill et al. (2013), findings suggest that physical activity contributes to multiple aspects of quality of life, that social and emotional benefits are primary motivators and outcomes for participants, and that the meaning of quality of life and physical activity benefits is subjective and contextualized, varying across individuals and settings.

Secondly, avoidance of smoking is another way of promoting health and wellness. Similar to physical activity, this promotes well-being and therefore helps achieve higher levels of quality of life. In the study of Piper et al. (2012), compared to continuing smokers, quitters showed improved global quality of life, health-related quality of life, and affect at year one and three and fewer stressors by year three. Successful quitters,

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in contrast to continuing smokers, reported improved subjective well-being, which could be used to motivate quit attempts by individuals with concerns about what life would be like without cigarettes.

Lastly, it has always been said that knowledge is power. Gaining knowledge on genomics health-related information is indeed power. Knowledge is somehow converted into practice and therefore the learned information can be put to practice, which promotes higher levels of quality of life. By analogy, the study of Couture et al. (2017) suggested that there is no relationship between health literacy and the physical and mental components of quality of life among frequent users of health care services.

The predictions were positive as indicated in the t values. A unit increase in lifestyle on physical activity, lifestyle on smoking behavior, and genomics health-related literacy, create a 6.412, 15.863, and 50.195 increase in the quality of life respectively.

The model summary showed that the r-value was .946, the r-squared value was .895, the adjusted r-square was .894, the standard error of the estimate was .38237, the F value was 737,571, and sig. values was .000. Thus, the model equation is as follows:

Quality of Life = -.053 + 6.412 (lifestyle on physical activity) + 15.863 (lifestyle on smoking behavior) + 50.195 (genomics health-related literacy)

The equation reads that quality of life is the result of the constant value of -.053 plus 6.412 of lifestyle on physical activity plus 15.863 of lifestyle on smoking behavior plus 50.195 of genomics health-related literacy. Based on the model summary, the r-squared value was .895 which indicates that the total variation in the quality of life can be explained by the independent variables of lifestyle on physical activity, lifestyle on smoking behavior, and genomics health-related literacy. In this case, 89.50 percent can be explained which has a strong effect. This means that the variables of lifestyle on physical activity, lifestyle on smoking behavior, and genomics health-related literacy predicting quality of life had a strong effect. Thus, the regression model was also strong. Based on the significant value of .000, the regression model predicts the dependent variable significantly. The value was equal to .000 and indicates that, overall, the regression model statistically significantly predicts the outcome variable (i.e., it is a good fit for the data).

However, the *p-value* for the independent variable of mental well-being was greater than the significant value of .05 which was interpreted as not significant which further meant that it did not predict quality of life. Therefore, quality of life is not influenced by mental well-being. There can still be a high level of quality of life no matter what level the mental well-being of the person.

Contrary to the finding, according to the study by Phan et al. (2022), there was a relationship between mental health and the health-related quality of life among healthcare workers. Integration of healthy lifestyles and psychological support can help improve mental health and quality of life for healthcare workers. Also, in the study of Ausin et al. (2020), the variables that have the greatest impact on quality of life (QoL) are as follows: a greater number of physical and psychological symptoms, experiencing financial difficulties, and the presence of a psychological disorder, while continuing to work has a positive effect on QoL. Physical and mental disorders have a similar impact on QoL. The presence of a greater number of psychological symptoms (without necessarily fulfilling the criteria of a mental disorder) is a predictive variable of worse QoL. Mental health has a burden on the QoL of people over 65 years of age which is as powerful as physical health.

Also, the results of the study of AhmadiGatab et al. (2011) showed that there was a significant relationship between psychological health, happiness, and life quality. The respondents whose psychological health was higher were happier and had higher life quality. The result of the study of Singh et al. (2021) showed that there is a significant impact on quality of life which shows poor well-being/QoL that is affected by the indicators of mental health.

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Thus, it is important to strive to make sure that physical exercise is being done, smoking is being avoided, and literacy on genomic health-related information is gained to be able to achieve higher levels of quality of life. In the process of formulating a care plan for persons, the interrelationships that exist between the variables are significant aspects to take into consideration. Considering that these aspects have an impact on the quality of life, they must be evaluated and addressed while delivering health education and counseling to the individuals in question.

As a limitation of the study, the lifestyle part of the study is only utilizing the instrument on physical activity and smoking behavior. The diet aspect of the lifestyle was excluded.

AGBAYANI'S TRI-DIMENSIONAL QUALITY OF LIFE MODEL FOR PEOPLE WITH NON-COMMUNICABLE DISEASE

By: Hazel P. Agbayani (2024)

Generalizations. A high quality of life is achieved when a person engages in a lifestyle of engaging in exercise and avoiding smoking as well as gaining literacy on health-related genomics.

Assumptions

-Quality of life is achieved by practicing a lifestyle of engaging in physical activities or exercise;

-Quality of life is achieved by practicing a lifestyle of avoiding smoking; and

-Quality of life is achieved by gaining literacy about genomics health-related information.

Definition of Terms

The following terms are defined operationally as applied in the model, to wit:

Quality of Life. This refers to a multidimensional construct encompassing the physical, psychological, social, and environmental well-being of a person.

Physical Activity Lifestyle. This refers to the desire to become physically active under normal circumstances with influence from family, and friends.

Avoiding Smoking Lifestyle. This refers to the desire to avoid smoking under normal circumstances with influence from family, and friends.

Literacy on Genomics Health-related. This refers to the literacy relating to genetics and genomes.

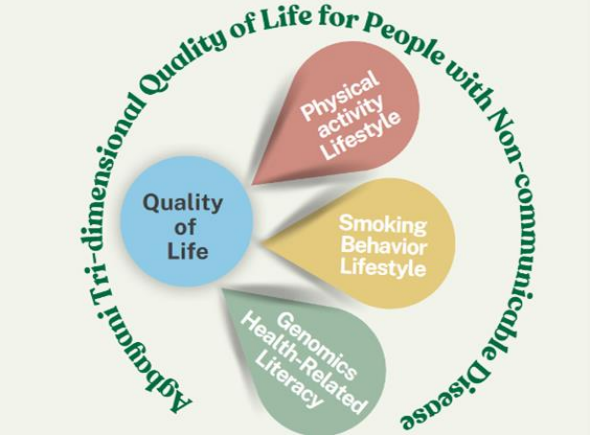

Figure 2 Schematic Diagram of the Agbayani Tri-dimensional Quality of Life for People with Non-communicable Disease

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DISCUSSION

The model is tri-dimensional as it focuses on three focal points. The first dimension is engaging in physical activity. Active participation in a lifestyle that emphasizes physical activity is the primary focus of attention. A person is said to have a lifestyle that includes engaging in physical exercise if they find it to be pleasurable, satisfying, good, important, desirable, and easy to be more physically active. When it comes to engaging in physical activity, partners, family members, and friends all have a voice. It also indicates that for them to be physically active, they need to be physically active under regular conditions, even when they are busy or on vacation, and that it is simple for them to accomplish this. And that even though they have been inactive for a period of time, it is not difficult for them to take up where they left off and become more physically active. According to Better Health Channel (2023), physical activity or exercise can improve health and reduce the risk of developing several diseases like type II diabetes, cancer, and cardiovascular disease. Physical activity and exercise can have immediate and long-term health benefits. Most importantly, regular activity can improve quality of life.

Also, in the study of Gill et al. (2013), findings suggest that physical activity contributes to multiple aspects of quality of life, that social and emotional benefits are primary motivators and outcomes for participants, and that the meaning of quality of life and physical activity benefits is subjective and contextualized, varying across individuals and settings.

The second dimension is avoiding smoking. An act in which a person believes that quitting smoking is pleasurable, gratifying, good, important, desirable, and easy is the second dimension of having a lifestyle that is centered on avoiding smoking. Also, a person's partners, family members, and friends can have an impact on their decision to abstain from smoking. The individual can quit smoking under normal circumstances, can refrain from smoking even when others give them a cigarette or cigar, can prevent himself from smoking even when others around him are smoking, and can quit smoking even when they are under stressful circumstances. To do this, they should be able to smoke less under regular circumstances, and it should be easy for them to smoke less under normal circumstances. Additionally, they should find it difficult to refrain from smoking when they are surrounded by people who are smoking. In addition, this can be accomplished when it is simple to refrain from smoking, even when other people insist on or offer them a cigarette, and when confronted with stressful situations. Last but not least, this can be accomplished when the individual has decided to quit smoking and has the intention of doing so within the next year. In the study of Piper et al. (2012), compared to continuing smokers, quitters showed improved global quality of life, health-related quality of life, and affect at years one and three and fewer stressors by year three. Successful quitters, in contrast to continuing smokers, reported improved subjective well-being, which could be used to motivate quit attempts by individuals with concerns about what life would be like without cigarettes.

According to Oldfield (2024), people who quit smoking see major gains in life expectancy after just a few years. A study shows that smokers who quit smoking before age 40 can expect to live almost as long as those who never smoked. Those who quit at any age return close to never-smoker survival 10 years after quitting, and about half that benefit occurs within just three years.

The acquisition of knowledge concerning genomes to health is the third dimension. Having a good understanding of genetics and genomes is necessary. A greater understanding of how genes, which are qualities that are passed down from one generation to the next, influence the likelihood of developing particular health disorders is something that should be made available to the general public. In addition, their health needs to be aware of whether or not diseases such as cancer, diabetes, stroke, or heart disease are prevalent in their family. The individual will be able to take the required safeguards and preventative measures to obtain wellness if they are aware of this information or if they acquire literacy on these topics. According to the Genomics Education Programme (2024), genomics plays a role in the management of a range of medical conditions. It is well established that the majority of rare diseases have a genetic basis, but genomic testing is also increasingly being used for patients with cancer and other conditions.

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All these three dimensions when achieved can lead to quality of life. Unlike other theories of quality of life, this theory emphasizes only three dimensions, one is engagement in physical activity, second is avoiding smoking, and third is gaining literacy on health-related genomics.

Contrary to the Quality of Life Model by Lawton (1991). Lawton conceptualized the QoL model through four (4) components including behavioral competencies, perceived quality of life, the objective environment, and psychological well-being. The first domain, behavioral competence, concerns how well a person functions in the areas of physical health (body and organs), functional health (ADLs), cognition (perception and memory), and social behavior. The second domain, psychological well-being, concerns the global aspects of mental health (presence or absence of depression; emotional states; and general life satisfaction). The third domain, perceived QoL, entails the evaluation of one's neighborhood, family, friends, etc. Environmental quality is the fourth domain, which includes housing quality (Lawton, 1991). In the tri-dimensional Quality of Life Model, the concept of quality of life is composed of tri-dimensions which are engagement in physical activity, avoidance of smoking, and literacy of health-related genomics. The model is quite simplified as these identified three factors are the only factors that can achieve quality of life compared to the 4 factors mentioned in the Quality of Life Model by Lawton (1991).

Further, in comparison to the QoL theory developed from Abraham Maslow's human developmental perspective (Maslow, 1962; Ventegodt et al., 2003a; 2003b; 2003c). It has been said that developed societies involve members who are mostly preoccupied with satisfying higher-order needs (social, esteem, and self-actualization needs), it is argued, whereas less-developed societies involve members who are mostly preoccupied with satisfying lower-order needs (biological and safety-related needs). QoL is defined in terms of the hierarchical need satisfaction level of most of the members of a given society. The higher the need satisfaction of the majority in a given society the greater the QoL of that society. Institutions are designed to serve human needs in a society, and therefore a society's QoL. Societal institutions that serve human needs include productive, maintenance, managerial/political, and adaptive institutions. Each of these types of societal institutions involves a hierarchical dimension. It is argued that progressive increases in QoL are accompanied with hierarchical changes in these societal institutions. However, in the developed model on quality of life, it is achieved only by achieving the three focuses which are engagement in physical activity, avoidance of smoking, and having literacy on health-related genomics.

CONCLUSION AND RECOMMENDATION

Conclusion

In conclusion, quality of life is influenced by having a lifestyle of engaging in physical activity, avoiding smoking, and gaining literacy on health-related genomics. Additionally, a higher level of lifestyle engaging in physical activity and avoiding smoking, and a higher literacy on health-related genomics, appear to have a higher quality of life.

The Mental Well-being Theory emphasizes that mental health is not merely the absence of psychological disorders but a state of thriving and flourishing in which the individuals with NCDs had a moderate level only. Based on the Health Behavior Change Model, individuals with NCDs only moderately perceived the importance of lifestyle changes like engaging in physical activity and quitting smoking. Also, the Health Literacy Theory was partially proven in the study as there was moderate literacy pertaining to the examination of individuals' ability to access, comprehend, evaluate, and apply health-related information. The WHOQOL Model which encompassed physical, psychological, social, and environmental domains, providing a holistic approach to understanding an individual's well-being was only moderate in the study. To address the study's findings, a theoretical framework and enhancement plan were developed.

Recommendations

The following Recommendations were given based on the findings of the study:

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Practice. Concerning healthcare practice, the developed quality of life enhancement plan shall be recommended for use in the community. Health institutions will be invited to partake in a meeting to discuss the findings of the study and propose the adoption of the quality of life enhancement plan as may apply to their organization.

Policy. In the context of healthcare, the findings will be able to support healthcare institutions to allocate resources for the development and implementation of public health campaigns aimed at raising awareness about the importance of lifestyle modifications and genomics literacy in preventing and managing NCDs. Advocate for policies that support access to affordable healthcare services, including mental health support and genomic testing, for individuals with NCDs.

Collaborate to develop comprehensive health promotion programs targeting NCD prevention and management at the community level. Strengthen the integration of mental health services into primary healthcare systems to better support individuals with NCDs.

Take an active role in managing their health by adhering to recommended lifestyle changes, seeking regular medical check-ups, and engaging in self-management practices. Participate in educational programs and support groups to enhance understanding of their condition and improve health-related decision-making.

Foster a supportive environment that promotes healthy lifestyle choices and reduces the stigma associated with NCDs, mental health, and genetic testing. Engage in community-based initiatives aimed at promoting physical activity, healthy eating, and tobacco cessation to create a culture of health and well-being.

Education. The findings of the study can serve as a reference to studies relating to mental well-being, lifestyle physical activity, and smoking behavior, genomic health-related literacy, and quality of life in health care. The study can also serve as an educational material in discussing research methodology, statistical treatment of data, and ethics in research.

Research. Submit the study for publication in any local or international refereed journals. Also, submit the study for possible oral or poster presentation at any local or international research congress. For future researchers, the following research titles are also suggested.

1. Conduct further studies to explore the longitudinal effects of interventions targeting lifestyle modifications and genomics literacy on the quality of life of individuals with NCDs;
2. Investigate the impact of socio-economic factors, cultural beliefs, and access to healthcare services on health outcomes among diverse populations living with NCDs;
3. Exploring the lived experiences on mental well-being, lifestyle behaviors, and genomics health-related literacy as predictors of quality of life among individuals with NCDs;
4. Convergent parallel design on the mental well-being, lifestyle behaviors, and genomics health-related literacy on quality of life among persons with non-communicable disease; and
5. Conduct a validation study on the created theory across different regions and populations to identify best practices and tailor interventions to specific needs and contexts.

QUALITY OF LIFE ENHANCEMENT PLAN

Rationale

Non-communicable diseases (NCDs) represent a significant health challenge globally, contributing to substantial morbidity, mortality, and socioeconomic burden. Individuals living with NCDs often face multiple physical, psychological, and social challenges that impact their overall quality of life. Addressing the multifaceted needs of this population requires a comprehensive and integrated approach that goes beyond medical interventions alone. Therefore, this quality of life enhancement plan aims to provide holistic support

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and resources to individuals with NCDs, focusing on improving various aspects of their well-being and empowering them to lead fulfilling lives despite their health conditions.

The rationale behind this quality of life enhancement plan stems from the recognition of the complex and interconnected factors that influence the well-being of individuals with NCDs. While medical treatments play a crucial role in managing the symptoms and progression of NCDs, addressing broader determinants of health is essential for optimizing overall quality of life. Lifestyle factors, psychosocial support, access to information, community engagement, and advocacy all play pivotal roles in shaping the experiences and outcomes of individuals living with NCDs. By implementing targeted interventions across these domains, we aim to address the diverse needs of this population comprehensively and promote holistic well-being.

General Objectives

The primary purpose of this quality of life enhancement plan is to increase the levels of mental well-being, lifestyle in terms of physical activity and smoking behaviors, literacy on health-related genomics, and the quality of life among individuals with non-communicable diseases.

Specific Objectives

Specifically, this plan aims to achieve the following specific objectives:

1. To increase the moderate level of mental well-being to high among individuals with NCDs;
2. To increase further the moderate level of lifestyle in terms of physical activity to high levels among individuals with NCDs;
3. To increase further the level of lifestyle in terms of smoking to high levels among individuals with NCDs;
4. To increase the genomics health-related literacy from moderate to high among individuals with NCDs;
5. To increase the moderate quality of life to very high among individuals with NCDs in terms of physical health, psychological health, social relations, and environmental health; and
6. To attain and sustain high levels of lifestyle (physical activity and smoking behavior) and genomic health-related literacy among individuals with NCDs.

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