Electronic Journal of Applied Statistical Analysis
EJASA, Electron. J. App. Stat. Anal.
http://siba-ese.unisalento.it/index.php/ejasa/index
e-ISSN: 2070-5948
DOI: 10.1285/i20705948v19n1p149

Mapping the SES Spectrum for Sustainable Health in Sarawak: Constructing and Testing an SES Experience Index

By Liew et al.

March 15, 2026

Electronic Journal of Applied Statistical Analysis
Vol. 19, Issue 01, March 2026, 149-172
DOI: 10.1285/i20705948v19n1p149

Mapping the SES Spectrum for Sustainable Health in Sarawak: Constructing and Testing an SES Experience Index

Yew-Kang Liew[a], Shirly Siew-Ling Wong *[a], Keng-Sheng Chew[b], and Rosita binti Hamdan[a]

[a] *Faculty of Economics and Business, University Malaysia Sarawak, Kota Samarahan, Sarawak, Malaysia*
[b] *Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak, Kota Samarahan, Sarawak, Malaysia*

March 15, 2026

Social gradient refers to the consistent relationship between socioeconomic status (SES) and health, where lower SES is associated with poorer health outcomes. This gradient spans the entire socioeconomic spectrum, affecting individuals at every level, not just the richest and poorest. Recognizing the importance of social gradient is crucial for addressing inequality and promoting policies aimed at improving the overall well-being of a nation's population, this study investigates whether individuals with different socioeconomic statuses experience varying health-related aspects in Sarawak through the developed SES Experience Index to capture the social gradient of the individuals. Data were collected from 290 respondents from Sarawak. Indeed, the findings revealed significant disparities between high and low SES groups across all measured dimensions. High SES individuals exhibited better mental health and higher levels of health literacy compared to their low SES counterparts. Furthermore, low SES individuals engaged in riskier health behaviours and faced greater barriers to accessing healthcare services. These results highlight the pervasive impact of socioeconomic factors on health outcomes in Sarawak. The significant differences observed between SES groups underscore the urgent need for targeted public health strategies to address

*Corresponding author: wslshirly@siswa.unimas.my

ISSN: 2070-5948
http://siba-ese.unisalento.it/index.php/ejasa/index

these inequities. The results pinpoint the need of prioritizing the initiatives that enhance health literacy, reduce risky behaviours, and improve access to healthcare for low SES populations. By understanding these disparities is vital for developing effective interventions and policies to improve public health, it helps to move the state to be more ready towards sustainable development through promoting more equitable health outcomes and overall well-being.

1 Introduction

Health and well-being are crucial elements in achieving the Sustainable Development Goals (SDGs) by 2030. They serve as the foundation of human development, significantly influencing economic growth and community involvement by enabling individuals to work and learn effectively. The interconnected nature of the SDGs means that improving health outcomes can directly contribute to other goals, such as reducing poverty, enhancing education, and promoting gender equality (United Nations, 2024). Moreover, one of the key targets of SDG 3 (Good Health and Well-being) is achieving universal health coverage, which is vital for reducing health disparities and promoting equality. The COVID-19 pandemic has also highlighted the importance of global health security, emphasizing the need to strengthen health systems worldwide to manage health emergencies effectively (Lal et al., 2022). Lastly, investing in health is essential for addressing the long-term challenges posed by chronic diseases and aging populations, ensuring sustainable development across all sectors.

In the contemporary world, the relationship between socioeconomic status (SES) and health has been a focal point of public health research and policy development. This relationship, known as the social gradient in health, posits that individuals with lower SES tend to experience poorer health outcomes compared to their higher SES counterparts. The social gradient in health suggests a link between lower socioeconomic status (SES) and poorer health outcomes, influenced by factors such as restricted access to healthcare, suboptimal living environments, and greater exposure to vulnerabilities (McMaughan et al., 2020). Additionally, lower SES often correlates with reduced educational opportunities, heightened stress levels, and limited access to nutritious food (Gautam et al., 2023). These factors collectively contribute to health disparities, emphasizing the complexity of health outcomes across different socioeconomic levels and the challenges in addressing them.

Sarawak, one of the states in Malaysia, presents a unique context for studying the social gradient in health. Known for its rich cultural diversity and abundant natural resources, Sarawak also faces significant challenges in terms of health and socioeconomic disparities. The state's population is comprised of various ethnic groups, each with distinct cultural practices and socioeconomic conditions. These diverse backgrounds create a complex tapestry of health experiences and outcomes, making it a compelling case

for examining the influence of SES on health. In Sarawak, the disparities in health outcomes are stark and multifaceted. Individuals from lower SES backgrounds often face numerous barriers that adversely affect their health. Zoom in the lens of adolescents' health trend from Institute for Public Health [IPH] (2022), recent data reveals significant health disparities among adolescents in Sarawak, influenced by socioeconomic factors. The prevalence of current tobacco use is 24.3 percent, with 11.8 percent smoking cigarettes and 20.3 percent using e-cigarettes. Alcohol consumption is also high, with 23.8 percent currently drinking and 44.9 percent having tried alcohol, over half of whom started before age 14. Mental health concerns are notable, with 28.9 percent reporting depression symptoms and over 13 percent having suicidal thoughts. Additionally, 15.8 percent of adolescents were involved in physical fights, and 8.8 percent experienced bullying in the past month. These behaviors reflect a lack of supervision and guidance, often tied to lower socioeconomic status (Hawkins et al., 1992; Edge and Oliver, 2019).

These statistics reveal a clear image of the health challenges faced by adolescents, which are deeply intertwined with their socioeconomic backgrounds. Furthermore, these challenges present significant obstacles in identifying individuals from diverse socioeconomic layers. This situation necessitates the creation of a sophisticated tool that can accurately reflect the complexities of socioeconomic status and its effects on health. Thus, we propose the SES Experience Index, which focuses on individuals from varying socioeconomic levels. This index will incorporate a range of dimensions, including household resource, occupational complexity, education attainment, economic strain and food security. These include limited access to healthcare services, lower levels of health literacy, and engagement in riskier health behaviors. Conversely, those with higher SES tend to enjoy better mental health, higher health literacy, and greater access to healthcare services. These differences are not only indicative of the existing health inequities but also highlight the critical role of SES in shaping health outcomes.

Existing SES indices, typically based on income, education, or occupation alone, may not adequately reflect the socioeconomic realities of Sarawak, which include rural-urban divides, ethnic and cultural variation, and infrastructural constraints. A context-specific approach is required to more accurately identify and classify the nuanced SES spectrum in this state. The SES Experience Index proposed in this study responds to this gap by incorporating five interrelated components, household resources, occupational complexity, education attainment, economic strain, and food security, that are highly relevant in the Sarawakian context. This index aims to serve both as a research tool and a policy-relevant framework for targeted health and development interventions in underserved populations, thereby improving precision in addressing the social gradient in health. By addressing the limitations of conventional SES measures and tailoring this tool to the specific conditions of Sarawak, this study aims to fill a critical research and policy gap. This aligns with national and global efforts to achieve equitable health outcomes and promote inclusive, sustainable development. Therefore, motivated by this, this study aims to (1) develop a SES Experience Index, (2) assess the disparity by SES group, and (3) how economic strain, food security, health literacy, health risk attitude, and healthcare access collectively influence well-being among Sarawak residents.

2 Literature Review

2.1 Theoretical Underpinnings of Socioeconomic Status (SES)

Socioeconomic status (SES) is not merely an economic descriptor but a multidimensional construct grounded in several theoretical frameworks that explain how social and material inequalities shape health outcomes. The Social Determinants of Health (SDH) framework developed by the World Health Organization (WHO, 2010) posits that health is influenced by the conditions in which people are born, grow, live, work, and age, conditions largely shaped by the distribution of power, resources, and opportunities. Within this framework, income, education, and occupation are central structural determinants that interact to create stratified access to material and social resources. Complementing this perspective, Marmot (2005) Social Gradient Theory asserts that health outcomes improve at every step up the socioeconomic ladder, between the poorest and the richest. This "social gradient in health" indicates that relative position within the hierarchy influences exposure to psychosocial stressors, health literacy, and lifestyle opportunities. Studies such as McMaughan et al. (2020) and Gautam et al. (2023) demonstrate how these mechanisms operate within different socioeconomic layers, reinforcing the gradient effect. Additionally, the Life Course Perspective (Ben-Shlomo and Kuh, 2002) highlights how cumulative socioeconomic disadvantages from childhood through adulthood compound to influence health trajectories over time. Educational attainment, occupational complexity, and economic stability are not isolated variables but interconnected pathways through which SES exerts long-term effects on physical and mental health. Taken together, these theories justify examining SES as a complex construct encompassing multiple social and economic experiences, an approach that supports the development of a multifaceted SES Experience Index.

2.2 Constructing the SES Experience Index

Building on the theoretical foundations of socioeconomic status (SES), this study conceptualizes the SES Experience Index as a multidimensional construct that captures the lived realities of individuals across various socioeconomic conditions. Instead of viewing SES as a single indicator such as income or education, the index integrates five interrelated dimensions, household resources, economic stability, educational attainment, occupational complexity, and food security, that together provide a more comprehensive reflection of the socioeconomic experience within the Sarawak context. This approach aligns with the view that SES represents a constellation of material, social, and educational factors influencing both opportunity and well-being (Marmot, 2005; Darin-Mattsson et al., 2017). At the core of SES are household resources, which represent the tangible assets and income available to individuals and families. These resources determine access to fundamental needs such as housing, healthcare, and education. Numerous studies have shown that household income and wealth are closely linked to better self-

rated health and life satisfaction (Marmot, 2005; Aittomäki et al., 2010), underscoring that material deprivation directly constrains people's ability to maintain good health and pursue upward mobility.

Closely related to this is economic stability, which captures the degree of financial security or strain individuals experience. Economic strain is not only an outcome of limited income but also a psychological stressor that affects overall well-being. Lundberg and Kristenson (2008) reported that financial stress predicts poor health outcomes independent of income level, while Chiao et al. (2012) demonstrated that prolonged economic strain significantly diminishes life satisfaction. In this sense, economic stability functions as both a material and psychosocial dimension of SES. Educational attainment forms another pillar of the index, representing an individual's accumulated human capital that shapes their employment prospects, cognitive resources, and health literacy. Education enhances an individual's capacity to understand and act on health information, influencing behaviors and access to care (Cutler and Lleras-Muney, 2006; CHUNG, 2015). Therefore, it serves as both a social determinant of health and a driver of intergenerational mobility, making it indispensable to any comprehensive SES measure.

In addition, occupational complexity captures the skill, autonomy, and decision-making latitude inherent in one's employment. Occupations that demand higher cognitive engagement and offer greater control over work processes tend to be associated with better mental health and higher job satisfaction (Karasek Jr, 1979; Darin-Mattsson et al., 2017). Conversely, repetitive or insecure work environments often reinforce the adverse health consequences of low SES, linking occupational structure to broader patterns of inequality. Finally, food security represents a vital yet often overlooked aspect of socioeconomic well-being. Access to sufficient, affordable, and nutritious food is a basic human need and a recognized social determinant of health (**?**Denney et al., 2018). Food insecurity has been shown to predict poor physical and psychological health outcomes, especially among low-income populations (Mutisya et al., 2016; Headey and Martin, 2016). In a state like Sarawak, where rural and urban disparities persist, including food security ensures that the index captures the multidimensional vulnerabilities associated with poverty and inequality.

Taken together, these five components provide a coherent framework that encapsulates both the structural and experiential dimensions of SES. By integrating material conditions, educational attainment, occupational factors, and access to essential resources, the SES Experience Index offers a nuanced lens through which to examine how socioeconomic differences manifest in health and well-being. This multidimensional design also reflects previous calls in the literature to move beyond single-indicator SES measures and toward more holistic representations of social stratification (Darin-Mattsson et al., 2017).

2.3 Socioeconomic Status and Health Outcomes

A substantial body of research has established the robust link between SES and various health outcomes. Gazmararian et al. (1996) demonstrated that low SES is associated

with adverse maternal health behaviors due to limited access to healthcare and education. Similarly, McCaffery et al. (2020) revealed disparities in COVID-19–related knowledge and behaviors across SES levels, emphasizing the mediating role of health literacy. Menec et al. (2010) found that neighborhood SES continues to affect chronic disease prevalence into old age, while Bishop et al. (2023) showed that socioeconomic deprivation predicts poorer postoperative recovery. Beyond objective SES, subjective perceptions of social standing also shape health. Galvan et al. (2023) and Cundiff et al. (2013) found that Subjective Social Status (SSS) independently predicts physical and mental health outcomes by influencing stress and coping responses.Kirkcaldy et al. (2004) and Hawley et al. (2014) further reported that lower SES correlates with greater psychological distress, depression, and chronic illness. These findings align with the theoretical models described earlier, SES influences health through both material deprivation and psychosocial pathways. Recent studies also emphasize health literacy as a mediating mechanism between SES and health outcomes (Lastrucci et al., 2019; Omachi et al., 2013). Individuals with higher education and income are more likely to understand health information, seek preventive care, and maintain healthier behaviors. Likewise, Schüz et al. (2019) and Edge and Oliver (2019) highlight that SES moderates risk attitudes and health behaviors, with lower SES associated with riskier health patterns. Together, this literature provides strong empirical justification for examining the relationship between SES dimensions, health literacy, risk attitudes, healthcare access, and well-being, core variables in the current study.

Despite extensive research on the socioeconomic determinants of health, limited attention has been given to developing a context-specific measure of socioeconomic status that reflects the unique socioeconomic realities of Sarawak. Most existing SES indices in Malaysia have been adapted from national-level frameworks or Western constructs, which may inadequately capture the multidimensional and culturally embedded experiences of Sarawak's diverse population. The state's distinct socio-geographic characteristics, such as its rural–urban divide, indigenous community composition, and variations in access to basic services, necessitate a more localized and inclusive measurement approach. This gap underscores the need for a comprehensive SES Experience Index tailored to the Sarawak context, integrating dimensions such as household resources, economic stability, education, occupation, and food security. By addressing this contextual gap, the present study not only refines the conceptualization of SES but also advances a regionally grounded framework for understanding the link between socioeconomic conditions and health outcomes.

3 Methodology

This study employed a cross-sectional quantitative research design to capture the socioeconomic and health-related experiences of Sarawak residents. Primary data were collected using a structured questionnaire developed to measure the constructs of interest, including the dimensions of the Socioeconomic Status (SES) Experience Index, health

literacy, risk attitudes, healthcare access, and overall well-being. A non-probability purposive sampling technique was employed to ensure that respondents possessed characteristics relevant to the research objectives. The inclusion criteria were as follows: (1) individuals aged 18 years and above, (2) residents of Sarawak, (3) able to read and understand either English or Malay, and (4) willing to provide informed consent prior to participation. These criteria ensured that respondents had sufficient socioeconomic and health-related experiences to provide meaningful insights into the construction and testing of the SES Experience Index. Screening questions were included at the beginning of the questionnaire to verify eligibility before proceeding. Respondents were asked to confirm their age, residency status, and language proficiency, as well as to indicate informed consent. Only those who met the inclusion criteria were allowed to complete the full survey.

3.1 Measurements and Pilot Study

The study utilized a variety of validated scales to assess multiple dimensions of participants' health and well-being. Perceived social support was measured using the Brief Perceived Social Support Questionnaire (F-SozU K-6), a concise instrument with strong psychometric properties validated across diverse populations, including those in the United States, Germany, Russia, and China (Lin et al., 2019). Health literacy was assessed using the Taiwan Longitudinal Study on Aging (TLSA) Health Literacy Scale, which demonstrated good internal consistency and construct validity, particularly among middle-aged and older adults (Shih et al., 2021). Participants' attitudes toward health-related risks were evaluated with the Health-Risk Attitude Scale (HRAS-13), a comprehensive tool with acceptable internal consistency, capturing various dimensions of health-risk attitudes (Ware et al., 1996). Access to healthcare was assessed using a scale derived from the Demographic and Health Survey (DHS) project, focusing on barriers such as cultural, resource-related, and physical obstacles, with higher scores indicating greater difficulties in accessing care. Health outcomes were measured using the 12-Item Short-Form Health Survey (SF-12), which provides summary scores for physical and mental health, demonstrating reliability and validity across diverse populations (Ware et al., 1996). Finally, psychological well-being was assessed with the WHO Well-Being Index (WHO-5), which measures aspects of positive mood and vitality, offering insights into the overall well-being of participants (Omani-Samani et al., 2019). Prior to the main data collection, a pilot study involving 30 respondents from diverse socioeconomic backgrounds across Sarawak was conducted to examine the clarity, reliability, and cultural appropriateness of the instrument. Feedback from the pilot resulted in minor adjustments to the wording of several items to ensure comprehensibility and contextual fit. The pilot data indicated satisfactory internal consistency, with Cronbach's alpha coefficients exceeding 0.70 across all scales, confirming the reliability of the instrument for the Sarawak population.

3.2 Data Collection Procedure

Data collection was conducted using both online and in-person approaches to ensure wide participation across urban and rural areas. The online questionnaire was distributed through Sogolytics, while in-person data collection was carried out at selected public spaces with the assistance of trained enumerators. The dual-mode approach was adopted to minimize sampling bias and accommodate participants with limited internet access or digital literacy. All respondents were briefed on the study's objectives, assured of confidentiality, and informed that participation was voluntary. Each participant independently completed the questionnaire without researcher influence. Enumerators provided clarifications only when needed to maintain the accuracy of responses. Completed questionnaires were screened for completeness before data entry and statistical analysis.

3.3 Development of SES Experience Index

The development of the Socioeconomic Status (SES) Experience Index is crucial for evaluating economic and social disparities within a population. This index includes five key elements: household resources, economic stability, educational attainment, occupational complexity, and food security, each selected for its significant role in reflecting different dimensions of SES Experience Index. Income is foundational, directly affecting access to essential resources like housing, healthcare, and education, with higher income levels linked to better overall well-being (Marmot, 2005). Economic stability captures financial stress, reflecting both the objective and subjective impacts of financial pressure, which are associated with poor health outcomes (Lundberg and Kristenson, 2008). Educational attainment influences employment opportunities and income potential, making it a critical determinant of SES (Cutler and Lleras-Muney, 2006). Occupational complexity (computed based on the Dictionary of Occupational Titles) measures job skill requirements, closely related to income and job security, and is linked to better health and job satisfaction (Karasek Jr, 1979). Food security is included as it reflects access to sufficient, nutritious food, a basic need directly tied to income and overall health (Gundersen and Ziliak, 2015). To ensure each component contributes equally to the SES index, variables are standardized using the min-max method, scaling each to a range of 1 to 5. This standardization creates a balanced composite score that accurately reflects the various dimensions of socioeconomic status. The cohort will be divided into low and high SES groups based on a cutoff determined by the mean of the computed SES Experience index.

4 Results and Discussion

The collected respondents' demographic details are summarized in Table 1 below. In short, the demographic profile reveals a balanced gender distribution with slightly more

males (55.50 percent) than females (44.50 percent). The majority of respondents belong to Generation Z (53.80 percent), followed by Generation Y (23.40 percent) and Generation X (20.70 percent), with Baby Boomers making up a small fraction (2.10 percent). Ethnically, the respondents are predominantly Malay and Bumiputera (64.48 percent), with Non-Malay or Bumiputera comprising the remaining 35.52 percent. In terms of educational attainment, a higher percentage of respondents have post-university education (59.31 percent) compared to those at the pre-university level (40.69 percent). Marital status shows a majority of single individuals (57.20 percent), with married respondents accounting for 38.60 percent, and a small percentage of divorced, widowed, and separated individuals. Financially, the middle-income group (M20) is the largest (51.38 percent), with nearly equal representation from the bottom (B40) and top (T20) income groups, at 24.48 percent and 24.14 percent respectively.

The SES Experience Index provides a comprehensive overview of socioeconomic status by evaluating five critical elements as presented in Figure 1. The index reveals a moderate overall socioeconomic standing with varying levels of performance across different domains. Household resource, with a score of 2.45 out of 5, suggests that many households are earning below the optimal threshold for socioeconomic well-being. This score indicates a significant need for strategies to increase household incomes, such as higher minimum wages, improved job opportunities, and supportive financial policies. The relatively low score in this area points to economic challenges that can impact various aspects of life, including access to healthcare, education, and housing. Research shows that household economic resources are closely linked to health outcomes, especially in low-income settings, where income inequality and limited resources can exacerbate health disparities (Aittomäki et al., 2010). This low score suggests a pressing need for policies and strategies that can elevate household incomes. One approach could be the implementation of higher minimum wages, which would directly increase the earnings of low-income workers and help reduce income inequality (Sepehri and Guliani, 2015). Additionally, creating improved job opportunities through economic development initiatives can provide more stable and higher-paying employment options. This includes investing in industries that are poised for growth and innovation, thereby attracting businesses that offer well-paying jobs (Lordan et al., 2012). Supportive financial policies are also critical in this context. These can include tax incentives for low-income families, increased access to affordable childcare, and subsidies for essential services such as healthcare and housing. Financial education programs can empower individuals to make informed decisions about their finances, encouraging savings and investments that can provide long-term stability. The relatively low score in household resources highlights economic challenges that pervade multiple aspects of life, from healthcare access to educational opportunities and housing security (Kim and Park, 2015). Addressing these issues comprehensively requires a multi-faceted approach that considers the diverse needs of the population.

Educational attainment, scoring 2.95, suggests that while education levels are somewhat average, they could benefit from further enhancement. While this is a positive sign, there is still substantial room for improvement. Enhancing educational opportunities through better funding for schools, access to higher education, and adult education

Table 1: Demographic Profile of the Respondents

	Frequency	**Percent (percent)**
Gender		
Male	161	55.50
Female	129	44.50
Age group		
Generation Z	156	53.80
Generation Y	68	23.40
Generation X	60	20.70
Baby Bommers	6	2.10
Ethnicity		
Malay and Bumiputera	187	64.48
Non-Malay or Bumiputera	103	35.52
Educational Level		
Pre-university	118	40.69
Post-university	172	59.31
Marital Status		
Single / Never married	166	57.20
Married	112	38.60
Divorced	6	2.10
Widowed	2	0.70
Separated	4	1.40
Income Group		
B40	71	24.48
M20	149	51.38
T20	70	24.14

programs can elevate this score. Improved educational attainment can lead to better job opportunities and economic outcomes, making it a crucial area for development (Alvarez-Galvez et al., 2013). Investment in education must start from the foundational levels. Better funding for primary and secondary schools can ensure that all children receive a high-quality education, regardless of their socio-economic background (CHUNG, 2015). This includes hiring qualified teachers, reducing class sizes, and providing modern educational resources and facilities. Access to higher education is another critical fac-

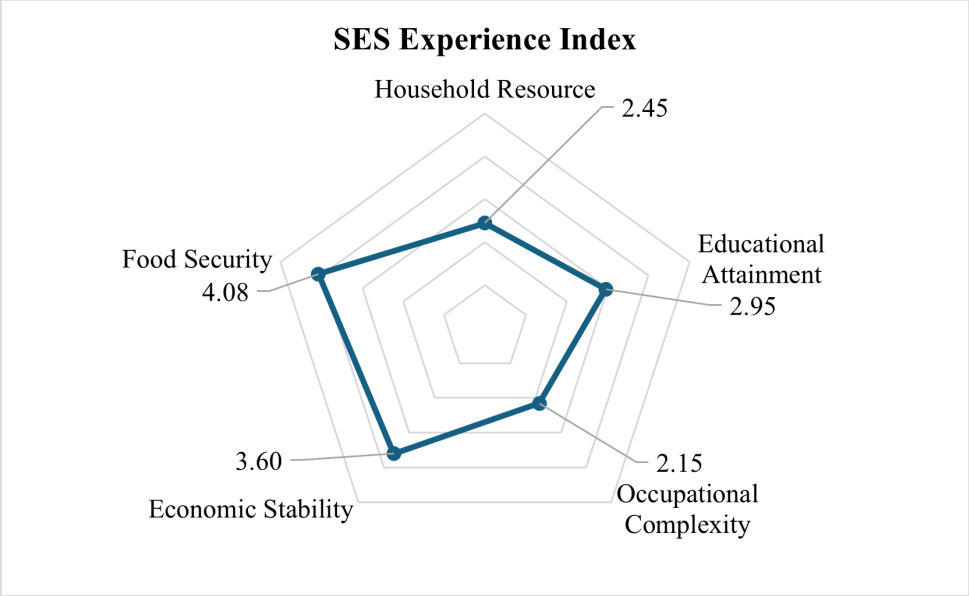

Figure 1: SES Experience Index for the Case of Sarawak

tor. Scholarships, grants, and affordable student loans can make college and university education accessible to more individuals, particularly those from low-income families (Mutisya et al., 2016). Adult education and vocational training programs can also play a vital role in boosting educational attainment. These programs can provide individuals with the skills needed to compete in a rapidly evolving job market. By aligning educational curricula with industry needs, educational institutions can prepare students for the demands of the workforce, leading to better job placements and higher incomes (Benamati et al., 2010).

Occupational complexity, at 2.15, reflects a lower engagement in complex and potentially higher-paying jobs, highlighting a need for better employment opportunities. Indirectly, it also indicates a need for more diverse and advanced job roles within the economy. Initiatives to promote skill development, vocational training, and career advancement can help increase the complexity of occupations that people engage in. This, in turn, can lead to higher incomes and improved economic stability for individuals (Darin-Mattsson et al., 2017). Promoting skill development is a key strategy. This can be achieved through targeted vocational training programs that equip individuals with the skills needed for more complex job roles. Partnerships between educational institutions and industries can help ensure that training programs are relevant to current market demands (Pamuk et al., 2011). Additionally, fostering a culture of continuous learning and professional development can encourage individuals to seek advanced roles within their fields. Career advancement opportunities are also crucial. Employers can play a significant role by offering clear career progression paths and investing in employee development (Benson et al., 2004). This can include providing access to further

education, training programs, and mentoring. Creating a supportive environment that encourages innovation and creativity can also lead to the development of more complex and fulfilling job roles. Expanding the range of industries within the economy is another important factor.

Economic stability scores relatively well at 3.6, indicating a reasonable level of financial security among the assessed population. This score reflects stable employment, savings, and investment levels. However, to further improve economic stability, policies aimed at fostering economic growth, creating more job opportunities, and ensuring fair wages are necessary (Kim and Park, 2015). Maintaining and enhancing economic stability is crucial for overall socioeconomic progress. Policies aimed at fostering economic growth are essential for enhancing economic stability. This includes supporting small and medium-sized enterprises (SMEs), which are often the backbone of the economy. Providing access to financing, reducing regulatory burdens, and creating a favorable business environment can help these enterprises thrive and create more jobs (Alvarez-Galvez et al., 2013). Ensuring fair wages is another critical aspect. Living wage policies can help ensure that all workers earn enough to support themselves and their families, reducing financial stress and promoting economic stability. Creating more job opportunities is also crucial. This can be achieved through targeted economic development initiatives that attract new industries and support existing ones (Aittomäki et al., 2010). Investments in infrastructure, technology, and education can create a more robust economy capable of weathering economic downturns. Encouraging savings and investment among individuals is another important strategy. Financial literacy programs can help individuals manage their finances more effectively, encouraging savings and investments that provide long-term security.

Food security, with the highest score of 4.08, demonstrates that access to adequate food is less of a concern, representing a significant strength in the socioeconomic fabric. This high score reflects the effectiveness of food support systems and policies that ensure food availability. While this is a strength, ongoing efforts are needed to maintain and further improve food security, especially for vulnerable populations. Ensuring food security contributes significantly to the overall health and well-being of the community. One of the key factors contributing to food security is the presence of robust food support programs (Denney et al., 2018). These programs, such as food banks and government assistance programs like SNAP, play a vital role in ensuring that vulnerable populations have access to the food they need. Continued support and expansion of these programs can help maintain high levels of food security, especially during economic downturns or other crises (Mutisya et al., 2016). Ensuring that the food available is not only sufficient but also nutritious is another important aspect. Nutrition education programs can help individuals make healthier food choices, which can lead to better health outcomes and reduced healthcare costs. Supporting local agriculture and sustainable farming practices can also contribute to food security by ensuring a stable supply of fresh, locally sourced food (Headey and Martin, 2016).

The findings of this study provide a clearer understanding of how socioeconomic experiences influence various dimensions of health and well-being among residents of Sarawak. Results from the Hierarchical Regression Analysis and Mann–Whitney U Test consis-

tently reveal that socioeconomic factors, particularly economic strain, educational attainment, and food security, significantly shape health literacy, healthcare access, and psychological well-being. These relationships are well-aligned with the Social Determinants of Health framework (WHO, 2010) and Marmot's (2004) Social Gradient Theory, both of which suggest that social and material inequalities accumulate across the socioeconomic spectrum, leading to differentiated health outcomes.

Table 2: Mann-Whitney U Test Results

Variables	**Group**	**N**	**Mean Rank**	**Sum of Ranks**	U	p**-value**
Health literacy	High SES Status	126	169.85	21,401.50	7,263.5	0.000
	Low SES Status	164	126.79	20,793.50		
Health risk attitude	High SES Status	126	156.74	19,749.50	8,216.0	0.003
	Low SES Status	164	136.86	22,445.50		
Health care access	High SES Status	126	155.44	19,585.50	8,915.5	0.045
	Low SES Status	164	137.86	22,609.50		
Physical health	High SES Status	126	152.71	19,241.50	9,079.5	0.077
	Low SES Status	164	139.96	22,953.50		
Mental health	High SES Status	126	125.33	15,792.00	9,423.5	0.199
	Low SES Status	164	160.99	26,403.00		
Well-being	High SES Status	126	156.74	19,749.50	8,165.0	0.002
	Low SES Status	164	136.86	22,445.50		

Table 2 indicates the results of the Mann-Whitney U Test, where the results provide fascinating insight into the disparities between individuals with high and low socioeconomic status (SES) across several dimensions of health and well-being. When examining health literacy, the results are equally compelling (U = 7263.5, p = 0.000). Those with higher SES demonstrate superior health literacy, suggesting that they are better equipped to understand and utilize health information. This advantage likely empowers them to make more informed health decisions and navigate the healthcare system more effectively (Lastrucci et al., 2019). Higher SES individuals tend to have better health literacy, which means they are more proficient in obtaining, processing, and understanding basic health information. This difference can be attributed to various factors, including educational attainment, access to health information, and cognitive resources. High SES individuals often have higher levels of education, which equips them with critical thinking skills and the ability to understand complex information. They also have better access to technology and resources that provide health information, enabling them to make informed health decisions and effectively navigate the healthcare system (Stormacq et al., 2020).

Health risk attitude also shows a notable difference between the groups (U = 8216, p = 0.003). Individuals with high SES have a distinct approach to health risks compared

to those with low SES, possibly reflecting varying levels of exposure to health education and preventive measures (Schüz et al., 2020). High SES individuals display distinct attitudes toward health risks, likely due to their greater exposure to health education and preventive measures. This population is more likely to have access to information about health risks and the benefits of preventive care, which shapes their attitudes and behaviors. Moreover, higher SES can afford individuals the luxury of focusing on long-term health outcomes rather than immediate survival concerns, leading to a more proactive approach to managing health risks.

Access to healthcare is another critical area where significant disparities are evident ($U = 8915.5$, $p = 0.045$). High SES individuals generally have better access to healthcare services, which can lead to earlier interventions and better health outcomes (Miravitlles et al., 2011). This can be rationalized by considering the financial and logistical barriers often faced by low SES individuals. Higher SES often means better health insurance coverage, the ability to afford out-of-pocket medical expenses, and access to quality healthcare facilities. Additionally, high SES individuals may have more flexible work schedules, allowing them to attend medical appointments more easily. In contrast, low SES individuals may delay or forego necessary healthcare due to cost, transportation issues, or inflexible work conditions (Sivakumar and Chau, 2017).

In terms of physical health, the test does not find a statistically significant difference between the groups ($U = 9079.5$, $p = 0.077$). This suggests that, at least in this sample, physical health status does not vary significantly with SES. It's a reminder that physical health outcomes can be influenced by a multitude of factors beyond SES (Kim and Park, 2015). Mental health results are similarly non-significant ($U = 9423.5$, $p = 0.199$), indicating that both high and low SES groups experience comparable mental health statuses (Bíró et al., 2011). This suggests that, in this sample, SES does not play a significant role in determining physical health outcomes. One rationale for this finding could be that physical health is influenced by a myriad of factors, including genetics, lifestyle choices, and environmental conditions, which can sometimes offset the advantages conferred by higher SES. Additionally, public health interventions and policies aimed at reducing health disparities might be effectively mitigating SES-related differences in physical health. This could indicate that mental health challenges are pervasive across all socioeconomic strata. While high SES individuals may have better access to mental health resources, they also face unique stressors such as high-pressure careers and social expectations, which can impact mental health. On the other hand, low SES individuals might experience stress due to financial instability and lack of access to mental health services. These contrasting factors could result in a leveling effect, making overall mental health status similar across SES groups.

Finally, the sense of well-being shows a significant difference ($U = 8165$, $p = 0.002$), with high SES individuals reporting higher levels of well-being. This finding highlights the broader impact of socioeconomic factors on overall life satisfaction and happiness (Stansfeld et al., 2013). The rationale for this finding likely lies in the cumulative advantages that higher SES confers. Higher income, better education, secure housing, and access to healthcare collectively enhance life satisfaction and happiness. Moreover, high SES individuals typically have more opportunities for leisure activities, personal

development, and social engagements, all contributing to a greater sense of well-being. This highlights the broad and multifaceted impact of socioeconomic status on overall life satisfaction.

The Mann–Whitney U Test revealed significant differences between low and high SES groups across several variables, including health literacy, healthcare access, and well-being. These disparities mirror patterns identified in previous studies, which found that individuals with lower socioeconomic backgrounds tend to have reduced access to health information, lower service utilization, and poorer self-rated health (McCaffery et al., 2020; Miravitlles et al., 2011; Menec et al., 2010). Such findings confirm that socioeconomic inequality remains a critical determinant of health disparities within the Sarawak population. Specifically, the lower health literacy among low SES groups likely reflects differences in educational opportunities and exposure to health information. Education enhances one's ability to understand and act upon health advice, which directly influences preventive care and treatment adherence (Cutler and Lleras-Muney, 2006; Lastrucci et al., 2019). Similarly, disparities in healthcare access may stem from both structural barriers, such as cost and distance, and psychosocial barriers like mistrust or limited awareness of available services (McMaughan et al., 2020). Collectively, these findings support the Social Determinants of Health framework, demonstrating that inequities in education, income, and resource distribution translate into unequal health experiences.

Table 3: Results of Hierarchical Regression Analysis

Predictors	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Economic strain	-0.401***	-0.397***	-0.407***	-0.426***
Food security	0.015	0.111	0.101	0.081
Health literacy	–	0.309***	–	–
Health risk attitude	–	–	0.262***	–
Healthcare access	–	–	–	0.179***
R^2	0.154	0.240	0.217	0.184
Adj R^2	0.142	0.223	0.199	0.165
R^2 Chg	0.154	0.086	0.062	0.029
F-statistics	12.243	14.01	12.251	9.966
Sig F Chg	0.000	0.000	0.001	0.031

Notes: Asterisks (***) indicate statistical significance at 1 percent. The dependent variable for the four models is Well-being.

The hierarchical regression analysis was conducted to evaluate the predictors of well-being. The analysis included the construction of four models, each adding different sets of predictors sequentially. In the first model, economic strain was included as the sole predictor of well-being. The results indicated that economic strain significantly predicted well-being, with a standardized coefficient (B) of -0.401 and a p-value less than 0.001. This model explained 15.4 percent of the variance in well-being ($R^2 = 0.154$), demonstrating a significant negative relationship between economic strain and well-being. This finding is particularly relevant to Sarawak, a state characterized by diverse economic conditions. For instance, rural areas in Sarawak often experience higher levels of economic strain due to limited job opportunities, lower incomes, and higher costs of living for basic necessities such as food and healthcare. These economic challenges can lead to increased stress and reduced life satisfaction among residents, highlighting the importance of addressing economic disparities to improve overall well-being in the region. The regression results show that economic strain negatively predicts well-being, supporting the notion that financial insecurity is a key stressor undermining mental and physical health. Individuals facing persistent economic pressure often experience heightened psychological distress, reduced coping resources, and lower life satisfaction (Chiao et al., 2012; Kim and Park, 2015). This finding resonates with the stress process model, which posits that chronic economic hardship erodes psychosocial resilience and limits the capacity for health-promoting behaviors. Moreover, the indirect effects observed through health literacy and healthcare access indicate that material deprivation not only affects subjective well-being directly but also operates through intermediate social and behavioral mechanisms.

The second model introduced food security and health literacy as additional predictors. The inclusion of these variables significantly improved the model, as evidenced by a change in R^2 (ΔR^2) of 0.086 with a p-value less than 0.001. This model accounted for 24.0 percent of the variance in well-being ($R^2 = 0.240$). In this model, both economic strain (β = -0.397, $p < 0.001$) and health literacy ($\beta = 0.309$, $p < 0.001$) were significant predictors, whereas food security did not significantly predict well-being ($\beta = 0.111$, $p > 0.05$). In Sarawak, food security remains a critical issue, especially in remote areas where access to affordable and nutritious food can be challenging. However, the lack of significant predictive power of food security in this model may indicate that other factors, such as health literacy, play a more crucial role in determining well-being. Health literacy, the ability to understand and utilize health information effectively, is vital in Sarawak, where diverse ethnic groups and varying levels of education can impact health outcomes. For example, public health campaigns aimed at improving health literacy in local languages could empower residents to make better health decisions, thereby enhancing their well-being (Knighton et al., 2017). The third model added health risk attitude to the predictors. This model was statistically significant and explained 21.7 percent of the variance in well-being ($R^2 = 0.217$), with a significant change from the previous model ((ΔR^2) = 0.062, p = 0.001). Significant predictors in this model included economic strain (β = -0.407, $p < 0.001$) and health risk attitude ($\beta = 0.262$, $p < 0.001$), suggesting that both economic strain and attitudes towards health risks significantly influenced well-being. Health risk attitudes, such as the willingness to engage in preventive

health behaviors, are crucial in the Sarawak context. For instance, in rural communities, attitudes towards traditional medicine versus modern healthcare can significantly influence health outcomes. A positive health risk attitude, where individuals actively seek preventive care and adhere to medical advice, can lead to better well-being. Community health initiatives that educate and encourage proactive health behaviors could thus play a pivotal role in improving well-being in Sarawak (Schüz et al., 2020).

In the fourth model, healthcare access was incorporated as an additional predictor. This model accounted for 18.4 percent of the variance in well-being ($R^2 = 0.184$), with a significant change in R^2 ($\Delta\ R^2 = 0.029$, p = 0.031). In this final model, both economic strain (β = -0.426, p $<$ 0.001) and healthcare access (β = 0.179, p $<$ 0.001) were significant predictors. The findings highlight the importance of healthcare access in predicting well-being, alongside economic strain. Healthcare access is a critical issue in Sarawak, where geographic and infrastructural challenges can impede access to medical services. In remote areas, limited healthcare facilities and long travel distances can deter individuals from seeking timely medical care. The significant positive impact of healthcare access on well-being in this model underscores the importance of improving healthcare infrastructure and accessibility. For example, mobile clinics and telemedicine services could bridge the gap in healthcare access, ensuring that even the most remote communities receive adequate healthcare, thereby enhancing their well-being (Zegeye et al., 2021).

The positive associations between health literacy, healthcare access, and well-being reaffirm previous findings that individuals with greater access to information and health services tend to adopt healthier behaviors and achieve better outcomes (Lastrucci et al., 2019; Omachi et al., 2013; McMaughan et al., 2020). Health literacy empowers individuals to interpret medical information, adhere to treatment, and engage in preventive health practices, while access to healthcare reduces barriers to early diagnosis and management of illness. The combined influence of these factors supports the Social Gradient Theory, which argues that each incremental improvement in SES provides additional psychosocial and material resources that protect health. Furthermore, the significant contribution of health risk attitude to well-being suggests that individuals with higher SES, who typically perceive greater control and self-efficacy, are more likely to engage in preventive health behaviors and avoid risky practices (Schüz et al., 2020; Edge and Oliver, 2019). Conversely, individuals in lower SES groups may exhibit more fatalistic health attitudes due to structural constraints and reduced perceived agency. These findings underscore the interconnected nature of socioeconomic and psychological determinants of health.

Taken together, the results of the Hierarchical Regression and Mann–Whitney U analyses present a cohesive picture of how SES shapes health and well-being through multiple pathways. The regression analysis demonstrates predictive mechanisms, while the Mann–Whitney U results highlight group-level disparities, both pointing to the same underlying gradient. Lower SES groups experience greater economic strain, reduced access to information and care, and consequently, poorer well-being outcomes. In contrast, higher SES groups benefit from cumulative social and material advantages that foster positive health behaviors and psychological resilience. This convergence supports the

Social Gradient Theory, which posits that health improves at every step up the socioeconomic hierarchy (Marmot, 2005). Moreover, the findings align with global evidence showing that reducing socioeconomic disparities contributes to sustainable health development (Stansfeld et al., 2013; Kim and Park, 2015). By illustrating how economic stability, literacy, and access interconnect to influence well-being, this study emphasizes that promoting equitable access to education and healthcare is central to achieving Sustainable Development Goal 3 (Good Health and Well-being) in the Sarawak context.

5 Conclusion and Recommendation

All in all, the findings from the hierarchical regression analysis underscore the complex and multifaceted nature of well-being, highlighting the critical influence of economic strain, health literacy, health risk attitudes, and healthcare access. Economic strain consistently emerged as a significant negative predictor of well-being across all models, reinforcing the profound impact of financial difficulties on life satisfaction. The inclusion of additional predictors, such as health literacy, health risk attitudes, and healthcare access, markedly enhanced the explanatory power of the models, demonstrating their essential role in understanding well-being. In particular, health literacy and healthcare access were identified as key factors in empowering individuals to make informed health decisions and seek necessary medical care, while positive health risk attitudes were associated with better health outcomes. These findings suggest that comprehensive strategies addressing economic disparities, enhancing health literacy, promoting proactive health behaviors, and improving healthcare accessibility are vital for improving overall well-being. In regions like Sarawak, where diverse economic conditions and geographic challenges prevail, these strategies are especially pertinent. By focusing on these critical determinants, policymakers and community leaders have the potential to make substantial strides in enhancing the well-being of their populations.

From this study, there are several policies to be considered into action plan in future by the policymakers. In tandem with economic support, enhancing health literacy is crucial for empowering individuals to make informed health decisions. The analysis revealed that health literacy significantly contributes to well-being by enabling individuals to navigate the healthcare system effectively, understand medical information, and engage in proactive health behaviors. To improve health literacy, targeted educational campaigns and community-based programs should be developed. These initiatives should focus on raising awareness about common health issues, preventive care, and the importance of regular check-ups. Given the diverse population and varying education levels in regions like Sarawak, it is essential that these programs are accessible and tailored to meet the needs of marginalized groups, including those in rural areas. Utilizing technology, such as mobile health (mHealth) applications and social media platforms, can also be instrumental in disseminating health information widely and effectively. By equipping individuals with the knowledge and skills necessary to manage their health, these programs can lead to better health outcomes and, consequently, enhanced well-being.

Another critical area for policy intervention is healthcare accessibility. Access to healthcare services is a fundamental determinant of well-being, as it directly affects individuals' ability to receive timely and appropriate medical care. In regions like Sarawak, geographic and economic barriers can significantly hinder access to healthcare, exacerbating health disparities. To address this, policies should focus on improving healthcare infrastructure and service delivery. Expanding the reach of healthcare facilities through mobile clinics and telemedicine services can provide much-needed medical care to remote and underserved communities. Telehealth platforms, in particular, offer a viable solution for overcoming geographic barriers, allowing residents in isolated areas to access consultations and follow-up care remotely. Additionally, investing in the training and retention of healthcare professionals in rural areas is essential to ensure that all residents have access to quality care. By improving healthcare accessibility, these policies can lead to better health outcomes, reduce disparities, and enhance the overall well-being of the population.

Finally, promoting positive health risk attitudes is essential for fostering healthier lifestyles and reducing the incidence of chronic diseases. The analysis indicated that individuals with positive health risk attitudes are more likely to engage in proactive health behaviors, leading to better health outcomes and improved well-being. Public health campaigns that emphasize the benefits of regular exercise, healthy eating, and avoiding harmful habits like smoking and excessive alcohol consumption should be prioritized. To support these campaigns, policies that increase access to healthy options, such as subsidizing healthy foods and creating public spaces for physical activity, are necessary. Additionally, offering community-based programs that provide support for individuals seeking to quit smoking, reduce alcohol consumption, or improve their diet and exercise habits can be highly effective. By fostering a culture of proactive health management, these policies can contribute to a healthier population and, in turn, enhance overall well-being.

Beyond its practical relevance, this study also makes an important theoretical contribution to the understanding of socioeconomic influences on health. By developing and empirically testing the Socioeconomic Status (SES) Experience Index, this research extends the application of the Social Determinants of Health framework (WHO, 2010) and Marmot's (2004) Social Gradient Theory within the Malaysian and Sarawakian context. The multidimensional structure of the index, encompassing household resources, economic stability, educational attainment, occupational complexity, and food security, demonstrates that SES operates not as a single indicator but as an interlinked system of material and experiential factors shaping health and well-being. The findings provide empirical evidence for how these dimensions interact to produce the observed social gradient in health outcomes. This contributes to existing theory by emphasizing the need to account for contextual, cultural, and economic diversity when examining the mechanisms through which socioeconomic status affects sustainable health.

While this study provides valuable insights into the factors influencing well-being, it is important to acknowledge certain limitations that should be considered when interpreting the findings. Firstly, the sample size of 290 respondents, while sufficient for exploratory analysis, may not fully capture the diversity of the broader population, par-

ticularly in a region as varied as Sarawak. This limitation suggests that the findings may not be entirely generalizable to all subpopulations, especially those with distinct socioeconomic or geographic characteristics. Nonetheless, despite these limitations, the study offers a meaningful contribution to the understanding of well-being in this context and provides a strong foundation for future research. Further studies, ideally with longitudinal designs and larger, more diverse samples, could build on these findings and offer deeper insights into the dynamic relationships between the key determinants of well-being.

Acknowledgement

The authors would like to acknowledge the financial support received from the RISE Research Grant Award (UNI/F01/RISE/85772/2023) and the Faculty of Economics and Business, Universiti Malaysia Sarawak. The authors also gratefully acknowledge Finance, Economics and Business Sustainability (FEBS) 2024, where an earlier version of this paper was presented, for the valuable feedback and constructive comments that contributed to the improvement of this paper.

References

Aittomäki, A., Martikainen, P., Laaksonen, M., Lahelma, E., and Rahkonen, O. (2010). The associations of household wealth and income with self-rated health–a study on economic advantage in middle-aged finnish men and women. *Social science & medicine*, 71(5):1018–1026.

Alvarez-Galvez, J., Rodero-Cosano, M. L., Motrico, E., Salinas-Perez, J. A., Garcia-Alonso, C., and Salvador-Carulla, L. (2013). The impact of socio-economic status on self-rated health: Study of 29 countries using european social surveys (2002–2008). *International journal of environmental research and public health*, 10(3):747–761.

Ben-Shlomo, Y. and Kuh, D. (2002). A life course approach to chronic disease epidemiology: conceptual models, empirical challenges and interdisciplinary perspectives.

Benamati, J. H., Ozdemir, Z. D., and Smith, H. J. (2010). Aligning undergraduate is curricula with industry needs. *Communications of the ACM*, 53(3):152–156.

Benson, G. S., Finegold, D., and Mohrman, S. A. (2004). You paid for the skills, now keep them: Tuition reimbursement and voluntary turnover. *Academy of Management journal*, 47(3):315–331.

Bíró, É., Ádány, R., and Kósa, K. (2011). Mental health and behaviour of students of public health and their correlation with social support: a cross-sectional study. *BMC public health*, 11(1):871.

Bishop, C., El-Sayed, T., Baljer, B., Buckley, E., Convill, J., Rowlands, G., Bell, R., and Nandhra, S. (2023). Effect of health literacy and socioeconomic deprivation on outcomes after lower limb surgical revascularisation for chronic limb-threatening ischaemia: the healthi study. *Journal of Vascular Societies of Great Britain and Ireland*, 3(1):10–8.

Chiao, C., Weng, L.-J., and Botticello, A. L. (2012). Economic strain and well-being in late life: findings from an 18-year population-based longitudinal study of older taiwanese adults. *Journal of Public Health*, 34(2):217–227.

CHUNG, K. K. H. (2015). Socioeconomic status and academic achievement. *International encyclopedia of the social & behavioral sciences*, pages 924–930.

Cundiff, J. M., Smith, T. W., Uchino, B. N., and Berg, C. A. (2013). Subjective social status: construct validity and associations with psychosocial vulnerability and self-rated health. *International journal of behavioral medicine*, 20(1):148–158.

Cutler, D. M. and Lleras-Muney, A. (2006). Education and health: evaluating theories and evidence.

Darin-Mattsson, A., Fors, S., and Kåreholt, I. (2017). Different indicators of socioeconomic status and their relative importance as determinants of health in old age. *International journal for equity in health*, 16(1):173.

Denney, J. T., Kimbro, R. T., and Sharp, G. (2018). Neighborhoods and food insecurity in households with young children: A disadvantage paradox? *Social Problems*, 65(3):342–359.

Edge, H. J. M. and Oliver, L. K. (2019). The association between risky health behaviours

and socio-economic status in canadian armed forces recruits: the mediating effect of health-risk attitudes. *Journal of Military, Veteran and Family Health*, 5(S1):43–53.

Galvan, M. J., Payne, B. K., Hannay, J., Georgeson, A. R., and Muscatell, K. A. (2023). What does the macarthur scale of subjective social status measure? separating economic circumstances and social status to predict health. *Annals of Behavioral Medicine*, 57(11):929–941.

Gautam, N., Dessie, G., Rahman, M. M., and Khanam, R. (2023). Socioeconomic status and health behavior in children and adolescents: a systematic literature review. *Frontiers in Public Health*, 11:1228632.

Gazmararian, J. A., Adams, M. M., and Pamuk, E. R. (1996). Associations between measures of socioeconomic status and maternal health behavior. *American journal of preventive medicine*, 12(2):108–115.

Gundersen, C. and Ziliak, J. P. (2015). Food insecurity and health outcomes. *Health affairs*, 34(11):1830–1839.

Hawkins, J. D., Catalano, R. F., and Miller, J. Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: implications for substance abuse prevention. *Psychological bulletin*, 112(1):64.

Hawley, L. D., Leibert, T. W., and Lane, J. A. (2014). The relationship between socioeconomic status and counseling outcomes. *Professional Counselor*, 4(4):390–403.

Headey, D. D. and Martin, W. J. (2016). The impact of food prices on poverty and food security. *Annual review of resource economics*, 8(1):329–351.

Karasek Jr, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative science quarterly*, pages 285–308.

Kim, J.-H. and Park, E.-C. (2015). Impact of socioeconomic status and subjective social class on overall and health-related quality of life. *BMC public health*, 15(1):783.

Kirkcaldy, B., Furnham, A., and Siefen, G. (2004). The relationship between health efficacy, educational attainment, and well-being among 30 nations. *European Psychologist*, 9(2):107–119.

Knighton, A. J., Brunisholz, K. D., and Savitz, S. T. (2017). Detecting risk of low health literacy in disadvantaged populations using area-based measures. *eGEMs*, 5(3):7.

Lal, A., Abdalla, S. M., Chattu, V. K., Erondu, N. A., Lee, T.-L., Singh, S., Abou-Taleb, H., Morales, J. V., and Phelan, A. (2022). Pandemic preparedness and response: exploring the role of universal health coverage within the global health security architecture. *The Lancet Global Health*, 10(11):e1675–e1683.

Lastrucci, V., Lorini, C., Caini, S., Group, F. H. L. R., and Bonaccorsi, G. (2019). Health literacy as a mediator of the relationship between socioeconomic status and health: A cross-sectional study in a population-based sample in florence. *PloS one*, 14(12):e0227007.

Lin, M., Hirschfeld, G., and Margraf, J. (2019). Brief form of the perceived social support questionnaire (f-sozu k-6): Validation, norms, and cross-cultural measurement invariance in the usa, germany, russia, and china. *Psychological Assessment*, 31(5):609.

Lordan, G., Soto, E. J., Brown, R. P., and Correa-Valez, I. (2012). Socioeconomic status and health outcomes in a developing country. *Health Economics*, 21(2):178–186.

Lundberg, J. and Kristenson, M. (2008). Is subjective status influenced by psychosocial factors? *Social indicators research*, 89(3):375–390.

Marmot, M. (2005). *Status syndrome: How your social standing directly affects your health*. A&C Black.

McCaffery, K., Dodd, R., Cvejic, E., Ayre, J., Batcup, C., Isautier, J., Copp, T., Bonner, C., Pickles, K., Nickel, B., et al. (2020). Disparities in covid-19 related knowledge, attitudes, beliefs and behaviors by health literacy. *medRxiv*.

McMaughan, D. J., Oloruntoba, O., and Smith, M. L. (2020). Socioeconomic status and access to healthcare: interrelated drivers for healthy aging. *Frontiers in public health*, 8:231.

Menec, V. H., Shooshtari, S., Nowicki, S., and Fournier, S. (2010). Does the relationship between neighborhood socioeconomic status and health outcomes persist into very old age? a population-based study. *Journal of aging and health*, 22(1):27–47.

Miravitlles, M., Naberan, K., Cantoni, J., and Azpeitia, A. (2011). Socioeconomic status and health-related quality of life of patients with chronic obstructive pulmonary disease. *Respiration*, 82(5):402–408.

Mutisya, M., Ngware, M. W., Kabiru, C. W., and Kandala, N.-b. (2016). The effect of education on household food security in two informal urban settlements in kenya: a longitudinal analysis. *Food security*, 8(4):743–756.

Omachi, T. A., Sarkar, U., Yelin, E. H., Blanc, P. D., and Katz, P. P. (2013). Lower health literacy is associated with poorer health status and outcomes in chronic obstructive pulmonary disease. *Journal of general internal medicine*, 28(1):74–81.

Omani-Samani, R., Maroufizadeh, S., Almasi-Hashiani, A., Sepidarkish, M., and Amini, P. (2019). The who-5 well-being index: a validation study in people with infertility. *Iranian journal of public health*, 48(11):2058.

Pamuk, E. R., Fuchs, R., and Lutz, W. (2011). Comparing relative effects of education and economic resources on infant mortality in developing countries. *Population and development review*, 37(4):637–664.

Schüz, B., Brick, C., Wilding, S., and Conner, M. (2020). Socioeconomic status moderates the effects of health cognitions on health behaviors within participants: Two multibehavior studies. *Annals of Behavioral Medicine*, 54(1):36–48.

Sepehri, A. and Guliani, H. (2015). Socioeconomic status and children's health: evidence from a low-income country. *Social Science & Medicine*, 130:23–31.

Shih, Y.-L., Hsieh, C.-J., Li, P.-S., and Liu, C.-Y. (2021). Psychometric properties of the health literacy scale used in the taiwan longitudinal study on middle-aged and older people. In *Healthcare*, volume 9, page 1391. MDPI.

Sivakumar, G. and Chau, B. (2017). Poverty: A clinical instrument for family physicians. *University of Western Ontario Medical Journal*, 86(2):62–64.

Stansfeld, S. A., Shipley, M. J., Head, J., Fuhrer, R., and Kivimaki, M. (2013). Work

characteristics and personal social support as determinants of subjective well-being. *PloS one*, 8(11):e81115.

Stormacq, C., Wosinski, J., Boillat, E., and Van den Broucke, S. (2020). Effects of health literacy interventions on health-related outcomes in socioeconomically disadvantaged adults living in the community: a systematic review. *JBI evidence synthesis*, 18(7):1389–1469.

Ware, J. E., Kosinski, M., and Keller, S. D. (1996). A 12-item short-form health survey: construction of scales and preliminary tests of reliability and validity. *Medical care*, 34(3):220–233.

Zegeye, B., El-Khatib, Z., Ameyaw, E. K., Seidu, A.-A., Ahinkorah, B. O., Keetile, M., and Yaya, S. (2021). Breaking barriers to healthcare access: a multilevel analysis of individual-and community-level factors affecting women's access to healthcare services in benin. *International journal of environmental research and public health*, 18(2):750.