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Association of Self-Efficacy With Functional Capacity, Life Engagement and Illness Avoidance in Middle-Aged and Older Adults: Moderated Mediation Analysis With a Large Multistage Sample

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ABSTRACT

Background: Research has confirmed the association of self-efficacy with social participation and other health outcomes, but to the best of our knowledge, no study has assessed a potential moderation of the association of self-efficacy with illness avoidance through life engagement by functional capacity.

Aim: This study is aimed at assessing a potential moderated mediation by life engagement in the association of self-efficacy with functional capacity and illness avoidance.

Methods: This study employed a cross-sectional design and multistage sampling to select 4147 middle-aged and older adults (mean age = 60 years). Standardised scales were used to measure constructs, and Hayes' PROCESS Macro was utilised to test a moderated mediation model. The regression coefficients were stratified by age and chronic disease status.

Results: Self-efficacy was positively associated with illness avoidance directly ($\beta = 0.105$; $t = 6.335$; CI: 0.074–0.135; $p < 0.001$) and indirectly through life engagement ($\beta = 0.124$; CI: 0.107–0.141; $p < 0.001$). Self-efficacy was more strongly associated with life engagement at higher functional capacity ($\beta = 0.047$; $t = 4.813$; CI: 0.028–0.066; $p < 0.001$). Moderated mediation was confirmed ($\beta = 0.020$; CI: 0.010–0.031; $p < 0.001$), implying that the indirect association of self-efficacy with illness avoidance through life engagement was stronger at higher functional capacity. The results were consistent across age groups and chronic disease statuses, but the standardised moderated mediation effect size appeared slightly larger in older adults aged over 60 years and those with chronic diseases.

Conclusion: Illness avoidance is more strongly associated with self-efficacy through life engagement amongst adults with higher functional capacity. Higher self-efficacy can be associated with functional capacity and illness avoidance. The results support the rationale for future experimental and longitudinal studies.

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1 | Introduction

The burden of chronic diseases and its associated healthcare costs in Ghana continues to increase as a consequence of population ageing [1]. The ideal way to manage population ageing is to empower older adults to avoid illness through health-seeking behaviours [2, 3]. Previous research in Ghana identifies the improvement of self-efficacy as a health-promoting and healthy ageing approach [4]. However, to the best of our knowledge, no integrated model linking self-efficacy, health-seeking behaviour and illness avoidance has been tested in Ghana, although evidence from this model may inform health-promoting interventions harmonious with Ghana's 2010 healthy ageing policy [5]. This study, thus, is aimed at providing evidence for implementing the foregoing policy and for advancing the debate on the role of psychological capital, specifically self-efficacy in well-being [6].

Self-efficacy is a belief in one's capability to complete specific tasks or overcome life challenges [7]. Systematic reviews suggest that self-efficacy is positively associated with health outcomes, including general well-being, self-care and quality of life [8, 9]. Such outcomes are often due to self-efficacy facilitating physical activity, social participation, adherence to prescribed disease management practices, self-care, healthcare utilisation, disease risk avoidance (e.g. smoking cessation), healthy eating and other healthy habits [4, 6, 10–12]. Thus, self-efficacy facilitates prohealth behaviours through which optimal health is maintained, especially in disorienting life situations. This study focuses on social participation self-efficacy, which is a belief in one's own ability to participate in social activities [13]. This type of self-efficacy is more likely to predict health-seeking behaviours (e.g. social participation and physical activity), since it motivates mobility in the community. The phrase 'self-efficacy' is subsequently used to refer to social participation self-efficacy.

Self-efficacy plays a role in well-being in the general population, but research recognises it as a psychological capital more relevant to well-being in adverse life situations or amongst people experiencing terminal illnesses [9, 14]. According to systematic reviews [9, 14], research exploring the health benefits of self-efficacy was focused on older adults and people living with chronic diseases. Since old age is a difficult stage of life, characterised by frailty and chronic diseases [15], research on the role of self-efficacy in health in older adults is normatively crucial. The population of every country, including Ghana, is ageing rapidly [16], implying that the proportion of older adults will increase over the coming decades. An improved understanding of the mechanisms by which self-efficacy correlates with well-being and illness avoidance is an essential way to develop interventions targeted at older adults.

Metacognition plays an important role in the mechanism by which self-efficacy is associated with illness avoidance through life engagement. It refers to the cognitive capacity to control, monitor and modulate cognitive processes, which guides and orients behaviour [17]. Metacognition would complement self-efficacy by enabling older adults, who may be dealing with age-related difficulties, to have control over any negative feelings and doubts about the value of social networks and participation.

Being able to control both positive and negative emotions is a psychological foundation for self-confidence and motivation to participate in health-seeking behaviours (e.g. social participation and healthcare use) [17, 18], which can be associated with illness avoidance.

Illness avoidance is a measure of health in old age characterised by physical functional capacity, medication avoidance and general well-being [19, 20]. Although it does not measure the avoidance of disease, its indicators (i.e. medication and therapy avoidance, pain avoidance and functional ability) reflect the general experiences or conditions of persons without a disease. Individuals with a disease would often use medication, need therapy or experience pain. Even so, illness avoidance is not necessarily a measure of the individual's disease avoidance, since people who feel healthy and avoid pain and medication may be living with a disease.

Notably, illness avoidance is an important measure of physical health in old age for a couple of reasons. Firstly, the health conditions it focuses on (e.g. avoidance of bodily pain, medication use and functional limitations) are important determinants of well-being in older age [19]. Additionally, medication use, functional dependence and physical health problems (e.g. pain) are prevalent amongst Ghanaian older adults [21–23]; hence, any measures incorporating these problems would play an important role in research focused on a Ghanaian sample. The only available scale used to measure illness avoidance is brief and is, therefore, an appropriate psychometric tool for collecting data from older adults. Arguably, illness avoidance may be more important if analysed in relation to self-efficacy and life engagement.

Life engagement refers to participation in social, economic and work-related activities [19]. It is a more inclusive measure of social participation because it encompasses work engagement, community involvement and financial support for one's family. Given that one of the ideal goals of healthy ageing is to maintain financial autonomy through sustained employment [24, 25], researching the role of life engagement, rather than traditional measures of social participation that do not include measures of work and economic engagement, may provide important practical implications. Researchers recognise life engagement as a proxy of successful ageing [4, 19], which signifies its exceptional role in optimal health in old age.

Research has confirmed a positive association between self-efficacy and health outcomes [8, 9] but has not assessed the association of self-efficacy with illness avoidance. This shortcoming is worth filling for several reasons. Illness avoidance is unique because it encompasses an item on the individual's avoidance of mobility limitations and medications. Medications are linked to illnesses, usually unappealing to individuals, and may impact the individual's physical and mental health. Mobility limitations may predict social isolation and physical inactivity, thereby increasing one's susceptibility to diseases. Illness avoidance in old age is one of the ultimate outcomes of healthy ageing since it incorporates perceptions of general well-being and indicators of illness avoidance, such as medication avoidance [3]. Hence, mechanisms by which it is associated with self-efficacy amongst older adults are

worth exploring. One of the behaviours by which self-efficacy is associated with health outcomes is social participation [6], implying that life engagement can mediate the relationship between self-efficacy and illness avoidance.

We argue that functional capacity, the physical and mental ability of the individual to independently perform tasks required for daily living or work [26], plays a crucial role in the foregoing mediating role. Suffice it to say that individuals with high self-efficacy but low functional capacity may be unable to engage with life, since mobility and physical strength are necessary for life engagement. Self-efficacy without functional capacity will probably not optimise life engagement. Similarly, the association of self-efficacy with illness avoidance through life engagement would be weak or nonsignificant at low functional capacity. These deductions imply the moderating role of functional capacity in the nexus amongst self-efficacy, life engagement and illness avoidance. However, this nexus has not been assessed, although it may provide novel practical implications. This study attempted to fill these gaps by answering the following research question: *Is the indirect association of self-efficacy with illness avoidance through life engagement moderated by functional capacity?*

This study makes three important contributions. First, it introduces and empirically tests an integrated moderated mediation model linking self-efficacy, life engagement, functional capacity and illness avoidance as a health-promoting mechanism. Second, the study positions functional capacity as a theoretical moderator within the model, extending previously tested frameworks beyond mediation. Third, by stratifying results by age group and chronic disease status, this study generates contextually nuanced evidence that maximises analytical robustness and reveals potential heterogeneity. To complement these contributions, the study elucidates relevant policy directions and implications.

2 | Theoretical Framework

This study draws on the salutogenic model [27] and conservation of resources (COR) theory [28] to explain how self-efficacy correlates with illness avoidance through life engagement and why this process depends on functional capacity. The salutogenic model, introduced by Antonovsky [27], shifts attention from disease causation to the processes that sustain health and well-being. It emphasises individuals' ability to mobilise resources to maintain health, particularly through active engagement in behaviours that promote well-being [27, 29]. From this perspective, illness avoidance represents a salutogenic outcome, reflecting the extent to which individuals engage in health-seeking behaviours.

The COR theory complements this view by explaining how such behaviours are shaped by resource availability. Individuals strive to acquire, retain and protect valuable resources, including psychological and physical resources [28, 30]. Psychological resources, such as self-efficacy, foster self-confidence and motivate individuals to perform health-promoting behaviours [4]. This view harmonises with the study of Martiadis et al. [17], which recognises self-efficacy as a psychological resource for emotional regulation and social participation. This study focuses on self-efficacy for social participation, which is more likely to motivate participation in social activities, including life engagement. From this perspective, life engagement serves as a behavioural activation of self-efficacy (see Figure 1).

However, life engagement is unlikely to translate into illness avoidance in the absence of sufficient functional capacity. When individuals lack the physical capacity to act, their self-efficacy may not translate into meaningful behavioural engagement. Thus, physical functional capacity is an enabler of physical and cognitive resources, including self-efficacy and life engagement.

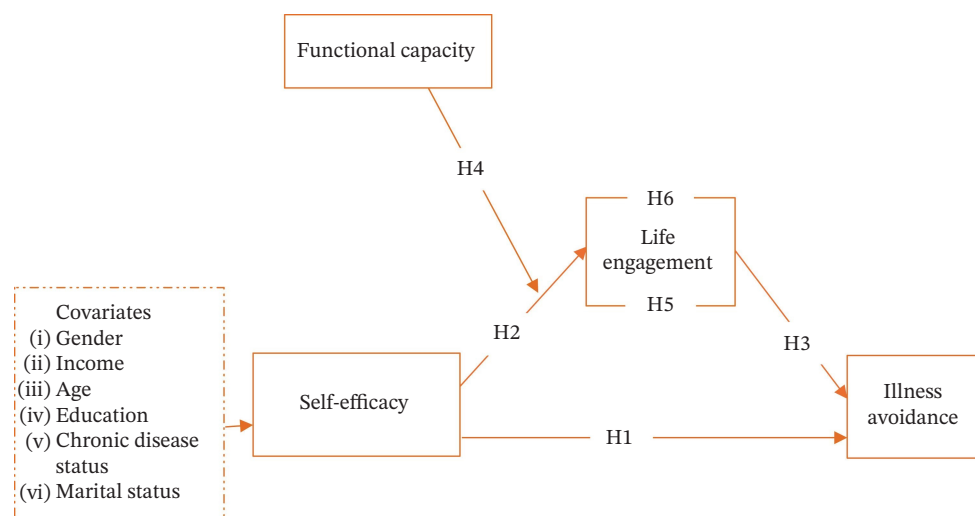


FIGURE 1 | The moderated mediation model. Note: Broken lines represent confounding. H1, the association between self-efficacy and illness avoidance; H2, the association of self-efficacy with life engagement; H3, the association of life engagement with illness avoidance; H4, functional capacity moderates the association of self-efficacy with life engagement; H5, life engagement mediates the relationship between self-efficacy and illness avoidance; H6, the indirect relationship between self-efficacy and illness avoidance through life engagement is moderated by functional capacity.

This study proposes that the association of self-efficacy with illness avoidance through life engagement depends on functional capacity, forming the basis of a moderated mediation. This study extends existing research by demonstrating when and why self-efficacy may translate into illness avoidance through life engagement, highlighting the critical role of functional capacity as a moderator in this process.

2.1 | Study Hypotheses

Individuals with higher self-efficacy are more likely to perceive health challenges as manageable and engage in behaviours aimed at maintaining well-being, including adherence to medical advice, participation in preventive health activities and avoidance of health risks [31, 32]. As a psychological resource, self-efficacy enhances individuals' capacity to maintain control over their health and adopt a proactive orientation towards well-being [27]. Individuals with strong self-efficacy are, therefore, more likely to engage in behaviours that reduce their susceptibility to illness. Empirical evidence supports this view, showing that psychological resources such as self-efficacy are associated with improved health outcomes [4, 6, 10–12]. Our first hypothesis (H1, see Figure 1) is, therefore, stated as follows:

Individuals with higher self-efficacy would report larger illness avoidance scores, which reflects a positive association between self-efficacy and illness avoidance.

Life engagement is critical for maintaining health, particularly amongst older adults, as it promotes physical functioning, social integration and psychological well-being [33, 34]. Self-efficacy plays a central role in facilitating life engagement. Individuals who believe in their ability to perform specific actions are more likely to initiate and sustain participation in health-seeking behaviours that contribute to their well-being [31]. This reflects the motivational function of self-efficacy, which encourages individuals to invest effort in activities that yield positive health outcomes. This perspective implies our second hypothesis (H2), which is stated as follows:

Individuals with higher self-efficacy would report larger life engagement scores.

Life engagement is a key determinant of health outcomes, as it reflects individuals' active involvement in behaviours that promote well-being and prevent illness. Engagement in physical activity improves physiological functioning, social participation provides emotional support and reduces psychological distress and healthcare utilisation facilitates early detection and management of health conditions [33, 35]. Life engagement represents active utilisation of resources to maintain health and avoid disease [29]. Individuals who remain engaged in such activities are more likely to adopt behaviours that reduce their vulnerability to illness and sustain their well-being. Based on this reasoning, we test the following third hypothesis (H3):

Higher life engagement is associated with larger illness avoidance scores.

Whilst self-efficacy motivates engagement in health-promoting behaviours, the translation of this motivation into action depends on functional ability [28]. When functional capacity is high, individuals can convert their self-efficacy into meaningful life engagement, including participation in physical, social and healthcare-related activities. In contrast, when functional capacity is low, individuals may lack the physical energy or capability to act on their beliefs, making self-efficacy less likely to result in sustained engagement in health-seeking behaviours. In such situations, functional capacity operates as a binding constraint that creates a gap between motivation and action. These arguments form the basis of the fourth hypothesis (H4):

The positive relationship between self-efficacy and life engagement is stronger at higher functional capacity.

The relationship between self-efficacy and illness avoidance is expected to operate through behavioural pathways, with life engagement serving as a key mediator. In other words, life engagement provides the pathway through which self-efficacy may be associated with illness avoidance. Self-efficacy enhances individuals' capacity to engage in behaviours that sustain health, whereas life engagement reflects the active expression of this capacity [27, 36]. Additionally, self-efficacy enables the mobilisation of behavioural resources, and life engagement represents the utilisation of these resources to achieve positive health outcomes (Hobfoll, 1989). Empirical evidence supports this mechanism, showing that self-efficacy influences well-being through behavioural engagement [4, 7, 37]. The following fifth hypothesis (H5) was informed by these thoughts:

Life engagement mediates the relationship between self-efficacy and illness avoidance.

Psychological resources produce favourable outcomes only when supported by sufficient physical resources [28]. The indirect association of self-efficacy with illness avoidance through life engagement is conditional on functional capacity. Thus, the mediating role of life engagement may be stronger at higher levels of functional capacity. We, therefore, hypothesise that the indirect association of self-efficacy through life engagement is stronger at higher levels of functional capacity (Hypothesis 6 [H6]). As illustrated in Figure 1, the hypothesised relationships can be confounded by demographic and socioeconomic factors. Previous research [38] suggests that age, education and gender are amongst potential confounders of the moderated mediation shown in Figure 1. This study, thus, attempted to adjust for these covariates.

3 | Methods and Materials

3.1 | Study Design

We employed a cross-sectional design to test the moderated mediation model. The hypotheses were tested through conditional process modelling [39], and the regression coefficients were stratified by age and chronic disease status.

3.2 | Participants and Sampling Strategy

The study targeted community-dwelling Ghanaian residents aged 50 years or above. We adopted a multistage sampling approach to generate a large community-based sample. First, we stratified Ghana into four zones (north, south, east and west), ensuring that each cardinal area was selected. Communities were then randomly selected from each zone: 18 communities were selected from the north, 15 from the south, 13 from the east and 21 from the west. Proportional sampling was utilised in selecting communities to avoid over- or underrepresentation of the zones. Communities were selected based on a guide from the Ghana Statistical Service, which we used in a previous study [4]. Within selected communities, households containing eligible adults were selected using a systematic sampling method. In the systematic sampling process, households were automatically numbered from 1 using the random number generator in MS Excel, allowing us to put all households in a sequence. We then determined the sampling interval by dividing the total number of households (reported by the Ghana Statistical Service) within each zone by the minimum sample size calculated below. The sampling intervals (k) from this process were 9 for the north, 8 for the south, 11 for the east and 10 for the west. We used the random sampling method in MS Excel to select the first households from the four sequences generated. Every other k -th household was then selected. Participants were eligible if they were (1) aged 50 years or above, (2) permanent residents of Ghana, (3) available to participate willingly and (4) not diagnosed with any neurodegenerative disorder. Individuals with severe cognitive impairment were excluded because this condition increases the risk of recall bias.

We followed recommended guidelines [40] to calculate the minimum sample size for a stratified moderated mediation with multiple linear regression based on two groups. The sample size was estimated using G*Power based on standard parameters (effect size = 0.15; α = 0.05; power = 0.80), resulting in a minimum sample size of 699 participants per group [40]. The sample size was estimated based on an effect size = 0.15, instead of a larger effect size, to maximise the sample size. We did not use an effect size < 0.15, ensuring that the resulting sample size did not lead to the statistical significance of very small effect sizes. We increased the estimated sample size by 20% to make room for nonresponse or partial questionnaire completion. This procedure led to an overall sample size of 839 per group. Thus, the minimum sample required for the stratified moderated mediation analysis was 1678.

3.3 | Measures

3.3.1 | Self-Efficacy

We operationalised self-efficacy as the independent variable, defined as perceived capability to perform social activities. We measured self-efficacy using an eight-item validated scale adopted in whole from Tadaka et al. [13]. This scale was designed and validated to measure social participation self-efficacy. It was preferred to other self-efficacy measures because social participation is a health-seeking behaviour that better aligns with the concept of

salutogenesis and our hypotheses. Participants rated statements describing their social participation self-efficacy based on descriptive anchors ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Some of the items are 'I can participate in the activities or volunteer work of my neighbourhood associations' and 'I can encourage nearby neighbours to come out to gatherings'. Internal consistency was evaluated based on Cronbach's alpha ≥ 0.70 [41], with the current data yielding a coefficient of 0.87. We computed composite scores by summing all items, with higher scores between 8 and 40 indicating higher self-efficacy.

3.3.2 | Life Engagement

Life engagement refers to the degree to which individuals participate in meaningful social, economic and work-related activities. It was measured using a subscale of the successful ageing scale developed by Ng et al. [19]. The nine-item scale was associated with five descriptive anchors, which ranged from *strongly disagree* (1) to *strongly agree* (5). Some of its items are 'I provided concern and support to enrich the lives of my neighbours' and 'I make a financial or productive contribution to my family'. Cronbach's alpha coefficient of the scale was 0.91, and scores were summed up to generate a composite score ranging between 9 and 45. Higher scores represent higher or more frequent life engagement.

3.3.3 | Illness Avoidance

Illness avoidance, the dependent variable, measures the avoidance of diseases and medication linked to them. The construct was measured using a four-item subscale of the successful ageing scale developed by Ng et al. [19]. Some items of the scale are 'I was healthy enough to move around freely' and 'I did not use medication or therapy'. Items were rated and coded on the same Likert scale as life engagement. The Cronbach's alpha coefficient of the scale was 0.71, which reflects satisfactory internal consistency. Composite scores were calculated by summing responses, with higher scores between 4 and 20 indicating higher illness avoidance.

3.3.4 | Functional Capacity

Functional capacity is an individual's ability to independently perform everyday essential activities, including activities of daily living and instrumental activities of daily living. The five-item scale was adopted in whole from previous research [19], and some of its items are 'I had enough energy for daily life' and 'my body and mind were strong enough to enable me to live independently without having others take care of me'. Its Cronbach's alpha coefficient was 0.76, which signifies satisfactory internal consistency. The responses were aggregated to produce a composite score ranging from 5 to 25, with higher values indicating higher functional capacity. Supporting Information 1: Appendix S1A–D shows all items of the scales and the coding scheme adopted.

3.3.5 | Potential Confounders

Age, gender, education, income, marital status, self-reported health and chronic disease status were included in the study as

potential confounders [38]. The measurement of these variables was consistent with previous research [4, 38]. Chronic disease status was assessed by asking respondents whether they had been diagnosed by a qualified health professional with one or more chronic conditions. The participants were then coded into two groups: those without any chronic disease and those with at least one chronic disease. Self-reported health was measured as a dichotomous categorical variable by asking the participants to indicate whether their health was poor or good. Following previous research [42], 'poor' was coded as 1, and 'good' was coded as 2. Age was measured as the respondent's chronological age in years and treated as a continuous variable in the analysis. Educational attainment was measured as a continuous variable, defined as the number of years of formal schooling completed. Monthly income was measured as the respondent's gross earnings in Ghana cedis. Income was coded into two categories: Respondents earning 2000 Ghana cedis or less were coded as 1, whereas those earning above 2000 Ghana cedis were coded as 2. Categorisation of income variables is common in social and public health research when the objective is to capture broad socioeconomic disparities rather than model detailed income gradients.

3.4 | Instrumentation

A self-reported questionnaire with two blocks of information was employed to collect data. The first block presented the measurement scales, whereas the second block contained questions on demographic variables and the potential confounders. Blocks and scales were presented in distinct sections, each of which accompanied survey completion instructions.

3.5 | Data Collection and Ethical Considerations

Ethical approval was obtained from the Institutional Ethics Review Boards of the University of Essex, School of Health and Social Care (Reference: TH2425-0021), and the Kwame Nkrumah University of Science and Technology (Reference: HuSSREC/AP/VOL. 3). Participation was voluntary, and written informed consent was obtained from all respondents before data collection. Respondents were informed that participation was anonymous and that they could withdraw from the study at any time without consequences. Trained data collection assistants collected the data at designated centres. We collected data over 4 weeks, from July 2025 to August 2025. Out of 4350 questionnaires distributed, 4147 were returned and analysed. The response rate was 95.3%, and 203 of the distributed questionnaires were either not returned at all or partially completed.

3.6 | Pilot Study and Instrument Validation

A pilot study was conducted in June 2025 to evaluate the questionnaire's reliability and clarity. The pilot study was based on 350 participants randomly selected from the larger sample of 4147. These individuals participated in the pilot study and main survey to provide data for test-retest reliability assessment. This procedure was consistent with best practices in psychometric

testing [43]. Research assistants assisted with data collection as described earlier. We assessed the internal consistency of the measures using Cronbach's alpha, with values above 0.70 considered acceptable [41]. Cronbach's alpha coefficients from the constructs ranged between 0.76 and 0.96, which reflected high internal consistency of the scales. All questions and items on the questionnaire were coherent and unambiguous to the participants. To minimise common method bias, procedural remedies were implemented, including the separation of constructs in the questionnaire and the use of validated scales [44]. A strong Pearson's correlation ranging from 0.76 to 0.81 between the pilot data and data from the main survey indicated consistency of the measures [43].

Since illness avoidance, functional capacity and life engagement conceptually overlap and come from the same psychometric tool, we used data from the main survey to assess their discriminant validity, ensuring that each subscale could be used as a unique measure. Discriminant validity confirms that subscales can serve as independent and distinct measures [45]. Following previous research [46, 47], we assessed discriminant validity by computing Pearson's correlation amongst items of illness avoidance, functional capacity and life engagement. The correlation between items from different subscales is predominantly less than 0.30 (see Supporting Information 1: Appendix S2), as recommended in the literature [46], an outcome that confirmed discriminant validity.

3.7 | Statistical Analysis

Data were analysed using SPSS (Version 31). Descriptive statistics and Pearson correlations were calculated to examine relationships amongst the study variables. Missing data were minimal (<2%) and were handled using the multiple imputation method [42]. Before deciding to perform multiple imputation, we first performed the 'missing completely at random' (MCAR) test. The nonsignificance of this test at $p > 0.05$ suggested that the missing data were randomly distributed. We further investigated the impact of the missing data by comparing the results between the complete dataset and the data with missing observations. Consistency of the results was observed in the analysis. The specific multiple imputation method used was the 'multiple imputation with chained equations', the most widely used approach [48]. Assumptions of linear regression, including normal distribution of the data, linearity of the relationships and multicollinearity, were assessed and met following recommended procedures [4, 49]. Normal distribution of the data was confirmed with skewness and kurtosis values within the recommended threshold of ± 2 [49]. Further to this, box plots did not show any outliers on the variables. Linearity of the relationships was confirmed with curve estimation [4], a procedure that yielded a significant result for the linear model ($p < 0.001$). Thus, the hypothesised relationships could be modelled with a linear function. Supporting Information 1: Appendix S3 is a sample graph from curve estimation. Multicollinearity was confirmed with tolerance values ≥ 0.5 across the predictors [49].

Hayes' PROCESS Macro (Model 7) [39, 50] was used to test the moderated mediation based on maximum likelihood estimation. This modelling approach was based on 5000

bias-corrected resamplings at a confidence level of 95%. Two groups of models were fitted. Firstly, the crude model excluding the confounding variables was fitted on all participants (i.e., the whole sample). We then fitted the adjusted model, which included the confounding variables, on the same sample. Mean centring was carried out as the gold standard in moderation and moderated mediation analysis [50]. To assess model robustness, analyses were stratified by age group (50–60 vs. > 60 years), consistent with Ghana's retirement structure [16]. Further stratification was done by chronic disease status (i.e. those who reported one or more chronic diseases and those who did not; see Table 1). The results were significant at a minimum of $p < 0.05$.

4 | Results

Table 1 shows a summary of all variables included in the study. The average age of the participants was 60 years

(mean = 60.45; SD = 8.64), whereas about 50% of the participants were men. The average years of schooling were 17 years (mean = 17.21; SD = 6.02). The average scores of self-efficacy (mean = 27.49; SD = 6.44) and illness avoidance (mean = 11.56; SD = 3.47) were 27 and 12, respectively. Table 2 shows the direct regression coefficients. Self-efficacy was positively associated with both life engagement ($\beta = 0.334$; $t = 26.126$; $p < 0.001$) and illness avoidance ($\beta = 0.105$; $t = 6.335$; $p < 0.001$) in the whole sample, implying that individuals who reported higher self-efficacy reported higher illness avoidance and life engagement. Functional capacity was positively associated with life engagement ($\beta = 0.442$; $t = 34.526$; $p < 0.001$), which was also positively associated with illness avoidance ($\beta = 0.424$; $t = 26.903$; $p < 0.001$). Thus, the direct relationships (i.e. H1, H2 and H3) were supported by the data.

The interaction between self-efficacy and functional capacity (i.e. SEF×Fc) was positively associated with life engagement

TABLE 1 | Summary of variables included in the study ($N = 4147$).

Variable	Group	<i>M</i> / <i>n</i>	SD/%	Min–max
Continuous variables				
Life engagement	—	29.58	8.03	9–45
Functional capacity	—	16.67	4.20	5–25
Illness avoidance	—	11.56	3.47	4–20
Self-efficacy	—	27.49	6.44	8–40
Age (years)	—	60.45	8.64	50–98
Education (years)	—	17.21	6.02	9–29
Categorical variables				
Self-reported health	Poor	1007	24.28	—
	Good	3140	75.72	—
Gender	Women	2084	50.25	—
	Men	2063	49.75	—
Chronic disease status	None	2474	59.66	—
	One or more	1673	40.34	—
Income (Gh¢)	≤ 2000	2305	55.58	—
	> 2000	1842	44.42	—
Marital status	Not married	1313	31.66	—
	Married	2834	68.34	—
	Total	4147	100.00	—

Note: '—' indicates not applicable; *n*, frequency; %, percent.

Abbreviations: *M*, mean; max, maximum; min, minimum; SD, standard deviation.

TABLE 2 | Association of self-efficacy with functional capacity, life engagement and illness avoidance.

Independent variable	Whole sample (<i>N</i> = 4147)			50–60 years (<i>N</i> = 2251)			Above 60 years (<i>N</i> = 1896)			CDS (none; <i>N</i> = 2474)			CDS (one or more; <i>N</i> = 1673)		
	Model 1	Model 2		Model 1	Model 2		Model 1	Model 2		Model 1	Model 2		Model 1	Model 2	
	Life engagement β (t)	Illness avoidance β (t)		Life engagement β (t)	Illness avoidance β (t)		Life engagement β (t)	Illness avoidance β (t)		Life engagement β (t)	Illness avoidance β (t)		Life engagement β (t)	Illness avoidance β (t)	
Crude coefficients															
Self-efficacy	0.349 (27.120)***	0.109 (6.969)***		0.332 (18.652)***	0.089 (4.204)***		0.370 (19.647)**	0.140 (6.042)***		0.292 (17.666)***	0.109 (5.395)***		0.418 (20.158)***	0.092 (3.720)***	
Functional capacity	0.439 (34.016)***			0.436 (24.670)***	—		0.441 (23.308)***	—		0.469 (28.338)***	—		0.403 (19.468)***	—	
Life engagement	—	0.422 (27.060)***		—	0.419 (19.742)***		—	0.428 (18.535)***		—	0.410 (19.815)***		—	0.423 (17.872)***	
SEF×Fc	0.050 (5.050)***	—		0.057 (4.182)***	—		0.048 (3.224)**	—		0.042 (3.318)**	—		0.061 (3.692)***	—	
Adjusted coefficients															
Self-efficacy	0.334 (26.126)***	0.105 (6.335)***		0.304 (16.905)***	0.074 (3.440)**		0.360 (19.384)***	0.141 (6.137)***		0.294 (17.899)***	0.096 (4.752)***		0.376 (18.293)***	0.098 (3.985)***	
Functional capacity	0.442 (34.526)***	—		0.432 (24.786)***	—		0.454 (23.974)***	—		0.457 (27.858)***	—		0.437 (21.247)***	—	
Life engagement	—	0.424 (26.903)***		—	0.420 (19.441)***		—	0.430 (18.648)***		—	0.419 (20.079)***		—	0.439 (18.384)***	
SEF×Fc	0.047 (4.813)***	—		0.049 (3.665)***	—		0.048 (3.298)**	—		0.041 (3.310)**	—		0.057 (3.534)***	—	
Covariates															
Age (years)	−0.029 (−2.374)*	−0.024 (−1.731)		—	—		—	—		−0.019 (−1.200)	−0.070 (−3.680)***		0.050 (2.618)**	0.022 (1.052)	
CDS (ref, none)	−0.029 (−2.370)*	−0.092 (−6.444)***		−0.039 (−2.128)*	−0.070 (−3.359)**		−0.013 (−0.753)	−0.122 (−6.299)***		—	—		—	—	
Sex (ref, women)	0.082 (6.952)***	−0.021 (−1.553)		0.086 (5.253)***	−0.020 (−1.072)		0.078 (4.662)***	−0.017 (−0.877)		0.053 (3.590)***	0.003 (0.187)		0.113 (5.862)***	−0.057 (−2.696)**	

(Continues)

TABLE 2 | (CONTINUED)

Independent variable	Whole sample (N = 4147)				50–60 years (N = 2251)				Above 60 years (N = 1896)				CDS (none; N = 2474)				CDS (one or more; N = 1673)			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
	Life engagement	β (t)	Illness avoidance	β (t)	Life engagement	β (t)	Illness avoidance	β (t)	Life engagement	β (t)	Illness avoidance	β (t)	Life engagement	β (t)	Illness avoidance	β (t)	Life engagement	β (t)	Illness avoidance	β (t)
Education (years)	0.037 (2.998)**		−0.017 (−1.222)		0.062 (3.603)***		−0.007 (−0.378)		0.005 (0.296)		−0.028 (−1.353)		0.027 (1.817)		0.015 (0.853)		0.057 (2.664)**		−0.072 (−3.098)**	
Income (ref, ≤ £2000)	0.029 (2.276)*		0.029 (1.945)		0.008 (0.456)		0.060 (2.967)**		0.066 (3.569)***		0.021 (0.998)		−0.021 (−1.285)		0.053 (2.744)**		0.100 (4.705)***		−0.001 (−0.042)	
SRH (ref, poor)	−0.030 (−2.466)*		−0.024 (−1.710)		0.020 (0.951)		−0.053 (−2.180)*		−0.071 (−4.547)***		0.008 (0.427)		−0.008 (−0.425)		−0.114 (−5.233)***		0.049 (2.788)**		0.026 (1.360)	
MS (ref, not married)	0.099 (8.293)***		−0.046 (−3.288)**		0.120 (7.008)***		−0.015 (−0.764)		0.077 (4.674)***		−0.078 (−4.126)***		0.110 (7.265)***		−0.034 (−1.873)		0.073 (3.700)***		−0.051 (−2.336)*	

Abbreviations: CDS, chronic disease status; Fe, functional capacity; MS, marital status; SEF, self-efficacy; SRH, self-reported health. ****p* > 0.001; ***p* > 0.01; **p* > 0.05.

in the whole sample ($\beta = 0.047$; $t = 4.813$; $p < 0.001$). The conditional indirect effects in Table 3 suggest that functional capacity positively moderates the relationship between self-efficacy and life engagement. Thus, self-efficacy was more strongly associated with life engagement at higher functional capacity, which confirms the H4. The moderation is shown in Figure 2A. Life engagement mediates the association of self-efficacy with illness avoidance in the whole sample ($p < 0.001$), which confirms the H5. There was a moderated mediation of the relationship between self-efficacy and illness avoidance by life engagement in the whole sample (moderated mediation index = 0.074; $p < 0.001$). This outcome confirms H6, suggesting that life engagement more strongly mediated the link between self-efficacy and illness avoidance at higher functional capacity.

The stratification analysis showed consistency of the results in that all the hypotheses were supported across the two age groups and chronic disease status. Even so, the moderated mediation effect size and the interaction effect size appeared slightly larger in participants aged over 60 years and in those with at least one chronic disease. Figure 2B–E shows the moderating role of functional capacity in the association of self-efficacy with illness avoidance across age groups and chronic disease statuses. The pairwise contrasts (see Table 4) were significant at $p < 0.001$ in the whole sample and in each of the four groups, suggesting that the mediation confirmed was stronger at higher functional capacity. Supporting Information 1: Appendix S4 shows the total variances on the dependent variables. In the whole sample, the total variance on illness avoidance after adjusting for the covariates was 43%, and the corresponding total variance on life engagement in the same model was 24%. The minimum variance across all the models was 23.3% (see Supporting Information 1: Appendix S4), implying that the models had a moderate fit.

5 | Discussion

This study assessed the potential moderated mediation by life engagement in the association of self-efficacy with functional capacity and illness avoidance. A cross-sectional design was employed, and the results were stratified by age and chronic disease status.

After adjusting for the covariates, this study confirmed a positive but weak association between self-efficacy and illness avoidance, which suggests that participants with higher self-efficacy reported higher illness avoidance. This result is analogous to evidence from previous research [9, 14]. A systematic review reported several studies that found a positive association between self-efficacy and self-care [9]. Self-care involves the performance of tasks for daily living and work, which may translate into physical activity and protection of well-being. It can also contribute to a reduction in the risk of disease. Another systematic review [14] has reported a positive association between self-efficacy and quality of life. None of these studies, however, considered illness avoidance as an outcome.

A partial mediation of life engagement in the relationship between self-efficacy and illness avoidance was found. This result is grounded in the direct association of self-efficacy with both illness

TABLE 3 | Association of self-efficacy with life engagement at levels of functional capacity (adjusted model).

Functional capacity level	Life engagement		
	Beta (β)	95% CI (bootstrapped)	
		Lower	Upper
Whole sample ($N = 4147$)			
−1 SD	0.299***	0.270	0.329
Mean	0.349***	0.324	0.375
+1 SD	0.399***	0.366	0.433
50–60 years ($N = 2251$)			
−1 SD	0.254***	0.213	0.295
Mean	0.304***	0.268	0.339
+1 SD	0.353***	0.306	0.401
Above 60 years ($N = 1896$)			
−1 SD	0.313***	0.270	0.356
Mean	0.360***	0.323	0.396
+1 SD	0.406***	0.358	0.455
CDS (none; $N = 2474$)			
−1 SD	0.254***	0.217	0.290
Mean	0.294***	0.262	0.327
+1 SD	0.335***	0.291	0.378
CDS (one or more; $N = 1673$)			
−1 SD	0.319***	0.270	0.368
Mean	0.376***	0.336	0.416
+1 SD	0.433***	0.380	0.486

Note: Estimates are based on 5000 sampling iterations (bootstraps).

Abbreviations: CDS, chronic disease status; CI, confidence interval; SE, standard error of β .

*** $p < 0.001$.

avoidance and life engagement and the positive association of life engagement with illness avoidance. The mediation is partial because self-efficacy was directly associated with illness avoidance, independent of life engagement, implying the existence of other unmeasured mediation pathways. Researchers [31, 51] have observed that self-efficacy and other psychological capital factors are a positive affect that protects psychological well-being without necessarily facilitating health-seeking behaviours. Positive affect is a protective emotional state that boosts immune and anatomical function [52, 53], leading to illness avoidance. This mechanism may have explained the partial mediation role of life engagement.

The mediating role of life engagement was moderated by functional capacity, indicating that life engagement more strongly

mediated self-efficacy and illness avoidance at higher functional capacity. This outcome supports our argument that functional capacity may be necessary for the positive association of self-efficacy with health-seeking behaviours. When their functional capacity is low, older adults are unlikely to perform such behaviours, even if their self-efficacy is high. This reasoning is supported by the weak direct association between self-efficacy and illness avoidance. The moderated mediation is stronger than this direct association, emphasising that self-efficacy is more strongly linked to illness avoidance through life engagement than it is directly associated with illness avoidance. This result is consistent with our analysis of the COR theory and the salutogenic model, both of which recognise self-efficacy as a resource that facilitates healthy behaviours. According to the salutogenic model, self-efficacy is one of the generalised resistance resources by which individuals overcome adversity [27, 54]. The COR theory also recognises self-efficacy as a personal resource that can be invested in life activities to avoid diseases [28, 30].

The socioeconomic status of older adults and the cultural landscape of Ghana are reflected in the mediating role of life engagement. Many Ghanaian older adults, including retired persons, work actively because they either lack state retirement benefits or live with inadequate financial support from the government [16]. Such older adults work within informal sectors (e.g. agriculture, construction and trade [16]) to survive, which can sustain life engagement (e.g. working to support one's family). Given that our sample was predominantly young and educated, its members were more likely to engage with life. Thus, from a cultural and socioeconomic perspective, the sample's life engagement was more likely to be associated with illness avoidance and to mediate self-efficacy and illness avoidance.

To the best of our knowledge, this study is the first to concurrently link self-efficacy to life engagement, functional capacity and illness avoidance. This integration is novel because it presents functional capacity as a complementary resource and explains whether its interaction with self-efficacy can improve the strength of the mediating role of a health-seeking behaviour (life engagement) in the relationship of self-efficacy with illness avoidance. It reveals life engagement as a potential behavioural pathway to relishing self-efficacy for illness avoidance, although this pathway is more likely to be associated with illness avoidance at higher functional capacity. In the context of the COR theory and salutogenic model, self-efficacy and functional capacity are personal resources, life engagement is a behavioural pathway through which these resources are invested and illness avoidance is the benefit of resource investment.

The results of the study are consistent between age groups and chronic disease statuses, albeit the confirmed moderated mediation is stronger amongst older adults aged over 60 years and those living with chronic diseases. This outcome corroborates the argument that psychological capital may more strongly predict health outcomes in adverse life situations [4]. Living with chronic disease or experiencing age-related functional limitations can create conditions in which psychological and physical resources become especially important. This thinking may have influenced the design of similar previous studies [9, 14] that focused on or included older adults experiencing acute or chronic health problems.

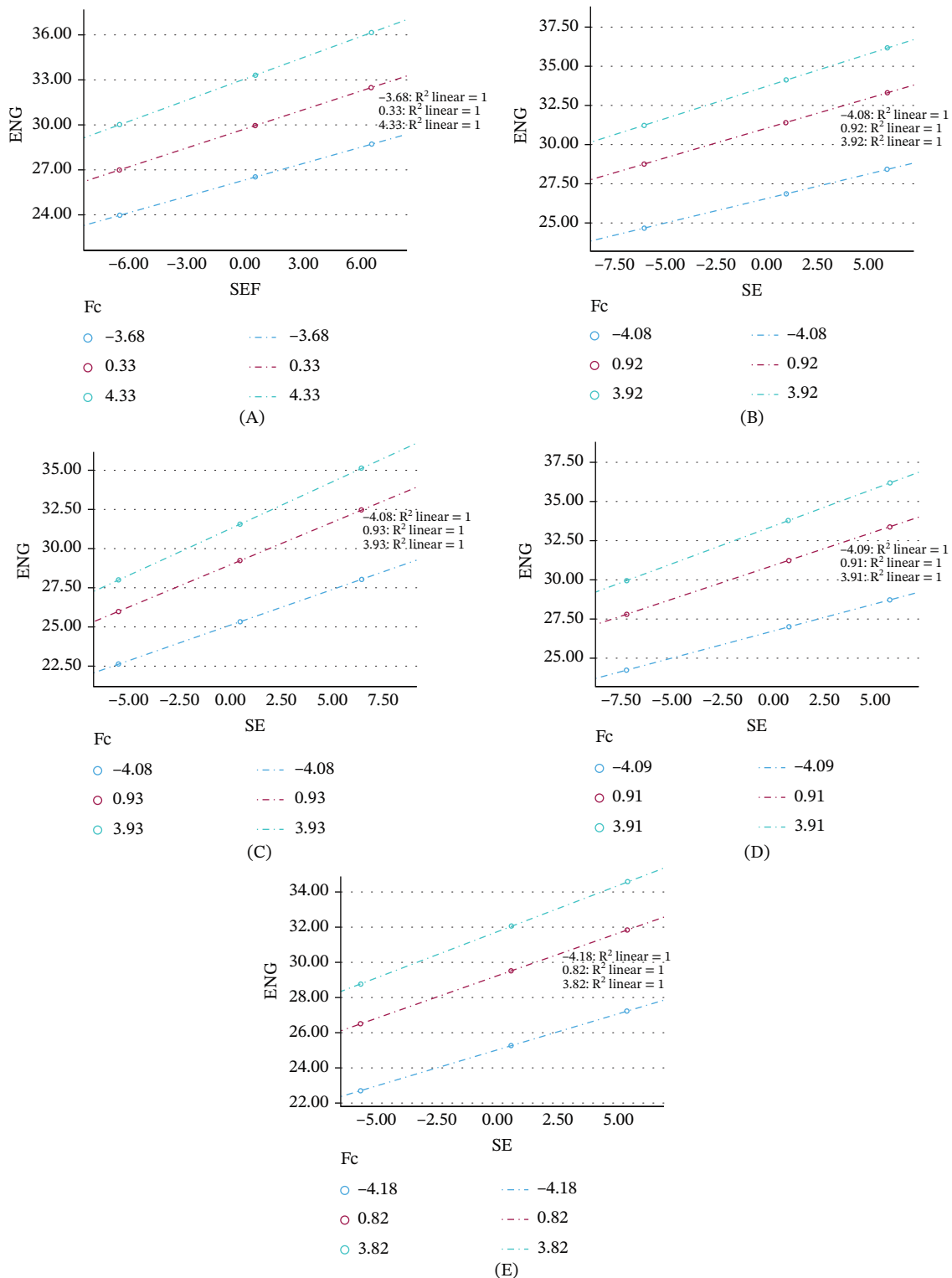


FIGURE 2 | Association of self-efficacy with life engagement at low, moderate and high levels of functional capacity, with stratification by age and chronic disease status. (A) Whole sample ($N = 4147$). (B) Participants with no chronic disease ($N = 2474$). (C) Participants with one or more chronic diseases ($N = 1673$). (D) Participants aged 50–60 years ($N = 2251$). (E) Participants aged over 60 years ($N = 1896$). Note: Blue lines, high functional capacity; red lines, moderate functional capacity; green lines, high functional capacity; ENG, life engagement; SEF, self-efficacy; Fc, functional capacity.

The results have implications for implementing Ghana's 2010 healthy ageing policy, which aims to improve support for older adults and empower them to maintain health-seeking behaviours [5]. As current evidence suggests, disease prevention efforts in

Ghana or elsewhere should include efforts to improve personal resources (e.g. self-efficacy and functional capacity), which may facilitate health-seeking behaviours. Such interventions may better be associated with illness avoidance in older adults living with

TABLE 4 | Indirect coefficients and pairwise contrasts from the adjusted models.

Fc level	Beta (β)	Pairwise contrasts		
		β_1	β_2	Contrast
Whole sample (index of moderated mediation = 0.074; $p < 0.001$; $N = 4147$)				
−1 SD	0.124***	0.144	0.124	0.020***
Mean	0.144***	0.164	0.124	0.040***
+1 SD	0.164***	0.164	0.144	0.020***
Age (50–60 years; index of moderated mediation = 0.021; $p < 0.001$; $N = 2251$)				
−1 SD	0.107***	0.127	0.107	0.021***
Mean	0.127***	0.148	0.107	0.042***
+1 SD	0.148***	0.148	0.127	0.021***
Age (above 60 years; index of moderated mediation = 0.021; $p < 0.001$; $N = 1896$)				
−1 SD	0.135***	0.155	0.135	0.020***
Mean	0.155***	0.175	0.135	0.040***
+1 SD	0.175***	0.175	0.155	0.020***
CDS (none; index of moderated mediation = 0.017; $p < 0.001$; $N = 2474$)				
−1 SD	0.106***	0.123	0.106	0.017***
Mean	0.123***	0.140	0.106	0.034***
+1 SD	0.140***	0.140	0.123	0.017***
CDS (one or more; index of moderated mediation = 0.025; $p < 0.001$; $N = 1673$)				
−1 SD	0.140***	0.165	0.140	0.025***
Mean	0.165***	0.190	0.140	0.050***
+1 SD	0.190***	0.190	0.165	0.025***

Abbreviations: CDS, chronic disease status; Fc, functional capacity.

*** $p < 0.001$.

terminal illnesses. Health-seeking behaviours linked to self-efficacy and functional capacity would play a crucial role in curbing the high prevalence of social isolation reported in Ghana [55]. Also notable is the bidirectionality of the relationships confirmed. It is possible that participants reported higher self-efficacy because they avoided illness. Alternatively, a belief in one's capacity to complete tasks may be due to their avoidance of disease, which emboldens them and increases their self-confidence. This example underscores the need for future experimental studies that examine causation amongst the variables.

5.1 | Implications for Practice

Self-efficacy is weakly associated with illness avoidance directly but is more strongly associated with illness avoidance through life engagement. Alternatively, self-efficacy is more likely to be associated with illness avoidance in situations where it facilitates

health-seeking behaviours, such as life engagement. Believing in one's ability to perform social activities alone may not be sufficient for avoiding illness. The individual's well-being is maintained or protected if this belief translates into life engagement. If so, interventions aimed at enhancing self-efficacy should be cognisant of the mediating role of life engagement. Worth applying is the model from Martiadis et al. [56] for lifestyle management in psychiatric outpatients. The rationale of this model corroborates the integration of behavioural engagement and self-management of illnesses, including affective disorders. Interventions such as this should be designed and implemented to improve individuals' knowledge of life engagement and its role in health. Through this effort, older adults can understand and appreciate life engagement as a mediator of self-efficacy and illness avoidance, thereby enhancing their motivation to be socially inclusive.

Functional capacity plays an outstanding role in the moderated mediation model in the sense that it complements both

self-efficacy and life engagement. This outcome makes practical sense, given that older adults without functional capacity cannot independently perform social activities and other health-seeking behaviours. Even if such individuals have a high self-efficacy, they may lack the physical and cognitive capacity to independently initiate and carry out social activities. They may also lack autonomy and dignity, important factors that contribute to well-being [57, 58]. Thus, self-efficacy may not be associated with illness avoidance without functional capacity, a lesson that underscores the need for multipurpose interventions aimed at concurrently enhancing self-efficacy, life engagement and functional capacity. Individuals ought to be informed that the ultimate way to relish their self-efficacy is by maintaining health-seeking behaviours, such as life engagement, physical activity and preventive healthcare utilisation.

A multipurpose intervention for enhancing self-efficacy may take the form of an interventional trial, a structured on-the-job training or an educational engagement process. An interventional trial is an experimental research intervention designed to improve self-efficacy and encourage participants to accept and maintain life engagement as a disease prevention habit. Research funding institutions may prioritise such trials, since they provide an understanding of how self-efficacy facilitates life engagement and possibly other health-seeking behaviours across the life span. Structured on-the-job training is suitable for corporate organisations, where employees need self-efficacy to complete job tasks and maintain health-seeking behaviours. Organisational investments in human development can foster well-being that translates into work performance. An educational engagement programme can be a community-based or formal educational activity aimed at improving self-efficacy and health literacy within communities. This programme should provide an understanding of the role of life engagement and functional capacity in self-efficacy and disease prevention.

The larger moderated mediation effect size in adults aged over 60 years and those with one or more chronic diseases has some implications for practice. This result implies that the foregoing interventions may be more strongly associated with illness avoidance in older age and amongst those with one or more chronic diseases, possibly because they enable these groups to better manage their terminal illnesses through life engagement activities. Research suggests that patients can avoid symptoms and complications of chronic diseases and live in optimal health if they engage in optimal disease self-management activities [59, 60], which include social inclusion, physical activity and preventive healthcare utilisation. This study did not investigate whether the participants with chronic diseases were involved in disease self-management activities, but the literature suggests people with clinically diagnosed terminal illnesses moderately engage in such activities [61].

Given that well-being is a measure of people's subjective assessment of symptoms they experience [62], individuals with chronic diseases can report high illness avoidance scores if they do not experience the symptoms of their terminal illnesses. Younger individuals, especially those without chronic diseases, may not participate in disease self-management activities regularly since they do not feel susceptible to chronic diseases. Hence, the recommended multipurpose interventions should address

individuals' perception of their health status and how their disease vulnerability perception influences their life engagement and other health-seeking behaviours. The interventions may differently impact groups with different disease vulnerability perceptions; hence, such groups should be differently addressed in the interventions. Health-promoting interventions for older adults with chronic diseases may enhance self-efficacy for adhering to evidence-based disease self-management practices, whereas similar programmes for those without chronic diseases may improve self-efficacy for preventive healthcare utilisation and other health-seeking behaviours.

The current results underscore the need for integrated interventions that combine self-efficacy training, social participation, chronic disease self-management, physical rehabilitation and preventive healthcare utilisation. This study, given its cross-sectional design, does not suggest that such interventions can be effective or enhance self-efficacy, functional capacity and well-being. Rather, we anticipate or hypothesise the positive effect of the integrated interventions (including randomised controlled trials and longitudinal studies) on the range of health outcomes considered in this study. Integrated interventions may be more valuable, since they can enhance multiple health outcomes, ideally with minimal implementation cost. This point recalls the limitations of this study.

5.2 | Limitations and Future Research

As a cross-sectional survey, this study does not confirm causality amongst the variables. The moderated mediation tested was for assessing associations and generating hypotheses for assessing potential causation in future experimental studies. This study adjusted for covariates but does not eliminate confounding owing to its cross-sectional design. Future research should adjust for as many covariates as possible or utilise an experimental design that eliminates confounding. The potential confounders of the model may vary between contexts, so future studies should include all relevant confounders unique to their contexts.

A unique set of covariates for a context may be identified through a robust review of the literature. Since self-reported health and chronic disease status are similar to illness avoidance, there was the risk of overadjustment of our model, but their incorporation in the analysis probably did not cause overadjustment, given their weak correlation with illness avoidance (see Supporting Information 1: Appendix S5). Pearson's correlation was -0.148 ($p < 0.001$) between illness avoidance and chronic disease status and -0.266 ($p < 0.001$) between illness avoidance and self-reported health (see Supporting Information 1: Appendix S5). Additionally, the effect sizes between the adjusted and crude models did not change substantially.

The evidence is not necessarily generalisable to younger and non-Ghanaian populations, although this study utilised a large multistage sample. A replication of this study in other populations is, therefore, imperative. Subjective scales, which are prone to recall and social desirability bias [63], were used to measure the constructs. Future researchers may utilise objective measures where possible. They can also build upon the current study by introducing other psychological capital factors (e.g. resilience

and optimism) in the moderated mediation model as independent variables, allowing for a comparative analysis of the factors.

There was a potential measurement overlap amongst functional capacity, life engagement and illness avoidance, which may have affected the strengths of the relationships. Future researchers may avoid this shortcoming by using more distinct measures. The measurement of chronic disease status was not based on clinical diagnosis or data, and the types and severity of disease were not considered. Future researchers should measure chronic disease status based on clinical diagnoses and perform statistical analysis based on disease categorisations (e.g. cardiovascular and neurodegenerative). The study sample predominantly comprised educated adults; hence, the results may not generalise to adults with no or low education, as well as adults with severe cognitive impairment, institutionalised older adults or populations outside Ghana. Future researchers are encouraged to adopt stratified sampling nested within multistage or cluster sampling to generate more representative samples. The mediation role of life engagement should be interpreted as an 'indirect association' only, not as a causal mediation. Interpreting the indirect association as a causal mediation is an overstatement of our results [64]. Individuals who participated in the pilot study possibly understood the main survey better and, therefore, provided different ratings. The tool used to measure life engagement possibly did not include all relevant indicators. We therefore call for studies developing or using more inclusive measures that incorporate all aspects of life engagement.

6 | Conclusion

Middle-aged and older adults with higher self-efficacy reported higher life engagement and illness avoidance, and self-efficacy was more strongly associated with life engagement at higher functional capacity. Life engagement more strongly mediated the positive association of self-efficacy with illness avoidance at higher functional capacity, especially in older participants and those with one or more chronic diseases. The study concludes that functional capacity may be an advantage for avoiding illness through participation in life engagement activities. Interventions for enhancing self-efficacy should ideally encourage life engagement and maintain functional capacity, but such interventions should be designed to meet the unique needs of groups with different disease vulnerability perceptions. We call for experimental research that assesses causation between the variables.

Author Contributions

N.A. conceived the research idea, analysed the data, and wrote part of the manuscript. A.K.C. and N.B.A. wrote the literature review and methods sections, respectively. S.M.A., E.E., E.W.A., C.Y., R.A-M.J., and G.B. coordinated data collection and contributed to the conceptualisation of the study. A.J. contributed to the study's conceptualisation and critically reviewed the manuscript.

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Disclosure

All authors proofread and approved the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data used for this study will be made available by the corresponding author upon reasonable request.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Supporting Information 1.** Appendix S1: (A–D) All measurement scales used. Appendix S2: Bivariate correlation coefficients amongst items of functional capacity, life engagement and illness avoidance. Appendix S3: A sampled figure from curve estimation that shows the relationship between self-efficacy and illness avoidance. Appendix S4: Total variances from the moderated mediation models. Appendix S5: Pearson's zero-order bivariate correlation coefficients of all variables included in the moderated mediation model. **Supporting Information 2.** Table S1: The STROBE checklist of the manuscript.