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Sociodemographic, functional disability and severe illness predict extreme fatigue among older adults in Ghana

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Abstract

Background Extreme fatigue is a disabling but under-recognized condition among older adults. However, studies investigating impact of sociodemographic and health-related factors on extreme fatigue among older adults in Ghana are limited. This study, therefore, examined the prevalence and predictors of extreme fatigue among older adults in Ghana.

Methods We analyzed cross-sectional data among community-dwelling older adults aged 50+ ($N=4,838$) extracted from the 2023 Ghana Annual Household Income and Expenditure Survey (AHIES). Participants had a mean age of 59.9 ± 8.3 years (maximum age = 99 years), and the sample comprised 2,159 (44.63%) males and 2,679 (55.37%) females. Extreme fatigue was self-reported and recorded dichotomously (yes/no). Descriptive statistics were applied to estimate the prevalence of extreme fatigue. A multivariable model estimated adjusted associations, with significance at $p < 0.05$.

Results Overall, 17.03% of participants reported experiencing extreme fatigue. In the multivariable model, severe illness (aOR = 5.16, 95% CI 4.21–6.31), functional disability (aOR = 1.31, 95% CI 1.05–1.63), rural residence (aOR = 1.26, 95% CI 1.06–1.50), and basic labor occupations (aOR = 1.41, 95% CI 1.13–1.78) predicted higher likelihood of experiencing extreme fatigue. Also, older adults of Gurma (aOR = 2.94, 95% CI 2.05–4.19) and other ethnic groups (aOR = 1.73, 95% CI 1.12–2.65) had higher odds of experiencing extreme fatigue. On the other hand, older adults in Northern (aOR = 0.31, 95% CI 0.22–0.43) and Southern Ghana (aOR = 0.48, 95% CI 0.40–0.58) were less likely to report extreme fatigue.

Conclusion Chronic illness, functional disability, occupation, and regional disparities emerged as key predictors, highlighting the need for geriatric care to extend beyond clinical treatment to include simple, community-level approaches that support daily functioning and healthy ageing, aligned with SDG 3.

Keywords Fatigue, Critical illness, Older adults, Chronic diseases, AHIES, Ghana



1 Introduction

The landscape of aging and chronic diseases in Ghana is being shaped by transitions in demographics and epidemiology [1–4]. The proportion of people over 60 years continues to increase steadily worldwide as a result of an increase in longevity and a concurrent decline in fertility [5, 6]. In Ghana, this proportion has seen a 4.5% growth, an increase from 213,447 in 1960 to 1,991,736 in 2021 [7]. According to most recent projections, this number is expected to reach 6.3 million by 2050 [8]. The increasing older adults population has resulted in increasingly substantial pressure on families and primary care services as this shift occurs alongside a constrained health and social system [9].

Extreme fatigue is the persistent state of tiredness unrelieved by rest [10]. This condition affects a substantial proportion of older adults and is commonly missed in routine assessments [11]. The prevalence of extreme fatigue varies across diverse populations and clinical contexts. A systematic review and meta-analysis revealed that, about 22% of cancer patients have been reported to experience fatigue [12]. Park et al. [13] reported that, about 80% of patients who experience chronic illnesses like multiple sclerosis, experience fatigue. This study focuses on extreme fatigue rather than general fatigue because extreme fatigue is more strongly associated with functional impairment, disability, and adverse health outcomes in older adults, whereas mild fatigue may be transient or clinically inconsequential [14, 15]. In the context of the growing burden of non-communicable diseases, extreme fatigue also reflects cumulative disease burden and physiological vulnerability, making it a more relevant public health indicator for healthy ageing research [16]. Extreme fatigue is a common and disabling marker of serious physical and mental health issues in older populations. In the latter stages of life, extreme fatigue has been shown to reduce psychological resilience, erode the independence of older adults and most often influence negatively the management of chronic diseases [17, 18]. Studies conducted worldwide have shown extreme fatigue is a risk factor for sleep associated disorders, a depressive state and multimorbidity in older adults [19–21]. A systematic review and meta-analysis of 21 studies involving 17,843 participants showed that slower gait, declining quality of life and a high rate of incident disability are experienced by older adults who frequently report fatigue [22]. The findings from these studies suggest that extreme fatigue is not just a symptom of lack of rest but an important indicator of vulnerability in the older population, which requires research, policy and clinical attention.

Several sociodemographic and health-related factors such as chronic health conditions, functional disability, age, gender, marital status and occupation may serve as correlates of extreme fatigue among older adults [23]. Noncommunicable diseases and multimorbidity are key epidemiologic profiles of older populations including Ghanaian older cohort, both of which are key players of extreme fatigue [24, 25]. A study conducted by the World Health Organization (WHO) on Global AGEing and adult health (SAGE) highlights the burden cardiometabolic diseases poses on the adult population in Ghana [26]. The difficulty in treatment and management of non-communicable diseases, and the associated psychosocial stress increase the likelihood of developing extreme fatigue. Furthermore, a study conducted in Ghana noted that patients with non-communicable diseases often complained of extreme fatigue [27]. For instance, there are reports of post-stroke fatigue affecting approximately 60% of people within the first month after

stroke [28]. Meanwhile, a population level estimate of how chronic health conditions predict extreme fatigue in Ghana is lacking.

Loss of functional ability is also considered both a correlate and a consequence of extreme fatigue [29]. Studies have reported that, older adults who report “feeling tired most of the time” display a reduced performance of physical activity and a greater difficulty in handling their daily routine [30, 31]. A vicious cycle is highlighted by this relationship: activity is limited by extreme fatigue, hastens deconditioning which subsequently worsens fatigue. In settings with limited resources especially where devices meant for assistance and rehabilitation programs are less accessible, the functional toll of extreme fatigue is highly felt increasing the likelihood of social isolation, utilizing health-care and becoming dependent [32].

How extreme fatigue is experienced and handled is further shaped by sociodemographic characteristics [33]. There have been consistent differences in reports of fatigue among sexes with women having a higher frequency in global and regional studies [34]. Also, food insecurity, socioeconomic status and limited social support remain crucial determinants of extreme fatigue [35]. There are notable gaps in age-friendly infrastructures and geriatric care capacity which inadvertently worsens the effect fatigue has on daily life [36, 37]. It is therefore important to understand how other sociodemographic factors such as level of education, structure of household, sex, age and employment status predict extreme fatigue to guide the creation of equitable and responsive interventions.

Collectively, population level estimates of extreme fatigue and its associated sociodemographic and health related factors among older Ghanaians are limited despite its importance in guiding healthy ageing, clinical practice, public health interventions and shaping policy and resource allocation for geriatric care in Ghana [38–40]. Most of the studies around this topic focus on either specific disease or surrounding geriatric conditions like depression, vision impairment and frailty [41–43]. These studies are able to highlight substantial loss of functional ability in later life, but they do not capture the prevalence and predictors of extreme fatigue. This study aims to address this gap by investigating the prevalence and predictors of extreme fatigue among older adults in Ghana. The results from this study are in direct support of targets 3.4 and 3.8 of the Sustainable Development Goal 3 which seeks to reduce premature mortality from NCDs and promote well-being and achieve universal health coverage respectively. Findings could help identify prevalence and predictors of extreme fatigue among older adults informing early detection, integrated care and interventions that ensure healthy ageing and overall well-being.

2 Materials and methods

2.1 Data source

This study was based on existing data from the Ghana Annual Household Income and Expenditure Survey (AHIES), conducted quarterly by the Ghana Statistical Service (GSS) between 2021 and 2023 [44]. The AHIES is Ghana’s first high-frequency national survey, collecting detailed quarterly and annual information on household finances, demographics, and well-being. It provides essential data for generating macroeconomic indicators and supports research, policymaking, and monitoring of national development programs and the Sustainable Development Goals (SDGs).

The AHIES sample was based on the 2021 Population and Housing Census. A total of 10,800 households were selected from 600 Enumeration Areas (EAs), with 304 (50.67%) urban and 296 (49.33%) rural areas. In each EA, 18 households were randomly selected, creating a nationally and regionally representative sample for expenditure and GDP estimates. Comprehensive details on the survey design, sampling framework, and field procedures are available in the Annual Household Income and Expenditure Survey (AHIES) report [44].

2.2 Measures

For this study, a subset of participants aged 50 years and above was analyzed due to the evidence that extreme fatigue is more prevalent among older adults. Although older adulthood is commonly defined as age ≥ 60 years globally, the age 50 years was used as the cutoff to reflect the demographic, social, and epidemiological context of sub-Saharan Africa [45, 46]. Empirical evidence from African scholars demonstrates that lower life expectancy, cumulative exposure to physically demanding occupations, and socio-economic adversity contribute to earlier functional decline, supporting the contextual appropriateness of the ≥ 50 -year cutoff [47, 48]. This approach aligns with prior studies in the region and provides a valid representation of older adulthood in Ghana, consistent with the World Health Organization's Multinational Study on Ageing (MNS), which adopted a threshold of 50 years for sub-Saharan African populations in recognition of the region's lower life expectancy [49].

The dependent variable in this study was extreme fatigue among older adults. Extreme fatigue was defined as "a condition characterized by persistent and overwhelming sense of tiredness which is unable to resolve after the individual attains rest". Respondents were asked, "During the past 2 weeks has (NAME) suffered from extreme fatigue", and answers were recorded in binary form (Yes or No). Responses were coded as "0" for "No" and "1" for "Yes." Treating extreme fatigue as a binary variable is consistent with previous population-based studies examining fatigue outcomes [50, 51].

Sociodemographic and health-related factors were included as predictors of extreme fatigue and independent variables. Key measures included illness status, functional disability, body mass index (BMI), educational attainment, and occupational classification. BMI was derived from objectively measured height and weight by trained GSS field officers during data collection.

Functional disability was derived from three activities of daily living (ADLs): walking or climbing steps, performing self-care tasks such as washing or dressing, and communicating effectively (including both understanding and being understood). Each of these items was coded dichotomously, with responses indicating either no difficulty (0) or some level of difficulty, assistance, or complete inability to perform the task (1). The responses were aggregated into a continuous disability score ranging from 0 to 3. Individuals who reported no difficulty across all three ADLs were categorized as having no disability (None). Those who reported difficulty with one or two tasks were considered to have moderate disability (Moderate), while those indicating difficulty with all three tasks were classified as having severe functional disability (Severe). This approach to classifying functional disability aligns with prior published research [52].

Severe illness was defined from self-reports of illness or injury. Respondents were classified as having severe illness if they reported either (a) an illness not serious but not

preventing work, (b) a serious illness not preventing work, or (c) illness/injury that temporarily or permanently stopped work. Those reporting no illness or injury were coded as having no severe illness.

BMI was regrouped using WHO criteria: underweight (< 18.5), healthy weight (18.5 – 24.9), overweight (25.0 – 29.9), and obese (≥ 30.0).

Educational status was coded as “Formal education” for any class-based schooling or “No formal education” for otherwise. Occupations were regrouped into three categories: white-collar for professional and managerial jobs, blue-collar/basic labor for manual and technical trades, and service/administrative for clerical and support roles.

Finally, the 16 administrative regions of Ghana were grouped into three zones to simplify our analysis: Central Ghana (Bono, Bono East, Ahafo, Ashanti, Eastern and Oti), Southern Ghana (Central, Greater Accra, Volta, Western and Western North), and Northern Ghana (Upper West, Upper East, North East, Northern and Savannah).

2.3 Data analysis

Statistical analysis was conducted using R programming software (version 4.4.3). The analysis began by importing the AHIES dataset, from which a targeted sample of individuals aged 50 and above was extracted for the study. The final analytic sample consisted of 4,838 participants out of the original 9,667 observations, after implementing complete-case analysis that excluded observations with missing or non-response values in the outcome variable or any covariates.

Prevalence of extreme fatigue was calculated using unweighted proportions from the analytic sample. Survey weights from the AHIES were not applied in this analysis to suit the primary aim of the study of examining associations rather than generate nationally representative estimates. However key design variables, including region and urban–rural residence, were included as covariates in regression models to account for sampling design. The potential for some variation in prevalence estimates under weighted analysis is acknowledged, particularly for population-level inference.

The relationship between each independent variable and extreme fatigue was first evaluated using bivariate logistic regression (Model 1). The model assessed the crude, unadjusted relationship between each independent variable and extreme fatigue. Next, in a multivariable analysis, Model 2 was built by including all independent variables to examine their adjusted associations with extreme fatigue. For all analysis, a p -value of less than 0.05 was statistically significant. Variance inflation factors (VIFs) were used to test for multicollinearity. All adjusted generalized variance inflation factors (GVIF) values were below 2, suggesting that multicollinearity was not a concern.

3 Results

3.1 Background characteristics and prevalence of extreme fatigue

Participants had a mean age of 59.9 years ($SD = 8.3$) with maximum age of 99 years. The sample comprised 2159 (44.63%) males and 2,679 (55.37%) females. Table 1 present the descriptive characteristics of participants and prevalence of extreme fatigue. Overall, as shown in Table 1, 824 participants (17.03%) reported experiencing extreme fatigue. In Table 1, the chi-square analysis showed Occupation class ($\chi^2 = 30.46$, $p < 0.001$), place of residence/settlement (urban vs. rural) ($\chi^2 = 22.72$, $p < 0.001$), regional group ($\chi^2 = 128.24$, $p < 0.001$), and ethnicity ($\chi^2 = 89.36$, $p < 0.001$) were all significantly associated with the

Table 1 Distribution of presence of extreme fatigue ($n = 4838$)

Variable	Levels	No (%)	Yes (%)	p-value (χ^2)
Extreme fatigue		4014(82.97)	824(17.03)	
Sex	Male	1795 (44.7)	364 (44.2)	0.80
	Female	2219 (55.3)	460 (55.8)	
Age (years)	50–59	2340 (58.3)	445 (54.0)	0.132
	60–69	1134 (28.3)	256 (31.1)	
	70–79	411 (10.2)	97 (11.8)	
	80+	129 (3.2)	26 (3.2)	
Marital status	Never married	53 (1.3)	12 (1.5)	0.242
	Divorced	222 (5.5)	38 (4.6)	
	Informal/living together	198 (4.9)	56 (6.8)	
	Married	2643 (65.8)	535 (64.9)	
	Separated	118 (2.9)	29 (3.5)	
	Widowed	780 (19.4)	154 (18.7)	
Education status	No formal education	1274 (31.7)	268 (32.5)	0.689
	Formal education	2740 (68.3)	556 (67.5)	
Occupation	Administrative & services	1001 (24.9)	148 (18.0)	< 0.001
	Blue-collar/Basic labor	2731 (68.0)	640 (77.7)	
	White-collar Occupations	282 (7.0)	36 (4.4)	
Settlement	RURAL	1989 (49.6)	484 (58.7)	< 0.001
	URBAN	2025 (50.4)	340 (41.3)	
Region	Northern Ghana	897 (22.3)	99 (12.0)	< 0.001
	Central Ghana	1574 (39.2)	497 (60.3)	
	Southern Ghana	1543 (38.4)	228 (27.7)	
Ethnicity	Akan	1901 (47.4)	389 (47.2)	< 0.001
	Ewe	574 (14.3)	140 (17.0)	
	Ga-Dangwe	253 (6.3)	45 (5.5)	
	Grusi	97 (2.4)	6 (0.7)	
	Guan	119 (3.0)	27 (3.3)	
	Gurma	168 (4.2)	85 (10.3)	
	Mande	26 (0.6)	4 (0.5)	
	Mole Dagbani	759 (18.9)	93 (11.3)	
	All Other Tribes (Hausa, Baribari, Zabrama)	117 (2.9)	35 (4.2)	
Current Health Insurance Status	No	1473 (36.7)	320 (38.8)	0.264
	Yes, covered	2541 (63.3)	504 (61.2)	
Body type	Underweight	362 (9.0)	87 (10.6)	0.234
	Healthy body	2093 (52.1)	442 (53.6)	
	Overweight	1031 (25.7)	202 (24.5)	
	Obese	528 (13.2)	93 (11.3)	
Severe illness status	No	3713 (92.5)	584 (70.9)	< 0.001
	Yes	301 (7.5)	240 (29.1)	
Functional disability	None	3496 (87.1)	671 (81.4)	< 0.001
	Moderate	512 (12.8)	151 (18.3)	
	Severe	6 (0.1)	2 (0.2)	

Bold values indicate statistical significance at $p < 0.05$.

distribution of extreme fatigue. Furthermore, severe illness status ($\chi^2 = 319.8$, $p < 0.001$) and functional disability level ($\chi^2 = 18.38$, $p < 0.001$) exhibited particularly strong associations. Other sociodemographic factors, including age, sex, marital status, education, body mass index, and health insurance status, were examined but did not show statistically significant associations as shown in Table 1.

3.2 Predictors of extreme fatigue

In a logistic regression analysis, Table 2 presents the odds ratios (OR), adjusted odds ratios (aOR), 95% confidence intervals (CI), and respective p-values for both the bivariable (Model 1) and multivariable (Model 2) models. In the multivariable model (Model 2), health related factors including severe illness and functional disability, as well as sociodemographic factors such as settlement/locality type, ethnicity, regions and occupation predicted the likelihood of experiencing extreme fatigue among older adults in this study. Specifically, older adults with severe illness were 5.16 times more likely to experience extreme fatigue compared to those with no illness (aOR = 5.16, 95% CI 4.21–6.31, $p < 0.001$). Compared to those with no functional disability, older adults with functional disability were 1.31 times more likely to experience extreme fatigue (aOR = 1.31, 95% CI 1.05–1.63). Also, older adults working as basic laborers were 1.41 times more likely to experience extreme fatigue compared to those working in Administrative & Service occupations (adjusted aOR = 1.41, 95% CI 1.13–1.78). Older adults living in rural areas were 1.26 times more likely to experience extreme fatigue compared to those in urban areas (aOR = 1.26, 95% CI 1.06–1.50). Compared with the Akan ethnic group, older adults who identified with Gurma (aOR = 2.94, 95% CI 2.05–4.19) and ‘other ethnic groups’ (aOR = 1.73, 95% CI 1.12–2.65) were 2.94 and 1.73 times, respectively, more likely to experience extreme fatigue. On the other hand, older adults in the Northern and Southern Ghana were 0.31 (aOR = 0.31, 95% CI 0.22–0.43) and 0.48 (aOR = 0.48, 95% CI 0.40–0.58) times less likely to experience extreme fatigue, respectively, compared to those in Central Ghana.

Figure 1 presents a forest plot showing the odd ratios of both the bivariable and multivariable logistic regression models as already shown in Table 2.

4 Discussion

This study sought to ascertain the prevalence of extreme fatigue and associated sociodemographic and health related predictors among older adults in Ghana. The results showed 17.03% of older adults in this study experienced extreme fatigue. Our regression analysis established that health related factors including severe illness and functional disability, as well as sociodemographic factors such as settlement/locality type, ethnicity, regions and occupation predicted the likelihood of experiencing extreme fatigue among older adults in this study.

Globally, fatigue prevalence varies significantly across studies and countries. The prevalence of extreme fatigue found in our study is within the range of previously reported rates [50, 53, 54]. However it is also lower than rates reported in other studies [22, 55]. For instance, in Korea, a study by Son et al. [47] reported a prevalence of 17.7% among the Korean study participants, which is almost the same as the rate found in our study. However, higher rates have been reported in other studies. A study by Hu et al. [50] found that the prevalence of fatigue in older adults was 42.6%. Similarly, in sub-Saharan

Table 2 Bivariable and multivariable predictors of extreme fatigue among older adults

Variable	Category	Bivariable Odds Ratio [95% CI]	p-value	Multivariable Odds Ratio [95% CI]	p-value
		Odds Ratio [95% CI]		Odds Ratio [95% CI]	
Severe illness status	No	–		Ref.	
	Yes	5.07 [4.19–6.13]	<0.001	5.16 [4.21–6.31]	<0.001
Functional disability	None	–		Ref.	
	Moderate	1.53 [1.26–1.87]	<0.001	1.31 [1.05–1.63]	0.017
	Severe	1.73 [0.25–7.56]	0.50	0.95 [0.11–4.97]	0.96
Occupation	Administrative & Service	–		Ref.	
	Blue-Collar or Basic Labor	1.59 [1.31–1.93]	<0.001	1.41 [1.13–1.78]	0.0029
	White-Collar occupations	0.86 [0.58–1.26]	0.458	1.18 [0.77–1.76]	0.43
Regional group	Central Ghana	–		Ref.	
	Northern Ghana	0.34 [0.28–0.44]	<0.001	0.31 [0.22–0.43]	<0.001
	Southern Ghana	0.46 [0.39–0.56]	<0.001	0.48 [0.40–0.58]	<0.001
Settlement	URBAN	–		Ref.	
	RURAL	1.44 [1.25–1.68]	<0.001	1.26 [1.06–1.50]	0.0087
Ethnicity	Akan	–		Ref.	
	Ewe	1.19 [0.96–1.47]	0.11	1.21 [0.95–1.53]	0.11
	Ga-Dangme	0.86 [0.61–1.20]	0.41	1.06 [0.73–1.49]	0.77
	Grusi	0.30 [0.12–0.64]	0.0042	0.56 [0.20–1.29]	0.21
	Guan	1.10 [0.71–1.68]	0.64	1.08 [0.67–1.70]	0.73
	Gurma	2.47 [1.86–3.27]	<0.001	2.94 [2.05–4.19]	<0.001
	Mande	0.75 [0.22–1.94]	0.60	0.96 [0.27–2.61]	0.94
	Mole-Dagbani	0.59 [0.47–0.76]	<0.001	1.07 [0.75–1.52]	0.70
	Other Tribes (Hausa, Baribari, Zabrama)	1.46 [0.97–2.14]	0.058	1.73 [1.11–2.64]	0.0137
Sex	Male	–		Ref.	
	Female	1.02 [0.88–1.19]	0.775	1.13 [0.94–1.37]	0.203
Age (years)	50–59	–		Ref.	
	60–69	1.19 [1.00–1.41]	0.047	1.15 [0.96–1.39]	0.133
	70–79	1.24 [0.97–1.58]	0.082	1.02 [0.77–1.34]	0.87
	80+	1.06 [0.67–1.61]	0.793	0.86 [0.52–1.38]	0.55
Marital status	Never married	–		Ref.	
	Divorced	0.76 [0.38–1.60]	0.44	0.71 [0.33–1.57]	0.38
	Informal/living together	1.25 [0.64–2.60]	0.53	0.86 [0.41–1.88]	0.68
	Married	0.89 [0.49–1.76]	0.73	0.90 [0.47–1.87]	0.76
	Separated	1.09 [0.52–2.36]	0.83	1.10 [0.50–2.53]	0.81
	Widowed	0.87 [0.47–1.75]	0.63	0.89 [0.45–1.88]	0.75
Education status	No formal education	–		Ref.	
	Formal education	0.96 [0.82–1.13]	0.66	1.03 [0.84–1.27]	0.44
Current Health Insurance Status	No	–		Ref.	
	Yes, covered	0.91 [0.78–1.07]	0.247	0.95 [0.81–1.13]	0.72
Body type	Healthy body	–		Ref.	
	Underweight	1.14 [0.88–1.46]	0.32	1.12 [0.84–1.47]	0.93
	Overweight	0.93 [0.77–1.11]	0.42	1.04 [0.85–1.27]	0.59
	Obese	0.83 [0.65–1.06]	0.14	0.99 [0.73–1.30]	0.78

Bold values indicate statistically significant associations ($p < 0.05$)

Africa, a recent community-based study in Ethiopia also reported a notably higher prevalence of 37.9% among older adults, potentially reflecting regional differences driven by socioeconomic factors such as poverty and low income levels; unemployment or underemployment; low educational status; rural residence and poor infrastructure;

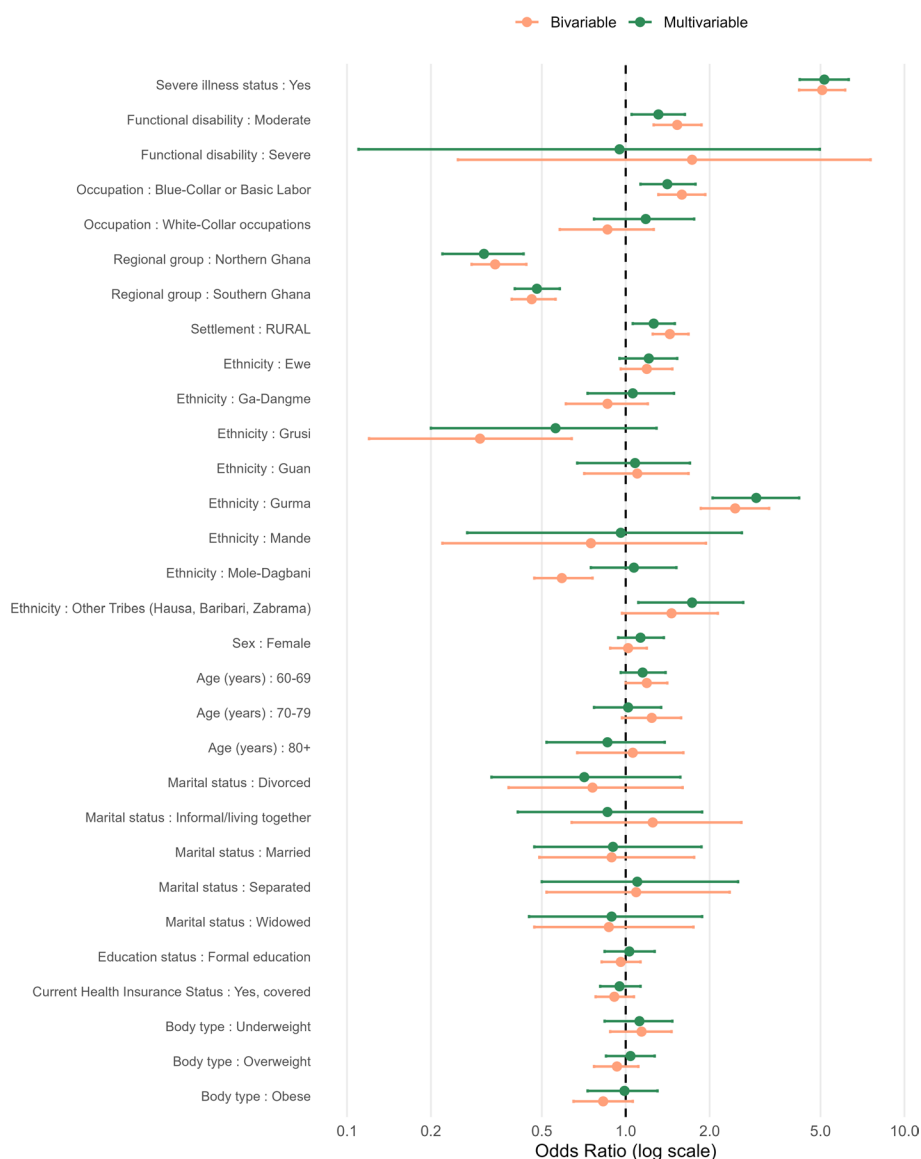


Fig. 1 Forest plot showing bivariable (orange) and multivariable (green) odds ratios of predictors of extreme fatigue with 95% confidence intervals. The vertical dashed line indicates OR=1

food insecurity and malnutrition and high healthcare costs; healthcare access, or varying definitions of extreme fatigue [51]. Broader regional evidence from Eastern Africa also underscores the heavy caregiving burdens placed on older persons, particularly in settings affected by the HIV/AIDS epidemic; in these “skipped-generation” households, older adults often assume primary responsibility for orphaned grandchildren while managing subsistence work and their own age-related health challenges, contributing to sustained physical strain, psychosocial distress, and energy depletion [56].

However, the comparatively lower prevalence of extreme fatigue in the Ghanaian sample may be due to its focus on severe cases rather than general fatigue. Furthermore, cultural factors in Ghana, such as stoicism or the tendency to normalize age-related tiredness among older adults, may contribute to underreporting, potentially influencing the reported prevalence rate [57]. A qualitative study of Ghanaians in Inner London reported that participants downplayed struggles as a form of resilience [58]. These

findings suggest that similar cultural dynamics in Ghana may contribute to the underreporting of symptoms such as fatigue, as they are either normalized or managed privately through faith rather than expressed as medical concerns [59].

In this study, older adults with severe illnesses were found to be over five times more likely to experience extreme fatigue compared to those without severe health conditions such as cardiovascular diseases like heart failure, stroke, chronic respiratory diseases, advanced HIV/AIDS, or other chronic infections, highlighting the significant influence of chronic illness and comorbidities on fatigue experiences. Persistent fatigue is associated with a broad spectrum of health issues, including the exacerbation of pre-existing conditions [60]. Extreme and chronic fatigue are highly prevalent in chronic diseases, with elevated rates observed in conditions such as multiple sclerosis, particularly in the context of multimorbidity [11, 61]. Thus, our observed association aligns with findings from global and African literature, which consistently link chronic conditions such as cardiovascular diseases, diabetes, and arthritis to heightened fatigue [11, 13, 62]. Chronic illness may contribute to extreme fatigue through physiological mechanisms, including inflammation, pain, and impaired oxygen delivery [63]. For example, in chronic kidney disease, increased fatigue is associated with progression toward dialysis initiation [64]. Similarly, in chronic obstructive pulmonary disease, fatigue is linked to increased mortality risk [65]. Thus, this finding underscores the need for targeted healthcare interventions such as pulmonary rehabilitation programs, optimized pharmacological therapy, nutritional support, and psychosocial counseling to address fatigue in these populations.

Occupation was a notable predictor, with blue-collar or basic laborers 1.41 times more likely to report extreme fatigue than those in administrative or service roles. This may be attributed to the physical demands of manual labor, which predominate in Ghana's agrarian and informal sectors, leading to cumulative wear and tear on older bodies. Studies conducted in the United States and China have found that fatigue is a prevalent and significant issue across diverse workplaces, stemming from intense physical labor or mental effort [66]. This is especially important because fatigue, accompanied by reduced motivation and vigilance, significantly contributes to an elevated risk of accidents and injuries [67].

Those with functional disability were 1.31 times more likely to experience extreme fatigue reflecting how limitations in daily activities perpetuate a cycle of deconditioning and energy depletion. Individuals with central nervous system trauma such as stroke, neurological diseases or degenerative muscle diseases like muscular dystrophy frequently experience fatigue as a secondary consequence of their primary impairments, which can intensify over time and adversely affect their health-related quality of life [68].

The data indicate significant ethnic and regional variations in fatigue prevalence among older adults in Ghana. The Gurma group retains a significantly elevated risk with the Hausa, Baribari, and Zabrama tribes showing a notable association with extreme fatigue suggesting ethnicity-specific factors may influence fatigue outcomes. This trend could be due to some historical and structural factors such as occupation (basic-labor agriculture), poverty and limited access to health facilities in regions where these ethnic groups are dominated. For instance, the Ghana Poverty Reduction Strategy revealed that the three northern regions of Ghana are still in the leading pack of administrative regions contributing approximately 40% of the poor in Ghana [69]. Abdulai et al. [70] demonstrates that colonial policies deliberately underdeveloped Northern Ghana,

turning it into a labor reservoir while neglecting education, infrastructure, and economic growth, which entrenched ethnic and regional disparities. Groups such as Gurma, Dagbon, Wala, and others bore the brunt of this neglect, facing poverty and limited opportunities, unlike their southern counterparts. These structural disadvantages created lasting health inequities, with some ethnic groups showing heightened vulnerability [70]. On the other hand, older adults in the Northern and Southern Ghana were 0.31 and 0.48 times less likely to experience extreme fatigue, respectively as compared to older adults in the central region. The reason for this trend is, however, unclear and more studies including qualitative evidence are needed to provide nuanced understanding and explanation for these findings.

5 Implications for policy, practice and research

This study provides essential evidence on the prevalence and determinants of extreme fatigue among older adults in Ghana, with 17.03% of respondents reporting this outcome. It enriches the literature by identifying key sociodemographic and health-related predictors such as severe illness, functionality disability, occupation, ethnicity, locality type and region that significantly shape fatigue risk. The magnitude of associations, particularly the fivefold higher odds among persons with severe illness, offers robust epidemiological insight. These results contribute to global scholarship on ageing while addressing a critical gap in public health research in sub-Saharan Africa.

The findings highlight the need for targeted policy measures that incorporate fatigue screening and management within chronic disease care, especially for older adults with severe illness or functional limitations. The elevated risk among manual laborers underscores the importance of occupational health strategies, ergonomic protections, flexible work options and retirement planning for ageing workers in informal sectors. Marked ethnic and regional disparities, higher risks among Gurma, other minority groups, and rural residents demand equity-oriented health planning. Policymakers should prioritize culturally responsive outreach, infrastructure investment, and resource allocation in underserved areas. The comparatively lower fatigue prevalence in Northern and Southern Ghana suggests protective factors worthy of further exploration and replication.

Healthcare providers should routinely assess extreme fatigue in older adults, particularly those with chronic conditions, functional disabilities, or physically demanding work. Extreme fatigue screening tools should be embedded in geriatric assessments and chronic disease protocols.

Community based interventions must be tailored to high-risk populations using culturally appropriate messaging to encourage disclosure and care seeking. In rural settings, mobile clinics and community health workers can play a critical role in detection and management. Recognizing the influence of cultural norms such as stoicism or spiritual coping on underreporting, practitioners should employ empathetic, context-aware communication to build trust and engagement.

This study opens several avenues for future research. Qualitative studies could examine how cultural beliefs, gender roles, and spiritual practices influence perceptions and reporting of fatigue among older Ghanaian adults. Longitudinal research could track the progression of fatigue and its effects on morbidity, disability, and mortality. Further studies exploring the apparent protective factors in Northern and Southern Ghana may reveal resilience mechanisms and adaptive behaviors. Intervention studies should test

integrated fatigue management approaches, combining community-based exercise, self-management education, physiotherapy, nutrition, and psychosocial support to improve health outcomes and quality of life among older adults.

6 Limitations

While this study draws on data from the Ghana Statistical Service Annual Household Income and Expenditure Survey (AHIES), which is designed to be nationally representative and covers diverse regions and settlement types across Ghana, our prevalence estimates were calculated using unweighted proportions. The breadth of the sampling frame strengthens the overall coverage and internal consistency of the findings however, the absence of survey weights may limit strict population-level generalizability. As such, the reported 17.03% prevalence should be interpreted cautiously when extrapolating to the national population.

Extreme fatigue was operationalized as a binary outcome (yes/no), which facilitates interpretability and comparability with other large-scale epidemiological surveys. However, this approach does not capture gradations of severity, chronicity, or multidimensional components such as physical, emotional, and cognitive fatigue.

The study relied on self-reported measures of extreme fatigue and severe illness which remains a pragmatic and widely accepted approach in large population-based surveys. Nonetheless, recall bias and social desirability bias cannot be excluded.

Although the direction and magnitude of associations were generally consistent across models, supporting the robustness of the principal findings, certain subgroup analyses, particularly among participants with severe functional disability and some ethnic minority groups, were based on relatively small cell counts, resulting in wider confidence intervals and reduced precision of effect estimates.

The cross-sectional design provides an important epidemiological snapshot in a context where empirical data on extreme fatigue among older adults remain limited. However, causal inferences cannot be drawn, and the temporal direction of observed associations cannot be established.

Finally, this study used complete-case analytical approach hence future research should explore alternative methods to address missing data and evaluate potential non-random missingness.

7 Conclusion

This study has shown that extreme fatigue is common among older adults in Ghana and is closely linked to chronic illness, functional disability, occupation, ethnicity, and regional differences. These findings point to the need for targeted geriatric interventions, such as community-based exercise programs and tailored self-management education, as well as stronger geriatric health systems to help older adults maintain independence and well-being. Policies should also address occupational health risks, ensure equitable access to care, and provide culturally sensitive support for high-risk populations. Future research should focus on longitudinal studies and use validated fatigue measures to better understand how fatigue develops over time and to identify effective strategies for prevention and management.

Abbreviations

ADLs Activities of Daily Living

AHIES	Annual Household Income and Expenditure Survey
aOR	Adjusted Odds Ratio
BMI	Body Mass Index
CI	Confidence Interval
EAs	Enumeration Areas
GDP	Gross Domestic Product
GSS	Ghana Statistical Service
GPRSI	Ghana Poverty Reduction Strategy I
OR	Odds Ratios
p	p-value
R	R programming software
SAGE	Global AGEing and Adult Health
SDGs	Sustainable Development Goals
WHO	World Health Organization
χ^2	Chi-square statistic

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12982-026-01918-x>.

Supplementary Material 1.

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Author contributions

D.F. contributed to the study concept, data analysis, results formulation, manuscript writing, and final revision. R.A., D.A., E.P.A., M.A.P. and B.N.D. contributed to the study concept, manuscript writing, and review of the final manuscript. P.P. and W.A.D. conceptualized and supervised the study.

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Data availability

The dataset (2023 Ghana Annual Household Income and Expenditure Survey-AHIES) analyzed in the current study is publicly available upon request from the Ghana Statistical Service website. (<https://microdata.statsghana.gov.gh/index.php/catalog/119/get-microdata>) (<https://microdata.statsghana.gov.gh/index.php/catalog/119/get-microdata>)

Declarations

Ethics approval

This study is a secondary analysis of publicly available, anonymized data from the Ghana Statistical Service (GSS) derived from the Annual Household Income and Expenditure Survey (AHIES). The original data collection by the GSS was conducted in accordance with the Statistical Service Act, 2019 (Act 1003), following all required ethical standards and informed consent procedures. Access to the dataset was granted by the GSS following a formal data access request submitted by the authors. As the authors of this study did not have any direct interaction with study participants and the dataset contains no personal identifiers, additional ethical and institutional review board (IRB) approval was not required.

Consent to participate

Verbal informed consent was obtained from participants before the interviews.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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