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Gender differences in caregiving satisfaction among informal caregivers of older adults in the Ashanti Region of Ghana: Prevalence and associated factors

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Abstract

Background

Although informal caregiving is often associated with stress and burden, it can also provide positive experiences, including caregiving satisfaction. However, caregiving experiences may differ between females and males due to differences in caregiving responsibilities, social expectations, and access to resources. Despite these potential gender differences, evidence on the prevalence and associated factors of caregiving satisfaction among female and male informal caregivers of older adults remains limited in Ghana. This study therefore examined gender differences in the prevalence and factors associated with caregiving satisfaction among informal caregivers of older adults in Ghana.

Methods: A cross-sectional study was conducted among 1,853 informal caregivers of older adults aged 50 years and above in the Ashanti Region of Ghana, recruited through snowball sampling. Descriptive statistics were used to summarize participant characteristics and assess gender differences in the prevalence of caregiving satisfaction. Guided by Lawton's two-factor model of caregiving appraisal, four sequential binary logistic regression models were fitted to identify factors associated with caregiving satisfaction in the total sample and separately among female and male caregivers. Interaction analyses were additionally performed to formally assess whether

associations between selected explanatory variables and caregiving satisfaction differed by gender. Statistical significance was set at $p \leq 0.05$.

Results: Among 1,853 informal caregivers, 90.12% reported caregiving satisfaction, with a slightly higher prevalence among males (92.23%) than females (89.34%). In the fully adjusted model, longer caregiving duration, employment, better self-rated health, and caring for parents, siblings, or grandparents were associated with higher odds of caregiving satisfaction, whereas non-Akan ethnicity and residence in the Middle geographical zone were associated with lower odds. Particularly, gender-stratified analyses revealed distinct patterns of associated factors. Among female caregivers, better self-rated health and caring for parents, siblings, or grandparents, compared with spouses, were significantly associated with greater caregiving satisfaction. In contrast, age was the only significant predictor among male caregivers, with those aged 45–54 years having lower odds of satisfaction than those aged 18–24 years. Furthermore, a significant interaction between sex and current marital status ($p = 0.030$) indicated that the association between marriage and caregiving satisfaction differed between female and male caregivers.

Conclusion: Caregiving satisfaction was high among informal caregivers of older adults in Ghana, with distinct factors associated with satisfaction among female and male caregivers. The significant interaction involving marital status further underscores the gendered nature of caregiving satisfaction. These findings advance understanding of caregiving satisfaction and highlight the need for gender-responsive interventions that support caregiver health, family relationships, and socioeconomic well-being, contributing to Sustainable Development Goals 3 (Good Health and Well-being) and 10 (Reduced Inequalities).

Keywords: Informal caregiving; Caregiving satisfaction; Older Adults; Gender differences; Informal caregivers; Caregivers' well-being; Ghana

Introduction

Population aging is leading to increased demand for caregiving services globally[1,2]. Specifically in Low- and middle-income countries (LMIC) and Africa, where women constitute up to 80% of caregivers[2,3]. Ghana's older population has increased from about 1960 to nearly 2 million in 2021, and caregiving in Ghana is rooted in a kinship system where it is seen as a filial duty and an expression of love. Gender ideals of the "feminine nurturing role" disadvantage women by determining caregiving arrangements, coping strategies, and resources, while men appear more flexible in negotiating their caregiving identity[3,4].

The burden dimension of this gendered experience is well documented; Bueno and Chase[5], in a systematic review of 12 studies on gender differences in caregiving for older adults, found that women tend to experience higher overall caregiver burden, stress, anxiety, shame, and role strain, though some studies noted men may be more affected during the initial transition into the caregiver role[5–8]. While the negative effects of caregiving have received extensive attention, scholars have increasingly recognized that caregiving also yields positive outcomes; Yu et al.[9], in an integrative review of 41 studies, described this as a paradigm shift from "reducing stress" to "optimising positive experience" and identified four key domains of positive caregiving: a sense of personal accomplishment and gratification, feelings of mutuality in a dyadic relationship, increased family cohesion, and personal growth.

Central to this shift is the concept of caregiving satisfaction, the positive affective response and sense of fulfilment that informal caregivers derive from the caregiving role, encompassing the pleasure of giving back, the emotional reward of seeing the care recipient thrive, personal accomplishment, and the strengthening of interpersonal bonds[10–12]. For instance, López-Martínez et al.[13], in a longitudinal study of Spanish caregivers, defined caregiving satisfaction as a positive appraisal of the caregiving experience that exerts a protective effect on psychological distress via its reduction of subjective burden. Caregiving satisfaction is conceptually related to, but distinct from,

broader constructs such as "positive aspects of caregiving" (gains, meaning, rewards) and general "life satisfaction"[14]. Lee and Li[15], in a systematic review evaluating the Positive Aspects of Caregiving (PAC) scale across 52 studies, identified four dimensions of positive experience: personal gains, motivation, caregiver satisfaction, and social aspects. Similarly, Quinn and Toms[16], in a systematic review of 53 studies, found that positive aspects of caregiving were associated with lower depressive symptoms and burden and with better mental health, quality of life, and self-efficacy among dementia caregivers. Further, Hall et al.[17] corroborated these findings, identifying rewards, opportunities to care, quality of care, and personal growth as common positive dimensions of caregiver satisfaction.

Despite the growing recognition of caregiving satisfaction, available literature[18–23] indicate that it is not a universal outcome with its occurrence varying considerably by care context, recipient condition, and caregiver resources. Pendergrass et al[24]., studying 734 informal caregivers in Germany, found that 87.1% experienced benefits in at least one caregiving domain, although a higher experience of benefits was simultaneously associated with higher burden and longer daily care time, suggesting the two experiences are intertwined rather than mutually exclusive. Also, among 35 ageing female informal caregivers of persons with dementia in the United States, over half scored "satisfied or higher" on the satisfaction with Life Scale[25].Additionally, Marinho et al.[26], in a Brazilian study of 52 informal caregivers, reported a strong positive correlation between satisfaction with care and burden scores, further confirming that satisfaction and burden can co-exist. These findings indicate that while a majority of informal caregivers report some degree of satisfaction, prevalence varies considerably depending on the care context, the recipient's condition, and the caregiver's resources[24,27,28].

Furthermore, a growing body of evidence has identified several factors that influence caregiving satisfaction. For instance, perceived social support has emerged as a particularly strong determinant of caregiving satisfaction[29]. Also, modifiable factors such as caregiver self-efficacy, coping strategies, and social support have been consistently related to caregiving satisfaction, while non-modifiable factors like gender, education, and caregiving duration were associated with caregivers reporting not satisfactied[14]. Additional predictors of caregiving satisfaction identified include personality characteristics such as agreeableness[30], quality of the caregiver-care recipient relationship[24], the caregiver's own health-related quality of life[31], and cultural motivations rooted in reciprocity, affection, and family values[32]. However, the relationship between gender and satisfaction in caregiving, is not well understood and the few available evidence is contradictory. For instance, García-Mochón et al.[29] found that the main predictors (social support, health-related quality of life) of caregiving satisfaction were related to both genders, yet females were 75% more likely to experience severe burden. Further Blaise and Dillenseger[33], using panel data from the Netherlands, found that providing care had a negative effect on life satisfaction with women caregivers being the most impacted, especially when providing personal support to partners. Again, Wakabayashi and Kureishi[34], analysing longitudinal data from Japan, found that men's life satisfaction was generally less sensitive to informal caregiving than females'. Also among140 Alzheimer's caregivers in Spain and found that perceived "gain" from caregiving varied by gender, with distinct mediational roles of psychological distress suggesting gender-specific pathways to satisfaction[35,36].

In LMIC and Africa specifically, female caregivers are motivated to persist due to cultural and moral duties despite considerable challenges such as functional difficulties with life tasks[37], anxiety and depression[38], physical strain[39], financial and economic burden[40,41], social isolation and loss of personal life[42] and gendered structural disadvantage and role conflict[41,43]. A scoping review by Okine and Ruggiano[44] found only 9 studies[45–53] addressing caregiver burden among informal caregivers of older adults in Ghana; highlighting that the body of evidence on informal

caregiver burden specifically in Ghana is extremely sparse. The existing Ghanaian literature focuses almost exclusively on burden, strain, and negative health outcomes[44,54,55]. Also, while females may find satisfaction in relational aspects of care, two studies in Spain and the US show no significant gender differences when confounding factors are controlled[35,36]. However, without empirical data from Ghana, these assertions remain speculative. Consequently, studies that focus only on caregiver burden miss the satisfaction dimension entirely, providing an inconclusive picture of the gendered caregiving experience[56]. To the best of our knowledge, no study has examined the gendered differences in caregiving satisfaction among informal caregivers of older adults in Ghana.

Our study, therefore, addresses a clear gap by examining gendered dynamics of caregiving satisfaction among informal caregivers of older adults in Ghana, thereby contributing gender-specific evidence to an area where the global literature is thin and the Ghanaian literature is nearly absent. Examining gender differences in caregiving satisfaction among informal caregivers of older adults in Ghana is relevant to achieving Sustainable Development Goal (SDG) 3 (Good Health and Well-being) and SDG 5 (Gender Equality). Caregiving satisfaction can buffer caregivers, especially women, against psychological distress and burden, supporting healthier lives. Investigating how gender shapes caregiving satisfaction can therefore inform gender-sensitive interventions that advance both global health initiatives.

Theoretical Framework: Lawton's Two-Factor Model of Caregiving Appraisal

This study is guided by Lawton's two-factor model of caregiving appraisal [57,58], which provides a theoretical foundation for understanding how caregivers evaluate their caregiving experiences. The model distinguishes between two dimensions of subjective caregiving appraisal: caregiving satisfaction and caregiving burden, recognising that positive and negative caregiving experiences may coexist. It further considers how objective caregiving stressors and caregiver resources contribute to these appraisals[57]. Accordingly, the model provides a useful framework for examining caregiving satisfaction as a distinct outcome rather than assuming that caregiving experiences are defined solely by burden.

Consistent with the model, this study considered two principal domains of explanatory variables: objective caregiving stressors and caregiver resources. Objective stressors refer to the demands arising from caregiving responsibilities, including the care recipient's health conditions, functional limitations, and need for assistance. In this study, caregiving intensity and duration, measured in hours, days, and years of care, served as indicators of objective caregiving stressors. Caregiver resources, on the other hand, encompass personal, social, and material capacities that may influence caregivers' ability to manage caregiving responsibilities and derive satisfaction from their roles[57]. These included caregivers' self-rated health, employment status, and relationship to the care recipient.

Although Lawton's original model does not explicitly identify background and contextual characteristics as a separate domain, this study incorporated these factors to account for the sociocultural and demographic circumstances within which informal caregiving occurs in Ghana. Specifically, gender, age, ethnicity, religious affiliation, and geographical location were considered background and contextual characteristics that may shape caregiving experiences and satisfaction. This extension is consistent with previous research examining positive aspects of caregiving, which has considered caregivers' sociodemographic and contextual characteristics alongside caregiving-related factors[59].

Within Lawton's framework, subjective caregiving appraisal reflects caregivers' evaluations of their caregiving experiences, encompassing both satisfaction and burden[57,58]. However, the present study focuses specifically on

caregiving satisfaction as the outcome variable, rather than examining both dimensions of appraisal. The model therefore informed the selection and classification of explanatory variables into objective caregiving stressors, caregiver resources, and background and contextual factors. It also guided the analytical approach and provided the theoretical basis for interpreting the associations between these factors and caregiving satisfaction. By examining these relationships in the total sample and separately among female and male caregivers, the study applies Lawton's framework to investigate how the factors associated with positive caregiving appraisal may differ by gender in the Ghanaian context.

Methods

Settings, data and sample

The research was conducted in the Ashanti Region of Ghana, chosen for its significant representation of the country's socio-cultural, demographic, and health characteristics, making it a suitable context for examining informal caregiving satisfaction. This study draws on data from a comprehensive cross-sectional survey examining informal caregiving, health, and healthcare among caregivers of older adults aged 50 years and above in Ghana's Ashanti Region. The survey was conducted by the first author as part of his doctoral research, with direct involvement in all stages of data collection. Sample size estimation followed established statistical procedures, resulting in a final analytic sample of 1,853 informal caregivers. The study area was stratified into three geographic zones, northern, middle, and southern, using cluster sampling. From the northern and southern zones, three districts were randomly selected each, while the more populous middle zone contributed seven randomly selected districts. Within each selected district, three communities were randomly chosen, culminating in a total of 39 communities, comprising 18 rural and 21 urban settings. Data were collected using interviewer-administered questionnaires, with responses entered digitally via Qualtrics survey software. Further details on the sampling methodology and data collection procedures are available in earlier publications[60,61]

Ethics

Ethical approval for the study was obtained from the Ashanti Regional Health Directorate under the Ghana Health Service (Ref: GHS/ASH/RES/V.2). Additional ethical clearance was secured from the General Research Ethics Board (GREB) at Queen's University, Kingston, Canada (Ref: GGEOPL-344-22), as well as from the Committee on Human Research Publication and Ethics (CHRPE) at the School of Medical Sciences, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana (Ref: CHRPE/AP/182/22). Prior to data collection, informed consent was obtained from all participants either verbally or in writing. For individuals who were illiterate, consent was provided by their legal guardians with the approval of the respective ethics committees.

Measurements

The outcome variable in this study was caregiving satisfaction among informal caregivers of older adults. Caregiving satisfaction was assessed with the question: "Overall, how would you rate your satisfaction with providing care?" Response options ranged from 1 = very satisfied, 2 = satisfied, 3 = neutral, 4 = not satisfied, to 5 = strongly dissatisfied. The use of a single item to measure caregiving satisfaction aligns with prior published research[62, 63]. For instance, in their study titled "Survey nonresponse among informal caregivers: effects on the presence and magnitude of associations with caregiver burden and satisfaction", Oldenkamp et al.[62] used a one-item scale to measure caregiving satisfaction, which underscores the appropriateness of using a one-item scale to

measure caregiving satisfaction. Further, Tough et al.[63] examined subjective caregiver burden and caregiver satisfaction and used a single item asking caregivers how much they agreed with providing care, underscoring that using a one-item scale to measure caregiving satisfaction is well grounded in the caregiving literature. Thus, Youngblut and Casper [64] highlighted that single-item scales generally have acceptable psychometric properties and are viable alternatives for measuring global concepts of interest in nursing research (i.e., informal caregiving research). Following the recommendation by Koo & Yang[65] response categories into two broader groups such as "agreement" (combining "Strongly Agree" and "Agree") versus "non-agreement" (combining "Neutral", "Disagree", and "Strongly Disagree") to improve interpretability particularly when some categories are sparsely populated. For instance, the responses were distributed across five satisfaction categories: very satisfied (n = 664, 35.8%), satisfied (n = 1,006, 54.3%), neutral (n = 89, 4.8%), not dissatisfied (n = 89, 4.8%), and very dissatisfied (n = 8, 0.3%). We initially considered ordinal logistic regression to account for the ordered nature of the response categories. However, the sparse distribution of responses in some categories, particularly the very dissatisfied category, prompted us to reconsider the analytical approach. We then used binary logistic regression, collapsing the original response categories into two groups aligned with the study's analytical objectives. Specifically, "not satisfied" included neutral, not satisfied, and strongly dissatisfied responses (coded as 0), while "satisfied" combined very satisfied and satisfied responses (coded as 1). This classification guaranteed that the "satisfied" group exclusively included individuals clearly expressing positive caregiving satisfaction.

The main independent variables were grouped into three: objective stressors, caregiver resources, and background and context variables. Because the study area was clustered into geographical zones (south, middle, and north), the analysis also controlled for geographic zone. More specifically, objective stressors included daily hours of caregiving (1 = ≤5 hours, 2 = 6–10 hours, 3 = >10 hours) and duration of caregiving in years (1 = <5 years, 2 = 5–9 years, 3 = ≥10 years). The caregiver resources are educational level (1=no formal education, 2=Primary, 3=Junior High School, 4=Senior high school, 5=tertiary), marital status (1=Never married,2=currently married,3=separated/widowed/divorced), employment status (1 =unemployed, 2= employed), monthly income (1=<GH₵1,000, 2=GH₵1,000–1,999, 3=>GH₵2,000) (minimum wage GH₵13.53/day; GH₵351.78; US$1=GH₵9.75 at the time of data collection in September 2022), living arrangement with the care recipient (1=no, 2=yes), relationship to the care recipient (1=spouse,2=Parent,3=in-law, 4=Friends/neighbours, 5=siblings, 6=grandparent), and caregivers' self-rated health status (1=poor/very poor, 2= fair 3=good, 4=very good, 5 =excellent; recoded as 1=good[good/very good], 2=poor [poor/very poor/fair])[66,67]. Background and context variables are age (years) (1=18–24, 2=25–34, 3=35–44, 4=45–54, and 5=55 years or older), place of residence (1=rural, 2=urban), ethnicity (1=Akan, 2= Mole-Dagbon, 3=Ewe, 4=Ga-Dangme, 5=Guan, 6=Gurma, 7=Grusi, 8=Mande-Busanga, 9=Others, recorded as: 1=Akan, 2= Non-Akan), gender (1=Male, 2= Female) and religious affiliation (1=Christian, 2=Muslim, 3=traditional religion, 4=No Religion). These variables are consistent with Lawton's two-factor model of caregiving appraisal and the caregiving literature [35,68,69].

Multicollinearity diagnostics

Multicollinearity diagnostics showed variance inflation factor (VIF) values ranging from 1.06 to 1.80, with a mean VIF of 1.26, as shown in Table 1. All tolerance values exceeded 0.50. These results indicate that multicollinearity was not a concern among the predictors included in the binary logistic regression analyses.

Table 1 Multicollinearity diagnostics for variables included in the binary logistic regression analysis

Variable	VIF	Tolerance (1/VIF)
Age	1.80	0.554843

Marital status	1.49	0.668938
Days of care per week	1.44	0.695576
Education level	1.43	0.700094
Religious affiliation	1.31	0.763238
Living with care recipient	1.29	0.778166
Ethnicity	1.27	0.789358
Hours of care per day	1.21	0.827317
Years providing care	1.21	0.828254
Relationship to care recipient	1.20	0.830796
Gender	1.20	0.835609
Self-rated health	1.14	0.875502
Employment status	1.14	0.880919
Residence	1.09	0.915471
Monthly income	1.07	0.936864
Geographical zone	1.06	0.944614
Mean VIF	1.26	

Data Analysis

Data analysis was performed using STATA version 17 (StataCorp, College Station, TX, USA), employing both descriptive and inferential statistical methods. Descriptive statistics, including frequencies, percentages, and means with standard deviations, were used to summarize the sociodemographic, caregiving, and health characteristics of participants. The prevalence of caregiving satisfaction by gender was calculated and graphically presented. Given the multistage cluster sampling procedure involving geographic zones, districts, and communities, geographic zone was included as a categorical covariate in the binary logistic regression models to account for geographical differences. Survey-weighted regression was not employed because participants were recruited through snowball sampling, which did not provide known individual selection probabilities required to calculate conventional survey sampling weights. Four sequential binary logistic regression models were fitted to identify factors associated with caregiving satisfaction in the total sample. The general logistic regression model was specified as follows:

$$\text{logit}(P_i) = \beta_0 + \Sigma_{j=1}^{k} \beta_j X_{ji} \quad (1)$$

where P_i represents the probability of caregiving satisfaction for caregiver i, β_0 is the intercept, β_j denotes the coefficient of explanatory variable X_{ji}, and k is the total number of explanatory variables. Model I included objective caregiving stressors; Model II additionally incorporated caregiver resources; Model III added background and contextual factors; and Model IV further adjusted for geographic zone. The four models were specified as follows:

$$\text{Model I: logit}(P_i) = \alpha_1 + \beta_1^T S_i \quad (2)$$

$$\text{Model II: logit}(P_i) = \alpha_2 + \beta_2^T S_i + \gamma_2^T R_i \quad (3)$$

$$\text{Model III: logit}(P_i) = \alpha_3 + \beta_3^T S_i + \gamma_3^T R_i + \delta_3^T C_i \quad (4)$$

$$\text{Model IV: logit}(P_i) = \alpha_4 + \beta_4^T S_i + \gamma_4^T R_i + \delta_4^T C_i + \theta_4^T G_i \quad (5)$$

Here, S_i represents objective caregiving stressors (daily caregiving hours, caregiving days per week, and years of caregiving); R_i denotes caregiver resources (education, monthly income, employment status, marital status, co-

residence, self-rated health, and relationship to the care recipient); C_i represents background and contextual characteristics (age, gender, residence, ethnicity, and religion); and G_i denotes geographic zone (North, Middle, and South). The parameters α_1–α_4 are model-specific intercepts, while β, γ, δ, and θ represent coefficient vectors, with superscript T indicating transposition. To examine gender-specific associations, the same four sequential models were estimated separately for female and male caregivers, with gender excluded from the background and contextual characteristics in the stratified analyses. The fully adjusted gender-specific model (Model IV) was specified as follows:

$$\text{logit}(P_ig) = \alpha_4g + \beta_4g^TS_ig + \gamma_4g^TR_ig + \delta_4g^TC_ig + \theta_4g^TG_ig \quad (6)$$

where g denotes female or male caregivers, P_ig represents the probability of caregiving satisfaction for caregiver i within gender group g, and the coefficients are estimated separately for each group. Crude (unadjusted) estimates were also reported for the total sample and gender-stratified analyses. To complement the gender-stratified analyses, interaction analyses were conducted to formally assess whether the associations between selected explanatory variables and caregiving satisfaction differed between female and male caregivers. This approach was important because differences in statistical significance between gender-stratified models do not necessarily indicate statistically significant differences in the associations across gender groups. Interaction terms between gender and selected caregiving characteristics, including daily caregiving hours, caregiving duration, marital status, and health insurance enrolment, were incorporated into binary logistic regression models. Male caregivers served as the reference category for gender. Results were expressed as odds ratios with 95% confidence intervals (CIs), and statistical significance was set at $p \leq 0.05$.

Results

Sociodemographic and health characteristics of the caregivers

Table 2 shows the descriptive characteristics of informal caregivers. Among 1,853 informal caregivers, the majority were female (72.91%), urban residents (56.72%), currently married (55.80%), employed (66.43%), and living with the care recipient (79.60%). Most provided care seven days per week (61.63%), 64.65% provided care for 5 hours or less in a day, and 45.17% had provided care for less than five years. The middle geographical zone contributed 54.13% of the participants.

Table 2 Descriptive characteristics of informal caregivers

Variable and category	Frequency N(1,853)	Percentage (%)
Age (years)	**(Median=38,interquartile range(IQR)=20)**	
18-24	266	14.36
25-34	513	27.68
35-44	439	23.69
45-54	369	19.91
55-64	172	9.28
65 or above	94	5.07
Gender		
Male	502	27.09
Female	1,351	72.91
Residence		
Rural	802	43.28
Urban	1,051	56.72
Ethnicity		
Akan	1,412	76.20
Non-Akan	441	23.80

Religious affiliation		
Christianity	1,495	80.68
Islam	295	15.92
African Traditional Religion	13	0.70
No Religion	50	2.70
Education level		
No formal education	530	28.60
Primary	152	8.20
Junior High School	445	24.02
Senior high school	445	24.02
Tertiary	281	15.16
Employment status		
Unemployed	622	33.57
Employed	1,231	66.43
Marital status		
Never married	561	30.28
Currently married	1,034	55.80
Separated widowed or divorced	258	13.92
Living with care recipient		
No	378	20.40
Yes	1,475	79.60
Monthly income GHS		
Less than 1000	1,422	76.74
1000-1999	299	16.14
2000 or above	132	7.12
Relationship to care recipient		
Spouse	199	10.74
Parent	1,184	63.90
In-law	39	2.10
Friend or neighbour	35	1.89
Sibling	80	4.32
Grandparent	316	17.05
Hours of care per day		
5 hours or less	1,198	64.65
6-10 hours	525	28.33
Above 10 hours	130	7.02
Days of care per week		
1-2	112	6.04
3-4	314	16.95
5-6	285	15.38
7	1,142	61.63
Years providing care		
Less than 5 years	837	45.17
5-9 years	604	32.60
10 years or above	412	22.23
Self-rated health		
Very poor or poor	28	1.51
Fair	72	3.89
Good	353	19.05
Very good	887	47.87
Excellent	513	27.68
Geographical zone		
North	419	22.61
Middle	1,003	54.13
South	431	23.26

Caregiving satisfaction by gender

Figure 1 shows the levels of caregiving satisfaction among informal caregivers. Overall, most participants (90.12%) reported being satisfied with caregiving. Among female informal caregivers, the majority (89.34%) reported being satisfied, while (10.66%) reported being dissatisfied with caregiving. In addition, males reported significantly higher caregiving satisfaction (92.23%), while slightly fewer informal male caregivers reported dissatisfaction (7.77%). In general, a slightly higher proportion of male informal caregivers were satisfied than female caregivers.

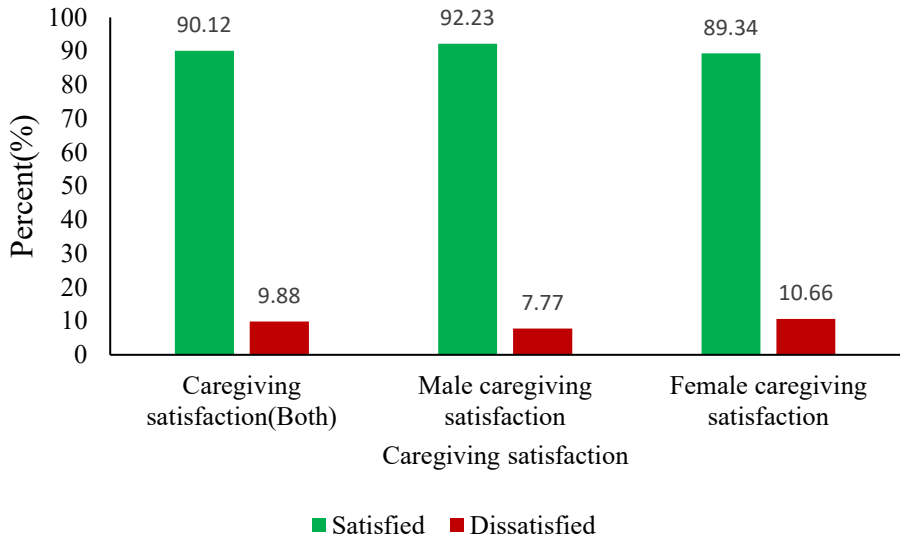


Figure 1:Caregiving satisfaction levels by gender

Binary logistic regression of predictors of caregiving satisfaction among informal caregivers

Table 3 shows the results of the Binary logistic regression of predictors of caregiving satisfaction among informal caregivers. In the crude analysis among informal caregivers; higher odds of caregiving satisfaction for those providing care for 5–9 years (OR=1.54, CI: 1.09–2.17, p-value=0.014) or ≥10 years (OR=3.13, CI: 1.89–5.17, p-value<0.001), compared with less than five years, those with junior high school education compared with no formal education (OR=1.61, CI: 1.04–2.48, p-value=0.031). Higher odds of caregiving satisfaction were also associated with very good health (OR=3.28, CI: 1.29–8.38, p-value=0.013) and excellent health (OR=5.11, CI: 1.91–13.68, p-value=0.001) compared with very poor/poor self-rated health, caring for a parent (OR=3.21, CI: 2.15–4.80, p-value<0.001), sibling (OR=3.30, CI: 1.34–8.11, p-value=0.009), or grandparent (OR=2.08, CI: 1.28–3.38, p-value=0.003), compared with a spouse.

In the adjusted analysis, Model I, caregiving for 5–9 years (OR=1.57, CI: 1.11–2.22, p-value=0.011) and ≥10 years (OR=3.06, CI: 1.85–5.09, p-value<0.001) remained associated with higher odds compared with less than five years, while 6–10 hours of daily care remained associated with lower odds compared with five hours or less (OR=0.69, CI: 0.48–0.97, p-value=0.036). In Model II, higher odds of caregiving satisfaction were associated with caregiving for ≥10 years compared with less than five years (OR=2.82, CI: 1.65–4.82, p-value<0.001), very good health (OR=2.87, CI: 1.06–7.78, p-value=0.038) or excellent health (OR=4.11, CI: 1.43–11.77, p-value=0.009) versus very poor/poor self-rated health, and caring for a parent (OR=2.44, CI: 1.50–3.95, p-value<0.001), sibling (OR=3.28, CI: 1.24–8.65, p-value=0.016), or grandparent (OR=1.88, CI: 1.03–3.42, p-value=0.040) compared with a spouse. In Model III, higher odds of caregiving satisfaction were associated with caregiving for ≥10 years

compared with less than five years (OR=2.15, CI: 1.24–3.75, p-value=0.007); excellent compared with very poor/poor self-rated health (OR=3.35, CI: 1.12–10.02, p-value=0.030); caring for a parent (OR=2.86, CI: 1.59–5.15, p-value<0.001), sibling (OR=3.75, CI: 1.36–10.33, p-value=0.011), or grandparent (OR=2.35, CI: 1.15–4.81, p-value=0.019) compared with a spouse. In Model IV, higher odds of caregiving satisfaction remained associated with caregiving for ≥10 years compared with less than five years (OR=2.01, CI: 1.15–3.52, p-value=0.015), employed compared unemployed (OR=1.49, CI: 1.01–2.20, p-value=0.046), very good health (OR=2.96, CI: 1.02–8.57, p-value=0.046) or excellent health (OR=3.89, CI: 1.27–11.93, p-value=0.018) versus very poor/poor health(self-reported health); caring for a parent (OR=2.76, CI: 1.52–5.01, p-value=0.001), sibling (OR=3.65, CI: 1.31–10.18, p-value=0.013), or grandparent (OR=2.44, CI: 1.18–5.06, p-value=0.016) compared with a spouse. Lower odds of caregiving satisfaction were associated with non-Akan versus Akan ethnicity (OR=0.61, CI: 0.37–0.99, p-value=0.045), no religious affiliation compared with Christianity (OR=0.28, CI: 0.14–0.57, p-value<0.001), middle compared with north geographical zone (OR=0.43, CI: 0.25–0.74, p-value=0.002). All Hosmer–Lemeshow tests for models I-II were non-significant, providing no evidence of lack of fit according to this test.

[Insert Table 3 Here]

Logistic regression of predictors of caregiving satisfaction among female caregivers

Table 4 shows the results of the Binary logistic regression of predictors of caregiving satisfaction among female informal caregivers. Among female caregivers, the crude analysis showed higher odds of caregiving satisfaction for those providing care for 5–9 years (OR=1.50, CI: 1.02–2.21, p-value=0.039) or ≥10 years (OR=2.66, CI: 1.53–4.64, p-value=0.001), compared with less than five years; and those with junior high school (OR=1.76, CI: 1.10–2.82, p-value=0.018) or senior high school education (OR=1.87, CI: 1.13–3.07, p-value=0.014), compared with no formal education. Higher odds were also observed for very good health (OR=3.95, CI: 1.48–10.53, p-value=0.006) and excellent health (OR=8.69, CI: 3.02–25.00, p-value<0.001), compared with very poor/poor health; and caring for a parent (OR=3.82, CI: 2.48–5.89, p-value<0.001), sibling (OR=6.89, CI: 2.05–23.15, p-value=0.002), or grandparent (OR=2.89, CI: 1.67–4.98, p-value<0.001), compared with a spouse.

In Model I; caregiving for 5–9 years (OR=1.51, CI: 1.02–2.23, p-value=0.038) and ≥10 years (OR=2.61, CI: 1.49–4.57, p-value=0.001) remained associated with higher odds of caregiving satisfaction compared with less than five years. In Model II, higher odds of caregiving satisfaction were associated with caregiving for ≥10 years compared with less than five years (OR=2.34, CI: 1.28–4.27, p-value=0.006), very good (OR=3.66, CI: 1.26–10.66, p-value=0.017) or excellent health (OR=6.99, CI: 2.21–22.07, p-value=0.001) compared with very poor/poor health, and caring for a parent (OR=2.62, CI: 1.53–4.47, p-value<0.001) or sibling (OR=6.21, CI: 1.71–22.50, p-value=0.005) compared with a spouse. In Model III, higher odds of caregiving satisfaction were associated with very good (OR=3.23, CI: 1.05–9.99, p-value=0.041) and excellent health (OR=6.15, CI: 1.84–20.57, p-value=0.003) compared with very poor/poor health, and caring for a parent (OR=3.68, CI: 1.90–7.14, p-value<0.001), sibling (OR=8.54, CI: 2.18–33.40, p-value=0.002), or grandparent (OR=2.84, CI: 1.24–6.53, p-value=0.014), compared with a spouse; other religious affiliation compared with Christianity was associated with lower odds of caregiving satisfaction (OR=0.19, CI: 0.08–0.47, p-value<0.001). In Model IV, higher odds of caregiving satisfaction remained associated with very good (OR=3.75, CI: 1.17–11.99, p-value=0.026) and excellent health (OR=6.92, CI: 2.00–23.91, p-value=0.002) compared with very poor/poor health, and caring for a parent (OR=3.49, CI: 1.78–6.84, p-value<0.001), sibling (OR=7.97, CI: 2.00–31.76, p-value=0.003), or

grandparent (OR=2.88, CI: 1.24–6.68, p-value=0.014), compared with a spouse. The Hosmer–Lemeshow tests were non-significant for Models II- IV, providing no evidence of lack of fit according to this test.

[Insert Table 4 Here]

Binary logistic regression of caregiving satisfaction among male caregivers

Table 5 shows the results of the binary logistic regression of predictors of caregiving satisfaction among male informal caregivers. In the crude analysis, caregiving for 10 years or above was significantly associated with higher odds of caregiving satisfaction compared with caregiving for less than five years (OR=5.43, CI: 1.61–18.32, p-value=0.006). Being currently married was also associated with higher odds compared with never being married (OR=2.64, CI: 1.31–5.31, p-value=0.006). In contrast, non-Akan ethnicity was associated with lower odds compared with Akan ethnicity (OR=0.47, CI: 0.24–0.91, p-value=0.025), and no religious affiliation was associated with lower odds compared with Christianity (OR=0.26, CI: 0.08–0.85, p-value=0.026). In the adjusted analysis, Model I, caregiving for 10 years or above remained significantly associated with higher odds of caregiving satisfaction compared with less than five years (OR=5.56, CI: 1.62–19.08, p-value=0.006). In Model II, no individual predictor was significantly associated with higher or lower odds of caregiving satisfaction. The association with caregiving for 10 years or above was no longer statistically significant (OR=3.46, CI: 0.91–13.19, p-value=0.069). In Model III, senior high school education was significantly associated with lower odds of caregiving satisfaction compared with no formal education (OR=0.27, CI: 0.07–0.99, p-value=0.048). Caregivers aged 45–54 years had lower odds compared with those aged 18–24 years (OR=0.19, CI: 0.04–0.98, p-value=0.048). No religious affiliation was also associated with lower odds compared with Christianity (OR=0.20, CI: 0.05–0.83, p-value=0.027). In the fully adjusted model, age (45–54 years) remained significantly associated with lower odds of caregiving satisfaction compared with age 18–24 years (OR=0.18, CI: 0.03–0.98, p-value=0.048). The associations with senior high school education and other religious affiliation were no longer statistically significant. The Hosmer–Lemeshow tests were non-significant for all Models providing no evidence of lack of fit according to this test.

[Insert Table 5 Here]

Interaction effects on caregiving satisfaction

Table 6 presents the interaction analysis examining whether caregiver sex modified the associations between daily caregiving hours, years of caregiving, marital status, health insurance status, and caregiving satisfaction. Among the interaction terms examined, only the interaction between female sex and being currently married was statistically significant (OR = 0.39; 95% CI: 0.16–0.91; p = 0.030), indicating that the association between current marriage and caregiving satisfaction differed between female and male informal caregivers. The remaining interaction terms were not statistically significant ($p > 0.05$). The Hosmer–Lemeshow goodness-of-fit test showed no evidence of poor model fit (p = 0.7525).

Table 6 Interaction effects between caregiver sex and selected predictors of caregiving satisfaction

Interaction	Contrast	Odds ratio	95% CI	p-value
Sex by hours of care per day	Female by 6-10 hours	0.77	0.32-1.82	p=0.549
	Female by above 10 hours	1.00	0.11-9.41	p=0.999
Sex by years providing care	Female by 5-9 years	0.95	0.40-2.28	p=0.912
	Female by 10 years or above	0.66	0.16-2.69	p=0.558

Sex by marital status	Female by currently married	0.39	0.16-0.91	p=0.030
	Female by separated widowed or divorced	0.60	0.15-2.42	p=0.469
Sex by health insurance	Female by insured	1.69	0.77-3.74	p=0.194
Model fitness	**Number of observations**	1,853		
	LR chi-square	47.47		p<0.001
	Log likelihood	-573.57391		
	Pseudo R-squared	0.0397		
	P-value of Hosmer-Lemeshow test	5.05		p=0.7525

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Discussion

This study provides important insights into gender differences in caregiving satisfaction among informal caregivers of older adults in the Ashanti Region of Ghana. Overall, caregiving satisfaction was high (90.12%), with a slightly higher prevalence among male (92.23%) than female caregivers (89.34%). This finding highlights a frequently overlooked dimension of informal caregiving: the possibility of deriving fulfilment from care despite its physical, psychological, and socioeconomic demands[16,39]. This finding is consistent with Lawton's two-factor model of caregiving appraisal, which conceptualizes caregiving satisfaction and burden as distinct dimensions of caregivers' subjective experiences, allowing positive and negative appraisals to coexist [57]. In Ghana, Kyei-Arthur et al.[70] documented positive caregiving experiences among family caregivers of older persons in resource-limited communities, while Kyei-Arthur and Atobrah [71] identified affection, reciprocity, and family responsibility as important caregiving motivations. These sociocultural values may help explain the high satisfaction observed in the present study, where caring for older relatives may represent not only a responsibility but also an expression of gratitude, belonging, and family solidarity. The slightly higher satisfaction among males may reflect differences in gendered caregiving expectations, particularly where females combine direct personal care with household and economic responsibilities[72]. However, the high satisfaction among both sexes suggests that positive caregiving experiences can coexist with substantial caregiving demands. This is particularly relevant given recent Ghanaian evidence documenting caregiver burden, health problems, and unmet healthcare needs among informal caregivers[55,73,74,75]

In the fully adjusted model for the total sample, caregiving satisfaction was positively associated with longer caregiving duration, employment, better self-rated health, and caring for parents, siblings, or grandparents rather than spouses. These findings suggest that positive caregiving experiences may depend not only on the demands of care but also on caregivers' capacity to manage those demands and the meaning attached to their responsibilities [16,73.] Lawton's two-factor model of caregiving appraisal provided the theoretical foundation for this study, guiding the selection of variables relating to objective caregiving stressors, caregiver resources, and background and contextual characteristics, as well as the interpretation of caregiving satisfaction[57,58]. Within this framework, the observed associations suggest that positive caregiving appraisals may reflect the interplay between caregiving demands, personal resources, and the broader sociocultural context in which care is provided. Longer caregiving duration may facilitate the development of practical skills, confidence, and adaptive coping strategies, while employment may provide financial resources that help caregivers meet care-related expenses [39]. The importance of caregiver resources is supported by Agyemang-Duah and Rosenberg[60], who identified socioeconomic differences in healthcare utilization among informal caregivers in the Ashanti Region. Similarly, the association with better self-rated health suggests that personal well-being may be an important resource for sustaining positive caregiving experiences, particularly in light of recent evidence of substantial health and healthcare needs among Ghanaian caregivers [73]. The higher satisfaction among caregivers supporting parents, siblings, or grandparents may reflect the emotional rewards of reciprocity and intergenerational solidarity, whereas spousal caregiving may involve distinctive emotional and practical challenges[16,71]. Conversely, the lower satisfaction among non-Akan caregivers and those residing in the Middle geographical zone suggests that caregiving satisfaction may also be shaped by sociocultural and geographical circumstances. Previous research in Ghana has demonstrated geographical inequalities in caregiver burden[75], reinforcing the importance of examining caregiving satisfaction within their local contexts. Collectively, these findings suggest that caregiving satisfaction reflects an interplay between accumulated experience, personal resources, family relationships, and the wider social environment.

A particularly compelling contribution of this study is the contrast in factors associated with caregiving satisfaction among female and male caregivers. Among female caregivers, personal health and the relationship to the care recipient emerged as the principal correlates of satisfaction in the fully adjusted model. Female caregivers reporting very good or excellent health had significantly higher odds of satisfaction than those reporting very poor or poor health. This suggests that females' positive caregiving experiences may be closely associated with their own health and functional well-being. Within the Ghanaian sociocultural context, where females may simultaneously undertake caregiving, household management, childcare, and income-generating activities, good health could provide an important resource for managing these overlapping responsibilities[39,72]. Conversely, poor health may

intensify the physical and emotional challenges of caregiving, potentially diminishing its perceived rewards[39]. Viewed through Lawton's framework, better health may represent a personal resource associated with more favourable caregiving appraisals, even when caregiving responsibilities remain demanding[57]. This finding suggests that although females may derive considerable fulfilment from caregiving, their ability to sustain positive caregiving satisfaction may be closely linked to their own health. Protecting caregiver health should therefore be considered an essential component of sustainable informal caregiving satisfaction.

Beyond personal health, family relationships appeared particularly important to caregiving satisfaction among females. Female caregivers supporting parents, siblings, or grandparents had significantly higher odds of satisfaction than those caring for spouses. This finding suggests that the emotional meaning of caregiving relationships may influence females' experiences beyond the practical responsibilities involved. Caring for parents and grandparents may provide opportunities to reciprocate earlier support, express gratitude, and fulfil intergenerational obligations. This interpretation resonates with Kyei-Arthur and Atobrah[71], who identified affection, reciprocity, and family responsibility as important motivations for caregiving in Ghana. In contrast, spousal caregiving may involve a different emotional experience, including changes in marital roles, concerns about a partner's deteriorating health, and the loss of previously shared responsibilities[16, 72]. The particularly strong association among caregivers is intriguing and may reflect emotional closeness, shared family histories, or differences in caregiving arrangements, although the magnitude of this association should be interpreted cautiously. The importance of care-recipient relationships is also consistent with Lawton et al.[57], who demonstrated that caregiving appraisal may differ between spousal and adult-child caregivers. These findings suggest that caregiving satisfaction among females may depend not simply on providing care but on the relational meaning, expectations, and emotional rewards associated with caring for particular family members.

Among male caregivers, a different pattern emerged, with age being the only statistically significant predictor in the fully adjusted model. Males aged 45–54 years had significantly lower odds of caregiving satisfaction than those aged 18–24 years. This finding may reflect the convergence of caregiving responsibilities with the economic and social demands of middle adulthood. In Ghana, middle-aged males may be expected to provide financially for their households, support dependent children, and contribute to the welfare of ageing relatives. These overlapping responsibilities could generate financial strain and competing demands on time, potentially reducing the satisfaction derived from caregiving[39,74]. The finding further emphasises the influence of competing social roles and contextual stressors on caregiving experiences[76]. It also raises the possibility that caregiving satisfaction among males may be shaped by life-stage responsibilities rather than caregiving activities alone. Nevertheless, the absence of other significant predictors in the male model should not be interpreted as evidence that health or family relationships are unimportant to males. Rather, the findings identify middle-aged male caregivers as a potentially important group for further investigation.

The gender-specific findings therefore offer a distinctive perspective on informal caregiving in Ghana. Among females, satisfaction was associated with personal health and family relationships, whereas among males, age-related circumstances emerged as the only significant correlate. This contrast suggests that positive caregiving experiences may be embedded in different personal and social circumstances for females and males[72]. From the perspective of Lawton's model, these findings suggest that the resources and contextual circumstances associated with positive caregiving appraisal may vary across caregiver groups[57]. However, differences in statistical significance between the sex-stratified models do not necessarily establish statistically significant differences in predictor effects. The findings nevertheless highlight the value of moving beyond gender-neutral explanations of caregiving satisfaction to investigate how health resources, family relationships, and life-stage responsibilities intersect with gendered expectations of care.

Importantly, the interaction analysis provided additional evidence of a gender-related difference involving marital status. The interaction between female sex and being currently married was statistically significant, indicating that the association between current marriage and caregiving satisfaction differed between female and male caregivers relative to the reference marital-status category. This finding raises an interesting possibility that marriage may not provide equivalent caregiving-related advantages to females and males. Married females may experience

overlapping domestic, spousal, and caregiving responsibilities, whereas married males may receive different forms of practical and emotional support within the household[39,72]. Consequently, the relationship between marriage and caregiving satisfaction may depend less on marital status itself than on how caregiving responsibilities and support are distributed within marriage. However, these mechanisms were not directly examined, and a joint test would be required to establish the overall significance of the sex-by-marital-status interaction. Nevertheless, the finding highlights marital circumstances as a potentially important dimension of gendered caregiving experiences.

These findings suggest that caregiving satisfaction should be understood as a multidimensional experience shaped by personal resources, family relationships, socioeconomic circumstances, and gendered responsibilities[16, 73]. Consistent with Lawton's two-factor model, understanding caregiving requires attention to its positive appraisal rather than assuming that caregiving demands necessarily preclude satisfaction[57]. The study contributes to the growing literature on caregiving satisfaction in sub-Saharan Africa by demonstrating the importance of examining satisfaction alongside the more commonly studied dimensions of caregiver burden and health challenges. From a policy perspective, the findings underscore the need for gender-responsive caregiver support in Ghana. Interventions should prioritize the health and well-being of female caregivers, recognize the distinctive circumstances of spousal and intergenerational caregiving, and provide practical support for middle-aged male caregivers managing competing economic and family responsibilities. Strengthening caregiver health services, financial protection, and family-based support systems may help sustain positive caregiving experiences while addressing the challenges associated with unpaid care[39]. These findings have important implications for advancing Sustainable Development Goal 3 (Good Health and Well-being), as the association between caregivers' health and caregiving satisfaction underscores the importance of protecting caregiver health to promote positive caregiving experiences. The gender-specific findings and significant marital-status interaction further inform SDG 5 (Gender Equality), highlighting the need to address inequalities in gendered caregiving satisfaction through gender-responsive interventions that recognize the distinct circumstances of female and male caregivers. Also, the associations involving employment, ethnicity, and geographical location are relevant to SDG 10 (Reduced Inequalities), emphasizing the importance of addressing socioeconomic and geographical disparities in caregiving satisfaction and ensuring equitable access to caregiver support services.

Limitations of the Study

There are several shortcomings that should be taken into consideration despite all the strengths of this research. The first is that the study was conducted through a cross-sectional method; thus, no causal relationships were found, since the associations discovered between the variables are based only on correlational analysis of data collected at a certain point in time. Another weakness is the use of subjective measurements, which increases the risk of recall bias and social desirability bias in self-reports provided by informal caregivers who might have exaggerated their degree of satisfaction due to strong cultural traditions. Thirdly, despite the considerable number of subjects involved, this research is limited to the Ashanti Region of Ghana. Being restricted geographically, the results might not have been fully applicable to other regions of sub-Saharan Africa where there exist different cultural values, economic situations, and arrangements of the healthcare systems. Fourthly, in terms of measuring the level of caregiving satisfaction, only two states were considered, namely satisfied and dissatisfied. In turn, this approach may have reduced the sensitivity of the analysis because caregiving experiences are broader and include being moderately or highly satisfied. Fifthly, no attention was paid to certain psychological and psychosocial factors such as caregiver burden, depression, coping mechanisms used, and social support systems available. Lastly, the use of snowball sampling may have introduced selection bias and limited the generalizability of the findings. For instance, unknown individual selection probabilities precluded the construction of conventional design-based sampling weights. Although geographic zone was included in the regression models, potential within-cluster correlation may not have been fully accounted for, which should be considered when interpreting the statistical significance of the findings. Considering these limitations, we suggest the following areas for future research. First and foremost, longitudinal studies need to be carried out to evaluate changes in caregiving satisfaction over time and across different caregiving pathways, thus overcoming the limitations associated with cross-sectional designs. Second,

future research needs to include more psychosocial factors, including but not limited to stress, resilience, coping strategies, and caregiver burden. This will result in a considerably more advanced predictor of satisfaction. Third, qualitative research should be conducted to identify the exact mechanism of cultural and religious values' impact on caregiving satisfaction among ethnic groups in Ghana. Lastly, comparative research needs to be done across other countries in sub-Saharan Africa to establish whether the findings of the current study apply only to Ghana or have regionwide validity.

Conclusion

The objective of the study was to establish the prevalence and predictors as well as gender differences in caregiving satisfaction among informal caregivers of older people in Ghana. The results show a very high prevalence of caregiver satisfaction of 90.12%. However, this satisfaction level varies by gender, as females were less satisfied compared to their male counterparts. Caregiver satisfaction is shown to be highly influenced by a range of demographic, cultural, socioeconomic, and caregiving characteristics, including ethnicity, religious affiliation, insurance coverage, caregiver-cared-for relationship, caregiving burden, caregiving duration, and level of education. The findings emphasize the significance of considering context-specific determinants such as cultural, religious, and formal health sector determinants of caregiving in future studies on caregiving in Ghana.

Declarations

Ethics Approval and Consent to Participate

All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. For procedural ethics, the General Research Ethics Board (GREB), Queen's University, Kingston, Canada (Ref: GGEOPL-344-22) and the Committee on Human Research Publication and Ethics (CHRPE), School of Medical Sciences, College of Health Sciences, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana (Ref: CHRPE/AP/182/22) approved the study protocol. Further, the Ashanti Regional Health Directorate under Ghana Health Service further gave approval to the study site (Ref: GHS/ASH/RES/V.2) for the data collection exercise to begin. Verbal and informed written consent was sought from the participants. The procedure for obtaining verbal informed consent was approved by the ethics committee/institutional review board. We further confirm that for illiterate participants, informed consent to participate in the study was obtained from their legal guardians. Participants were assured of strict confidentiality and anonymity of the data they provided. The participation of the respondents in the study was also voluntary.

Availability data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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Conflict of Interest

All authors declare that they have no conflicts of interest.

Author's Contribution

Conceptualization, WA-D, FAA, AAA and PP; methodology, WA-D; software, WA-D and FAA; formal analysis, FAA; data curation, WA-D; writing—original draft preparation, WA-D, FAA, AAA, MA, EDLH, MAP, & PP; writing—review and editing, WA-D, FAA, AAA, MA, EDLH, MAP, & PP; supervision, WA-D; funding acquisition, WA-D. All authors have read and agreed to the published version of the manuscript.

Consent for Publication

Not applicable

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Table 3 Binary logistic regression of predictors of caregiving satisfaction among informal caregivers

Variable	Crude OR 95% CI p-value	Model I	Model II	Model III	Model IV
Objective stressors					
Hours of care per day					
5 hours or less	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
6-10 hours	0.63 (0.45-0.87), p=0.005	0.69 (0.48-0.97), p=0.036	0.79 (0.55-1.15), p=0.221	0.84 (0.57-1.24), p=0.371	0.87 (0.59-1.29), p=0.491
Above 10 hours	1.14 (0.58-2.24), p=0.702	1.12 (0.56-2.26), p=0.744	1.21 (0.58-2.52), p=0.612	1.01 (0.48-2.13), p=0.976	1.01 (0.48-2.13), p=0.985
Days of care per week					
1-2	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
3-4	0.93 (0.40-2.13), p=0.863	0.91 (0.40-2.11), p=0.833	1.08 (0.46-2.57), p=0.854	1.22 (0.51-2.91), p=0.651	1.35 (0.56-3.23), p=0.503
5-6	0.59 (0.26-1.31), p=0.195	0.64 (0.28-1.45), p=0.287	0.69 (0.29-1.64), p=0.404	0.87 (0.36-2.07), p=0.751	0.99 (0.41-2.37), p=0.981
7	0.67 (0.32-1.40), p=0.287	0.70 (0.32-1.52), p=0.368	0.86 (0.37-1.97), p=0.719	1.03 (0.44-2.38), p=0.950	1.14 (0.49-2.65), p=0.759
Years providing care					
Less than 5 years	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
5-9 years	1.54 (1.09-2.17), p=0.014	1.57 (1.11-2.22), p=0.011	1.44 (0.99-2.10), p=0.055	1.44 (0.98-2.13), p=0.063	1.37 (0.93-2.03), p=0.116
10 years or above	3.13 (1.89-5.17), p<0.001	3.06 (1.85-5.09), p<0.001	2.82 (1.65-4.82), p<0.001	2.15 (1.24-3.75), p=0.007	2.01 (1.15-3.52), p=0.015
Caregiver resources					
Education level					
No formal education	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Primary	0.86 (0.50-1.46), p=0.567		0.76 (0.43-1.35), p=0.343	0.77 (0.42-1.40), p=0.388	0.80 (0.44-1.46), p=0.466

Junior High School	1.61 (1.04-2.48), p=0.031		1.27 (0.79-2.04), p=0.319	1.09 (0.66-1.80), p=0.737	1.09 (0.66-1.79), p=0.747
Senior high school	1.39 (0.92-2.11), p=0.121		1.15 (0.71-1.85), p=0.563	0.90 (0.54-1.51), p=0.689	0.93 (0.55-1.56), p=0.782
Tertiary	1.54 (0.93-2.54), p=0.090		1.17 (0.67-2.04), p=0.577	0.88 (0.48-1.62), p=0.681	0.92 (0.50-1.70), p=0.798
Monthly income GHS					
Less than 1000	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
1000-1999	0.80 (0.54-1.20), p=0.285		0.86 (0.56-1.33), p=0.503	0.82 (0.52-1.28), p=0.372	0.83 (0.53-1.31), p=0.429
2000 or above	0.75 (0.43-1.30), p=0.303		0.74 (0.41-1.33), p=0.309	0.66 (0.36-1.21), p=0.176	0.69 (0.37-1.26), p=0.223
Employment status					
Unemployed	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Employed	1.36 (0.99-1.85), p=0.057		1.12 (0.78-1.59), p=0.541	1.38 (0.94-2.03), p=0.097	1.49 (1.01-2.20), p=0.046
Marital status					
Never married	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Currently married	1.10 (0.78-1.55), p=0.581		1.13 (0.73-1.74), p=0.595	1.24 (0.75-2.06), p=0.394	1.26 (0.76-2.09), p=0.380
Separated widowed or divorced	0.99 (0.61-1.60), p=0.956		1.01 (0.58-1.75), p=0.982	1.11 (0.59-2.09), p=0.743	1.17 (0.62-2.22), p=0.630
Living with care recipient					
No	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Yes	0.74 (0.49-1.12), p=0.158		0.80 (0.49-1.29), p=0.358	0.80 (0.49-1.31), p=0.379	0.80 (0.49-1.32), p=0.386
Self-rated health					
Very poor/ poor	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Fair	1.13 (0.39-3.31), p=0.824		1.02 (0.33-3.15), p=0.979	1.06 (0.33-3.48), p=0.918	1.16 (0.35-3.88), p=0.805
Good	1.12 (0.44-2.87), p=0.810		1.16 (0.43-3.14), p=0.777	1.18 (0.42-3.34), p=0.754	1.45 (0.50-4.23), p=0.493

Very good	3.28 (1.29-8.38), p=0.013		2.87 (1.06-7.78), p=0.038	2.45 (0.87-6.90), p=0.090	2.96 (1.02-8.57), p=0.046
Excellent	5.11 (1.91-13.68), p=0.001		4.11 (1.43-11.77), p=0.009	3.35 (1.12-10.02), p=0.030	3.89 (1.27-11.93), p=0.018
Relationship to care recipient					
Spouse	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Parent	3.21 (2.15-4.80), p<0.001		2.44 (1.50-3.95), p<0.001	2.86 (1.59-5.15), p<0.001	2.76 (1.52-5.01), p=0.001
In-Law	-		-	-	-
Friend or neighbour	0.90 (0.38-2.13), p=0.816		0.91 (0.35-2.36), p=0.848	1.04 (0.37-2.89), p=0.947	1.09 (0.38-3.10), p=0.871
Sibling	3.30 (1.34-8.11), p=0.009		3.28 (1.24-8.65), p=0.016	3.75 (1.36-10.33), p=0.011	3.65 (1.31-10.18), p=0.013
Grandparent	2.08 (1.28-3.38), p=0.003		1.88 (1.03-3.42), p=0.040	2.35 (1.15-4.81), p=0.019	2.44 (1.18-5.06), p=0.016
Background and contextual factors					
Age (years)					
18-24	1.00 (Ref.)			1.00 (Ref.)	1.00 (Ref.)
25-34	0.68 (0.39-1.18), p=0.171			0.61 (0.33-1.12), p=0.109	0.62 (0.34-1.15), p=0.133
35-44	0.86 (0.48-1.53), p=0.612			0.56 (0.27-1.18), p=0.126	0.58 (0.27-1.22), p=0.149
45-54	0.44 (0.25-0.76), p=0.003			0.45 (0.21-1.00), p=0.050	0.48 (0.21-1.06), p=0.069
55-64	1.03 (0.48-2.17), p=0.947			1.29 (0.47-3.51), p=0.621	1.29 (0.47-3.54), p=0.618
65 or above	0.73 (0.32-1.67), p=0.451			0.97 (0.32-2.96), p=0.957	0.94 (0.30-2.88), p=0.908
Gender					
Male	1.00 (Ref.)			1.00 (Ref.)	1.00 (Ref.)
Female	0.71 (0.49-1.02), p=0.065			0.76 (0.50-1.15), p=0.196	0.76 (0.50-1.15), p=0.195

Residence					
Rural	1.00 (Ref.)			1.00 (Ref.)	1.00 (Ref.)
Urban	0.56 (0.40-0.78), p=0.001			0.76 (0.52-1.09), p=0.137	0.97 (0.65-1.43), p=0.862
Ethnicity					
Akan	1.00 (Ref.)			1.00 (Ref.)	1.00 (Ref.)
Non-Akan	0.56 (0.40-0.77), p<0.001			0.58 (0.36-0.94), p=0.028	0.61 (0.37-0.99), p=0.045
Religious affiliation					
Christianity	1.00 (Ref.)			1.00 (Ref.)	1.00 (Ref.)
Islam	0.58 (0.40-0.86), p=0.006			0.97 (0.54-1.73), p=0.920	0.84 (0.47-1.50), p=0.552
African Traditional Religion	1.07 (0.14-8.27), p=0.951			1.29 (0.14-12.12), p=0.826	1.46 (0.15-14.64), p=0.748
No Religion	0.12 (0.07-0.22), p<0.001			0.24 (0.12-0.48), p<0.001	0.28 (0.14-0.57), p<0.001
Geographical zone					
North	1.00 (Ref.)				1.00 (Ref.)
Middle	0.39 (0.25-0.61), p<0.001				0.43 (0.25-0.74), p=0.002
South	1.08 (0.60-1.94), p=0.803				0.80 (0.42-1.51), p=0.484
Model Fitness					
Number of observations		1,853	1,814	1,814	1,814
LR chi-square and p-value		35.24, p<0.001	117.11, p<0.001	160.43, p<0.001	173.24, p<0.001
Log likelihood		-579.68897	-534.65132	-512.99193	-506.58703
Pseudo R-squared		0.0295	0.0987	0.1352	0.1460
p-value of Hosmer-Lemeshow test		0.0826	0.0887	0.1953	p=0.2491

Table 4 Binary logistic regression of predictors of caregiving satisfaction among female caregivers

Variable	Crude OR 95% CI p-value	Model I	Model II	Model III	Model IV
Objective stressors					
Hours of care per day					
5 hours or less	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
6-10 hours	0.66 (0.46-0.94), p=0.023	0.68 (0.46-1.01), p=0.055	0.83 (0.54-1.27), p=0.388	0.87 (0.55-1.36), p=0.529	0.89 (0.56-1.39), p=0.596
Above 10 hours	1.23 (0.60-2.52), p=0.576	1.17 (0.56-2.48), p=0.676	1.30 (0.58-2.91), p=0.519	1.05 (0.47-2.38), p=0.900	1.04 (0.46-2.37), p=0.921
Days of care per week					
1-2	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
3-4	0.45 (0.13-1.58), p=0.213	0.45 (0.13-1.59), p=0.217	0.61 (0.17-2.23), p=0.453	0.70 (0.19-2.57), p=0.587	0.74 (0.20-2.75), p=0.657
5-6	0.30 (0.09-1.04), p=0.058	0.34 (0.10-1.17), p=0.087	0.36 (0.10-1.33), p=0.127	0.45 (0.12-1.66), p=0.231	0.51 (0.14-1.88), p=0.309
7	0.39 (0.12-1.26), p=0.114	0.43 (0.13-1.41), p=0.163	0.51 (0.14-1.83), p=0.303	0.60 (0.17-2.16), p=0.436	0.66 (0.18-2.36), p=0.519
Years providing care					
Less than 5 years	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
5-9 years	1.50 (1.02-2.21), p=0.039	1.51 (1.02-2.23), p=0.038	1.42 (0.93-2.17), p=0.109	1.39 (0.89-2.18), p=0.147	1.30 (0.83-2.05), p=0.251
10 years or above	2.66 (1.53-4.64), p=0.001	2.61 (1.49-4.57), p=0.001	2.34 (1.28-4.27), p=0.006	1.70 (0.91-3.17), p=0.093	1.59 (0.85-2.98), p=0.149
Caregiver resources					
Education level					
No formal education	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Primary	0.95 (0.54-1.68), p=0.861		0.77 (0.41-1.45), p=0.421	0.87 (0.44-1.70), p=0.679	0.88 (0.45-1.73), p=0.707
Junior High School	1.76 (1.10-2.82), p=0.018		1.33 (0.78-2.25), p=0.296	1.19 (0.68-2.09), p=0.536	1.19 (0.68-2.10), p=0.538
Senior high school	1.87 (1.13-3.07), p=0.014		1.41 (0.79-2.51), p=0.245	1.22 (0.66-2.28), p=0.527	1.26 (0.68-2.35), p=0.467

Tertiary	1.50 (0.81-2.77), p=0.200		1.16 (0.58-2.32), p=0.667	1.06 (0.51-2.22), p=0.873	1.11 (0.53-2.33), p=0.788
Monthly income GHS					
Less than 1000	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
1000-1999	0.83 (0.53-1.30), p=0.421		0.93 (0.56-1.53), p=0.765	0.89 (0.53-1.49), p=0.645	0.91 (0.54-1.54), p=0.724
2000 or above	0.75 (0.40-1.38), p=0.353		0.75 (0.38-1.47), p=0.399	0.72 (0.36-1.47), p=0.368	0.75 (0.37-1.53), p=0.433
Employment status					
Unemployed	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Employed	1.28 (0.90-1.83), p=0.168		1.09 (0.73-1.63), p=0.669	1.33 (0.85-2.06), p=0.211	1.44 (0.92-2.26), p=0.112
Marital status					
Never married	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Currently married	0.83 (0.55-1.26), p=0.389		1.06 (0.63-1.80), p=0.828	1.06 (0.58-1.94), p=0.840	1.05 (0.58-1.93), p=0.864
Separated widowed or divorced	0.90 (0.52-1.56), p=0.718		1.01 (0.54-1.91), p=0.968	0.99 (0.48-2.04), p=0.983	1.03 (0.50-2.12), p=0.946
Living with care recipient					
No	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Yes	0.77 (0.48-1.25), p=0.293		0.85 (0.48-1.52), p=0.592	0.84 (0.46-1.53), p=0.572	0.84 (0.46-1.53), p=0.573
Self-rated health					
Very poor or poor	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Fair	1.22 (0.39-3.81), p=0.734		1.05 (0.31-3.59), p=0.934	1.21 (0.33-4.46), p=0.778	1.27 (0.33-4.85), p=0.724
Good	1.38 (0.52-3.69), p=0.519		1.55 (0.53-4.53), p=0.422	1.80 (0.58-5.60), p=0.309	2.12 (0.66-6.82), p=0.208
Very good	3.95 (1.48-10.53), p=0.006		3.66 (1.26-10.66), p=0.017	3.23 (1.05-9.99), p=0.041	3.75 (1.17-11.99), p=0.026
Excellent	8.69 (3.02-25.00), p<0.001		6.99 (2.21-22.07), p=0.001	6.15 (1.84-20.57), p=0.003	6.92 (2.00-23.91), p=0.002

Relationship to care recipient					
Spouse	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Parent	3.82 (2.48-5.89), p<0.001		2.62 (1.53-4.47), p<0.001	3.68 (1.90-7.14), p<0.001	3.49 (1.78-6.84), p<0.001
In-Law	-		-	-	-
Friend or neighbour	0.93 (0.39-2.25), p=0.875		0.90 (0.32-2.49), p=0.837	1.11 (0.37-3.36), p=0.848	1.13 (0.37-3.48), p=0.833
Sibling	6.89 (2.05-23.15), p=0.002		6.21 (1.71-22.50), p=0.005	8.54 (2.18-33.40), p=0.002	7.97 (2.00-31.76), p=0.003
Grandparent	2.89 (1.67-4.98), p<0.001		1.95 (0.98-3.88), p=0.056	2.84 (1.24-6.53), p=0.014	2.88 (1.24-6.68), p=0.014
Background and contextual factors					
Age (years)					
18-24	1.00 (Ref.)			1.00 (Ref.)	1.00 (Ref.)
25-34	0.65 (0.33-1.29), p=0.216			0.62 (0.28-1.37), p=0.240	0.64 (0.29-1.41), p=0.267
35-44	0.61 (0.31-1.22), p=0.160			0.52 (0.21-1.27), p=0.151	0.53 (0.21-1.31), p=0.168
45-54	0.33 (0.17-0.65), p=0.001			0.59 (0.22-1.55), p=0.283	0.63 (0.24-1.69), p=0.358
55-64	0.85 (0.36-2.03), p=0.719			1.90 (0.58-6.26), p=0.289	1.93 (0.58-6.40), p=0.281
65 or above	0.46 (0.19-1.15), p=0.097			1.16 (0.33-4.11), p=0.821	1.13 (0.31-4.05), p=0.853
Residence					
Rural	1.00 (Ref.)			1.00 (Ref.)	1.00 (Ref.)
Urban	0.49 (0.33-0.71), p<0.001			0.67 (0.43-1.03), p=0.069	0.87 (0.54-1.38), p=0.541
Ethnicity					
Akan	1.00 (Ref.)			1.00 (Ref.)	1.00 (Ref.)
Non-Akan	0.57 (0.39-0.83), p=0.004			0.63 (0.35-1.13), p=0.119	0.66 (0.37-1.18), p=0.158

Religious affiliation					
Christianity	1.00 (Ref.)			1.00 (Ref.)	1.00 (Ref.)
Islam	0.59 (0.38-0.94), p=0.025			1.10 (0.55-2.22), p=0.788	0.93 (0.46-1.90), p=0.844
African Traditional Religion	0.39 (0.04-3.49), p=0.398			1.10 (0.08-14.71), p=0.943	1.29 (0.09-18.57), p=0.852
No Religion	0.07 (0.03-0.16), p<0.001			0.19 (0.08-0.47), p<0.001	0.23 (0.09-0.56), p=0.001
Geographical zone					
North	1.00 (Ref.)				1.00 (Ref.)
Middle	0.35 (0.21-0.59), p<0.001				0.41 (0.22-0.78), p=0.007
South	1.04 (0.52-2.05), p=0.919				0.74 (0.35-1.57), p=0.438
Model fitness					
Number of observations		1,351	1,316	1,316	1,316
LR chi-square and p-value		24.81, p<0.001	113.59, p<0.001	150.03, p<0.001	159.73, p<0.001
Log likelihood		-446.01799	-397.62636	-379.40829	-374.55830
Pseudo R-squared		0.0271	0.1250	0.1651	0.1757
P-value of the Hosmer-Lemeshow test		0.2504	0.5807	0.7860	0.0986

Table 5 Binary logistic regression of predictors of caregiving satisfaction among male caregivers

Variable	Crude OR 95% CI p-value	Model I	Model II	Model III	Model IV
Objective stressors					
Hours of care per day					
5 hours or less	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
6-10 hours	0.64 (0.30-1.38), p=0.257	0.82 (0.37-1.83), p=0.621	1.07 (0.45-2.55), p=0.871	1.00 (0.39-2.55), p=0.992	1.08 (0.42-2.80), p=0.876
Above 10 hours	1.07 (0.14-8.47), p=0.946	0.99 (0.12-8.36), p=0.995	1.35 (0.14-12.78), p=0.796	1.46 (0.13-16.09), p=0.757	1.08 (0.09-12.47), p=0.949
Days of care per week					
1-2	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
3-4	2.44 (0.71-8.42), p=0.159	2.29 (0.65-8.03), p=0.196	2.46 (0.64-9.45), p=0.189	2.78 (0.69-11.28), p=0.151	3.27 (0.79-13.56), p=0.103
5-6	1.48 (0.44-4.96), p=0.523	1.54 (0.45-5.32), p=0.495	1.86 (0.47-7.30), p=0.374	2.17 (0.52-9.04), p=0.289	2.67 (0.62-11.55), p=0.188
7	1.33 (0.47-3.72), p=0.591	1.15 (0.39-3.43), p=0.800	1.26 (0.36-4.41), p=0.718	1.62 (0.42-6.19), p=0.480	1.86 (0.48-7.28), p=0.371
Years providing care					
Less than 5 years	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
5-9 years	1.76 (0.82-3.77), p=0.146	1.81 (0.83-3.93), p=0.134	1.48 (0.64-3.40), p=0.361	1.69 (0.70-4.10), p=0.242	1.67 (0.69-4.04), p=0.257
10 years or above	5.43 (1.61-18.32), p=0.006	5.56 (1.62-19.08), p=0.006	3.46 (0.91-13.19), p=0.069	4.02 (1.00-16.24), p=0.050	4.03 (0.98-16.59), p=0.053
Caregiver resources					
Education level					
No formal education	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Primary	0.41 (0.09-1.85), p=0.247		0.78 (0.15-4.01), p=0.769	0.69 (0.12-3.91), p=0.678	0.76 (0.13-4.32), p=0.758
Junior High School	0.77 (0.23-2.62), p=0.680		0.86 (0.24-3.10), p=0.823	0.56 (0.14-2.26), p=0.414	0.56 (0.14-2.27), p=0.416

Senior high school	0.40 (0.14-1.14), p=0.086		0.54 (0.18-1.67), p=0.288	0.27 (0.07-0.99), p=0.048	0.28 (0.08-1.06), p=0.061
Tertiary	0.73 (0.24-2.24), p=0.579		0.91 (0.27-3.00), p=0.873	0.42 (0.10-1.68), p=0.218	0.43 (0.10-1.77), p=0.243
Monthly income (GHS)					
Less than 1000	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
1000-1999	0.75 (0.31-1.77), p=0.505		0.76 (0.29-2.03), p=0.585	0.63 (0.22-1.79), p=0.388	0.63 (0.22-1.79), p=0.388
2000 or above	0.79 (0.23-2.75), p=0.711		0.70 (0.17-2.90), p=0.623	0.53 (0.12-2.38), p=0.404	0.55 (0.12-2.50), p=0.436
Employment status					
Unemployed	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Employed	1.55 (0.79-3.05), p=0.203		1.14 (0.48-2.71), p=0.765	1.91 (0.74-4.91), p=0.182	1.91 (0.73-5.03), p=0.189
Marital status					
Never married	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Currently married	2.64 (1.31-5.31), p=0.006		1.40 (0.56-3.50), p=0.468	1.80 (0.54-6.05), p=0.340	1.90 (0.56-6.45), p=0.304
Separated widowed or divorced	1.17 (0.33-4.19), p=0.810		1.04 (0.23-4.65), p=0.955	1.38 (0.23-8.20), p=0.722	1.53 (0.25-9.40), p=0.645
Living with care recipient					
No	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Yes	0.74 (0.33-1.65), p=0.459		0.70 (0.26-1.86), p=0.474	0.79 (0.28-2.25), p=0.654	0.74 (0.26-2.12), p=0.570
Self-rated health					
Very poor or poor	-		-	-	-
Fair	0.92 (0.18-4.60), p=0.918		0.91 (0.16-5.18), p=0.916	0.94 (0.15-5.89), p=0.946	0.90 (0.14-5.91), p=0.911
Good	0.60 (0.24-1.49), p=0.270		0.55 (0.19-1.60), p=0.274	0.70 (0.22-2.17), p=0.532	0.73 (0.23-2.29), p=0.591
Very good	1.64 (0.70-3.83), p=0.254		1.73 (0.67-4.46), p=0.258	2.42 (0.86-6.83), p=0.095	2.49 (0.88-7.04), p=0.086

Excellent	-		-	-	-
Relationship to care recipient					
Spouse	1.00 (Ref.)		1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Parent	0.39 (0.05-2.98), p=0.365		0.38 (0.04-3.27), p=0.376	0.28 (0.02-3.39), p=0.319	0.33 (0.03-3.76), p=0.369
In-law	-		-	-	-
Friend or neighbour	-		-	-	-
Sibling	0.12 (0.01-1.26), p=0.077		0.14 (0.01-1.77), p=0.129	0.16 (0.01-2.55), p=0.195	0.21 (0.01-3.30), p=0.268
Grandparent	0.17 (0.02-1.36), p=0.095		0.27 (0.03-2.54), p=0.251	0.24 (0.02-3.26), p=0.286	0.30 (0.02-3.92), p=0.360
Background/contextual factors					
Age (years)					
18-24	1.00 (Ref.)			1.00 (Ref.)	1.00 (Ref.)
25-34	0.75 (0.30-1.88), p=0.540			0.46 (0.16-1.32), p=0.149	0.49 (0.17-1.39), p=0.179
35-44	3.52 (0.88-14.05), p=0.075			0.95 (0.17-5.32), p=0.952	1.02 (0.18-5.87), p=0.986
45-54	0.97 (0.35-2.75), p=0.962			0.19 (0.04-0.98), p=0.048	0.18 (0.03-0.98), p=0.048
55-64	1.73 (0.34-8.74), p=0.510			0.24 (0.02-2.33), p=0.218	0.22 (0.02-2.22), p=0.199
65 or above	-			-	-
Residence					
Rural	1.00 (Ref.)			1.00 (Ref.)	1.00 (Ref.)
Urban	0.89 (0.46-1.73), p=0.733			1.27 (0.59-2.77), p=0.543	1.51 (0.67-3.39), p=0.321
Ethnicity					
Akan	1.00 (Ref.)			1.00 (Ref.)	1.00 (Ref.)
Non-Akan	0.47 (0.24-0.91), p=0.025			0.38 (0.14-1.06), p=0.065	0.40 (0.15-1.12), p=0.081

Religious affiliation					
Christianity	1.00 (Ref.)			1.00 (Ref.)	1.00 (Ref.)
Islam	0.49 (0.24-1.03), p=0.060			0.76 (0.24-2.35), p=0.630	0.71 (0.23-2.20), p=0.553
African Traditional Religion	-			-	-
No Religion	0.26 (0.08-0.85), p=0.026			0.20 (0.05-0.83), p=0.027	0.24 (0.05-1.05), p=0.058
Geographical zone					
North	1.00 (Ref.)				1.00 (Ref.)
Middle	0.54 (0.23-1.27), p=0.158				0.58 (0.20-1.65), p=0.308
South	1.23 (0.38-4.00), p=0.728				1.26 (0.33-4.79), p=0.739
Model fitness					
Number of observations		502	487	457	457
LR chi-square and p-value		14.44, p=0.0440	29.21, p=0.1735	45.05, p=0.0493	47.27, p=0.0513
Log likelihood		-129.87279	-121.25363	-110.74508	-109.63545
Pseudo R-squared		0.0527	0.1075	0.1690	0.1773
P-value of Hosmer-Lemeshow test		0.2976	0.7673	0.7024	0.7453

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