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Explaining the gender gap in health services use among Ghanaian community-dwelling older cohorts

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ABSTRACT

Although gender differences in use of health services have been documented, little is known about whether such disparities vary by marital and socioeconomic status in later life, especially in low- and middle-income countries. We examined the relation of gender to use of health care among community-dwelling older Ghanaians (N = 1200) and whether marital status and income moderated this relationship using data from the Aging, Health, Psychological Wellbeing and Health-seeking Behavior Study conducted in 2016/2017. Multivariate logistic regression modeling showed no significant gender disparities in use of health care, adjusting for covariates. However, married women were less likely to use health care than married men (adjusted Odds Ratio [aOR] = 0.324, 95% confidence interval [CI]: 0.146–0.718). Further, while married older people with higher incomes had lower odds of using health care (aOR = 0.355, 95% CI: 0.137–0.924), use of health services was greater in married women with higher incomes compared with their male counterparts (aOR = 8.695 (95% CI: 1.233–61.296). The modifying effects of marital status and income appeared substantial in explaining gender differences in use of health services in later life. These findings have implications for health policy, health promotion and quality of life of older people.

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Aging; gender disparities; health policy; health services utilization; marital status; masculine norms

Introduction

Escalating aging of populations has resulted in increases in both the absolute numbers and the proportion of older cohorts in many low- and middle-income countries (LMICs) (United Nations Department of Economic and Social Affairs [UNDESA] 2017; World Health Organization [WHO] 2015). Coupled with probable social and economic challenges, aging is often related to a wide range of health challenges including chronic illnesses, decline in physical functioning and worsening quality of life of older persons which may have marked gendered dimensions and also a call for increased demand for health services (Gyasi and Phillips 2018a; Smits et al. 2018; UNDESA 2017; WHO 2011).

Among the potential social determinants of health and use of health care, gender has received considerable attention. Indeed, the literature is replete with evidence that women at all ages report greater morbidity and disability but, paradoxically, tend to live longer than men (European Commission 2013; McCartney et al. 2011; McCracken and Phillips

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2017; WHO 2015). In addition to biological and behavioral explanations which propose that women have a unique physiology and their experiences of illness and responses to therapeutic interventions are often significantly different from those of men (Legato, Johnson, and Manson 2016; Regitz-Zagrosek 2012; Wang et al. 2013), the mortality gap has been widely related to different propensities in the use of health care between the genders (McCracken and Phillips 2017; Samsudin and Abdullah 2017). Nevertheless, most studies have not extended research to documenting specific evidence underlying the dynamics of likely gender differences in use of health services, especially in later life. Providing a clearer explanation for gender disparities in the use of health care and consideration of gender in health policies/programs and social interventions as well as research endeavors has become increasingly important, particularly among aging populations in LMICs.

Conceptual framework

Several health care studies have shown that in higher income countries, males of different ages, nationalities and ethnic backgrounds admit preventive health care behaviors, visit primary care physicians and other medical health specialists *less* frequently than females (Cylus et al. 2011; Glaesmer et al. 2012; Roy and Chaudhuri 2012). Miller et al. (2014) noted that women are more likely than men to engage in preventive health care behaviors. This has been ascribed to the view that women generally have higher health literacy and therefore monitor their own health much better than men (August and Sorkin 2010). In multilevel analyses based on data from the European Social Survey among 22 countries, Valeeva and Bracke (2018) noted in Central, North, West and East Europe that women have more capability to use health care facilities than men. Among people in Québec who have attempted suicide, Gontijo Guerra and Vasiliadis (2016) found that females were more likely than males to use health care services, including outpatient, in-patient and mental health-related diagnosis services. These observations appear to be similar in some LMICs. For example, studies in these contexts, including sub-Saharan Africa, have independently reported that women are about twice as likely as men to be mobility-impaired, report worse self-rated health, higher prevalence of hypertension, chronic pain, cancer, anxiety and depression and more likely than men to report use of health care, especially in the postmenopausal ages (Acheampong, Osei, and Adusei-Nkrumah 2016; Gyasi and Phillips 2018a; Smits et al. 2018; Tareque et al. 2007).

The greater morbidity, worse perceptions of health and health-related quality of life as well as the greater magnitude of disability among women call for a proportionately greater demand for health care (McCracken and Phillips 2017; WHO 2015). Further, the differential power relations between gender sub-groups are clear in many African sociocultural settings, and social inequalities may be apparent in women's health circumstances and their pursuit to access health care (Gyasi et al. 2018). Others have also associated the gender gap in use of health care with the diversity of social construction of health and ill-health which relates to the roles, attitudes, belief constructs and the general behavioral structure of the gender and age sub-groups (Centers for Disease Control and Prevention 2015; Chen et al. 2016). Moreover, the interplay between male norms and help-seeking has been suggested in much gender and health research over recent decades to explain men's often different health care behavior compared to that of women. Men's adherence to alleged *masculine norms* and male reluctance to seek help have been related to

males self-identifying as stoic (Cornell 2013) and to broader societal expectations and ideologies (Regitz-Zagrosek 2012), particularly with advancing age.

In contrast, some observations depart from the claim of greater use of health care by women, largely related to type of health care and general health conditions of specific populations. Studies have noted that men frequently report more use of hospitalizations, specialty care and emergency services than women (Wang et al. 2013) particularly among middle and older-aged groups (Gyasi 2018). In a prospective study of gender disparities in health and use of health care, Cameron et al. (2010) found American women tend to have shorter hospital stays and fewer physician visits than men with similar demographic and health profiles. Manuel (2018) also found that Asian men reported the largest increase in office visits between 2006 and 2012, and the increase continued through 2012–2014 compared with their female counterparts. In Barbados, older men accessed inpatient care more frequently than their female counterparts (Quashie 2018). Indeed, findings on gender differences in use of health care are, if anything, now less than clear and what explains the disparity is less charted, especially among older people and in LMICs where less research has been reported on this subject.

Observational studies have shown that marriage as a psychological resource has long been linked with positive health outcomes, including decreased risk of general ill-health, lower depressive symptomatology, improved psychological health, reduced cognitive function and health-related quality of life (Carlson and Kail 2018; Gyasi and Phillips 2018a; Zhang et al. 2018), which also vary between genders (Gyasi and Phillips 2018a). Marital relationships potentially provide diverse social control over couples/partners' health behaviors, which may intensify the health benefits of marriage (August and Sorkin 2010; Gyasi and Phillips 2018a; Iwashyna and Christakis 2003). Moreover, several reports have shown that socioeconomic circumstances, such as higher income levels and education, present a strong linkage to older people's health and access to medical appointments, dental care, inpatient and emergency services in both developing and richer countries (Almeida et al. 2017; Guo et al. 2015; Rodrigues, Ilinca, and Schmidt 2018). However, studies, especially in LMICs with distinct sociocultural features, often have failed to account for the potential role of marital status and household income in explaining gender differences in use of health services.

The present study

The aims of the present analyses were to examine gender differences in use of health services among older people and to investigate the potential modifying effect of marital and economic resources on gender differences in use of health care analysis. On the basis of the prior conceptual evidence and empirical findings, we aimed to test three hypotheses. First, we expected that females would be more likely to use health services than males. Second, we hypothesized that married women would have a lower consumption rate of health services than their men counterparts. We further expected that married women with higher incomes would be more likely to use health care than those with lower income levels. These analyses were important to gain a deeper understanding of the relation of gender to use of health care at older ages, which may be critical in devising health policies for older people's health promotion and wellbeing. Our study extends previous understanding by exploring the moderating role of marital position and income

on the relationship between gender and use of health care using a representative sample of older Ghanaian cohort.

Data and methods

Sample

Data for these analyses came from an Aging, Health, Psychological Wellbeing and Health-seeking Behavior Study (AHPWHBS) conducted in Ghana in 2016/17. The AHPWHBS devised a probability-based sample consisting of community-residing adults, ≥ 50 years of age, nested in six rural and urban districts. The sample size was estimated using Lwanga and Lemeshow's (1991) formula, assuming 5% margin of error, 95% confidence interval, design effect of 1.5, 5% and 15% of type 1 and type 2 errors respectively, and a conservative estimation/default prevalence of 50% (because the actual proportion of people aged 50+ years in the selected areas was unknown). The required sample size was, therefore, computed to be 901, but considering a 35% non-response, the final proposed sample size for this study was approximately 1219. Moreover, the statistical power calculation revealed that the sample size had 85% power to detect an odds ratio of ≥2.

Given shorter life expectancies and poor health status data in sub-Saharan Africa than in more developed parts of the world, individuals aged 50 years or older were defined as 'older persons' in this study. This eligibility criterion was developed given the view that chronological time has little or no relevance in conceptualizing old age in many parts of sub-Saharan Africa (WHO 2014, 2015). Changes in social roles as well as the functional capabilities of individuals should be considered when defining older people. Several recent gerontology studies have adopted 50+ years to define older person, which include the Minimum Data Set project on aging and many other regional studies, such as the WHO's Study on Global Aging and Adult Health that took place in five developing countries, including Ghana (Biritwum et al. 2013; WHO 2014).

To reflect the heterogeneity of the population and its cultural and socioeconomic differences, a multi-stage stratified cluster sampling procedure was followed (Gyasi 2018). Details of selection procedure have been reported elsewhere (Gyasi 2019; Gyasi and Phillips 2018a, 2018b; Gyasi, Phillips, and Abass 2018; Gyasi, Phillips, and Amoah 2018; Gyasi, Phillips, and Buor 2018). Briefly, in the first stage, three sub-regional zones, namely, the Northern (8 districts), Middle (15 districts) and Southern zones (7 districts), based on their geographic uniqueness, were formed as strata and then used as primary sampling units. In the second stage, two districts in each sub-regional zone were randomly selected, giving equal chances to all districts to be chosen. In the third stage, the selected districts were delimited into rural and urban areas based on the Ghana Statistical Service (2012) classification. The key eligibility requirements were that the participants were at least 50 years of age, resident in the respective study areas and had lived in the study setting for the past two years. In the final stage of the selection process, 1247 older persons were selected by systematic random sampling with the sampling interval varying by relative size of the study communities. Of the 1247 approached, 1219 (97.8%) were eligible to participate. Of these eligible participants, 19 declined to participate in the study yielding an overall participation rate of 98.4% (N = 1200).

The survey questionnaire was initially developed in English, translated into Asante Twi (the principal dialect in the study area) and back translated into English with reconciliation of discrepancies for quality control of the translation procedure following WHO translation guidelines for assessment instruments (Üstun, Chatterji, Mechbal and Murray 2005). Face-to-face interviews were conducted using interviewer-administered questionnaires, taking into consideration the high illiteracy rate among the sample.

Human Subject Certification and ethics approval were obtained from the Committee on Human Research Publication and Ethics, School of Medical Sciences, Kwame Nkrumah University of Science and Technology and Komfo Anokye Teaching Hospital, Kumasi, Ghana (Ref: CHRPE/AP/507/16). Ethics approval was granted by the Research Ethics Committee of Lingnan University, Hong Kong, before interviews began. Study participants gave written informed consent, which was either signed or thumb-printed (based on the choice of the participant, mainly based on their literacy levels), after briefing them on the research aims, procedures and the voluntary nature of their participation.

Measures

Outcome variable

The dependent variable of interest was a measure of use of health services. Respondents answered general items on use of health care concerning whether they consulted health care professionals or facilities for their health problems. The interview included retrospective self-reported data on use of health services, including physician visits, outpatient surgery services as well as accredited traditional healing services at the facility level received over the past 12 months. Inpatient hospitalization of one night or longer was also ascertained. Service use outcome measures applied a dummy indicator of whether a health service was used (0 = *no*, 1 = *yes*). Self-reported data are considered appropriate and provide reasonably accurate measures of any medical use when compared to administrative data.

Exposure variables

Gender constituted our focal explanatory variable for the analyses and was treated as a dummy variable with 1 if female and 0 if otherwise. We controlled for other demographic, socioeconomic and health-related variables. *Age of participants* was categorized into three groups: 1 = 50–69 years, 2 = 70–79 years, and 3 = 80+ years based on the WHO (2015) classification of older people into younger, older-old and oldest-old cohorts respectively. *Marital status* was recoded from four original responses into two categories: 0 = not married (to include the never married, divorced or separated and widowed), 1 = currently married. *Educational level* reflected four schooling levels: 1 = never/none, 2 = basic, 3 = secondary, 4 = tertiary. *Employment status* was dichotomized into 0 = unemployed, and 1 = employed, while *household income* was categorized into 0 = less or equal to GH¢500 and 1 = more than GH¢500[2]. Other background variables such as *ethnicity* (0 = non-Akans, and 1 = Akans) and *religious background* (1 = none, 2 = Christianity, and 3 = Islam) were included as control variables.

Self-rated health (SRH) was assessed with a single-item measure of the Short Form Health Survey 36 Questionnaire: "In general how would you rate your health?" with a five-point response scale: 1 = excellent, 2 = very good, 3 = good, 4 = fair and 5 = poor (Rand

health: Medical Outcomes Study 2007). *Number of chronic conditions (comorbidities)* were assessed through self-reported diagnoses by a health care professional of 10 frequently occurring chronic illnesses including hypertension, diabetes, respiratory diseases, cancers, stroke, chronic kidney diseases, asthma, arthritis, depression and insomnia). We also applied a symptom algorithm to detect non-diagnosed cases particularly at the advanced stage of the conditions (Garin et al. 2016). This information was used to classify respondents into one of three categories: 1 = no chronic illness, 2 = one chronic illness, and 3 = two or more chronic conditions. *Functional impairments* were obtained and included in the analysis as covariates. The older respondents' level of performance of five-item of basic tasks or activities of daily living (ADL) that are required to take care of oneself and also commonly used to gauge older people's daily performance such as *bathing, toileting, eating, bathing and dressing* and *getting in and out of bed* were recorded on a four-point scale: 1 = not limited at all, 2 = less limited, 3 = somewhat limited, and 4 = much limited (WHO 2012). The total score ranged from 5 to 20 and later divided into two levels: 5–10, considered 'not functionally impaired' = 0, and 11–20, adjudged 'functionally impaired' = 1.

Sleep problems were assessed with one item: 'overall in the last 30 days, how much of a problem did you have with sleeping, such as falling asleep unintendedly, waking up frequently during the night or waking up too early in the morning?' A four-point response scale was used: 1 = none, 2 = very mild, 3 = moderate, and 4 = extreme. A summary measure was created by averaging the responses. We measured *physical inactivity* with the following items: 'how often do you engage in activities that require a moderate level of energy such as gardening, cleaning the car, or doing a walk?' and 'How often do you engage in vigorous physical activity, such as sports, heavy housework, or a job that involves physical labor?' These questions had as possible responses: 1 = more than once a week, 2 = once a week, 3 = one to three times a month, and 4 = hardly ever/never. Physical inactivity was defined as never or almost never engaging in moderate or vigorous physical activity through the response of 0 = one to three times a month, and 1 = hardly ever/never to both questions. Regarding *alcohol intake*, respondents were asked to indicate on a no/yes response scale if they consumed any drink that contained alcohol such as beer, hard wine, spirit, over the past 30 days.

Analytic strategy

Bivariate associations and descriptive analyses compared gender and health services use differences in relation to respondents' demographic, socioeconomic and health-related measures using Pearson's χ^2 test and Fisher's exact test. Multivariate logit models were built with 'use' or 'non-use' of health services as the dependent variable. The major independent variable was gender with 'male' as the reference category. The basic regression model for use of a health facility was:

$$\text{Used}_i = \alpha_0 + X_i \alpha_i 1 + \varepsilon_i,$$

Where i = 1…*n* connoted older persons defined as those 50 years or older. Used_i was a dichotomous variable indicating the use of a health facility. X_i represented a set of variables that may be associated with use of health facility, while ε_i denoted the error term. The results produced an adjusted odds ratio (aOR) with a two-sided 95% confidence

interval (CI). Hierarchical modeling was adopted in which certain groups of variables were progressively included. Model 1 calculated the aOR for gender differences in health services use adjusting for background and health-related covariates. Models 2 and 3 included interaction terms as moderating variables (gender × marital status; gender × household income) in logistic regressions. In the Full Model, we added the interaction terms, marital status × household income; gender × marital status × household income to test whether the association of gender with use of health services significantly varied by marital status and income. While the *Enter* procedure was employed as the section criterion, variables with the highest χ^2 were selected to be included in the model. Variables associated with the outcome at $p < .05$ were retained in the multivariable regression models. In all models, the Hosmer–Lemeshow test was conducted to evaluate the goodness-of-fit (Table 3a, and Table 3b). Data analyses were performed using IBM-SPSS Statistics for Windows application (version 21; Chicago, IL, USA) with $p < 0.05$ as the level of significance (two tailed).

Results

The mean age of participants was 66.15 years (standard deviation = 11.85, range = 50-111years), and the majority (63%) were women (Table 1). Significant gender differences in the explanatory variables were observed. Most participants were Akans (86%), professed Christian faith (87%), and about 57% were unmarried. Men predominantly had achieved higher formal education, were married, employed and received higher incomes than women ($p < .001$). Although men were more likely to report current alcohol use and physical activity ($p < .001$), women reported more chronic diseases, were more likely to be functionally impaired and also were more likely to report extreme sleep problems ($p < .005$). Overall, women's self-assessments of their health tended to be more negative than those of men but women were more likely to report health services use ($p < .001$).

Use of health care was significantly associated with increased age and self-rating poor health but inversely associated with formal education (Table 2). Compared with other groups, those who were married (χ^2_1, $N = 1200$) = 10.586, $p < .001$) and employed (χ^2_1, $N = 1200$) = 16.388, $p < .001$), had higher incomes (χ^2_1, $N = 1200$) = 16.503, $p < .001$) and alcohol users (χ^2_1, $N = 1200$) = 34.486, $p < .001$) were significantly less likely to use health services. By contrast, respondents who were functionally impaired (χ^2_1, $N = 1200$) = 57.619, $p < .001$) and had diagnosed comorbidities (χ^2_1, $N = 1200$) = 35.592, $p < .001$) reported more use of health services. All other variables did not differ significantly between health services use and non-use of health care.

After adjusting for relevant background and health-related factors, females had a higher odds of use of health care than males, but the difference was statistically insignificant (aOR = 1.208, 95% CI: 0.757–1.929) (Model 1 of Table 3a). Additional analyses also revealed insignificant gender differences in use of health services across the stratified modifying variables of marital status and income levels (Table 3b). In Model 2, we found significant interactions between gender and marital status such that females who were married were 67.6% less likely to report use of health care compared with married males (aOR = 0.324, 95% CI: 0.146–0.718). Model 3 added the interaction between gender and household income, but we observed no significant modification of effect on use of health care. Model 4 included results from the interaction between marital status and

Table 1. Distribution of selected dependent and independent variables by gender.

	All		Women		Men		
	n	(%)	*n*	(%)	*n*	(%)	*P values*
Sample	1200	(100%)	759	(63.3)	441	(36.8)	-
Sociodemographic							
Age group (years)							.062
50–59	426	(35.5)	272	(35.8)	154	(34.9)	
60–69	343	(28.6)	208	(27.4)	135	(30.6)	
70–79	253	(21.1)	160	(21.1)	93	(21.1)	
80+	178	(14.8)	119	(15.7)	59	(13.4)	
Ethnicity							.004
Other	1028	(85.7)	668	(88.0)	360	(81.6)	
Akan	172	(14.3)	91	(12.0)	81	(18.4)	
Religious affiliation							<.001
Others	1046	(87.2)	692	(91.2)	354	(80.3)	
Christianity	154	(12.8)	67	(8.8)	87	(19.7)	
Married	521	(43.4)	218	(28.7)	303	(68.7)	<.001
Level of schooling							<.001
Never-being-to-school	601	(50.1)	481	(63.4)	120	(27.2)	
Primary	433	(36.1)	216	(28.5)	217	(49.2)	
Secondary	104	(8.7)	44	(5.8)	60	(13.6)	
Tertiary	62	(5.2)	18	(2.4)	44	(10.0)	
Employed	533	(44.4)	300	(39.5)	233	(52.8)	<.001
Income (higher)	264	(25.3)	123	(19.0)	141	(35.4)	<.001
Health-related variables							
Self-assed health							<.001
Excellent	61	(5.1)	19	(2.5)	42	(9.5)	
Very good	178	(14.8)	94	(12.4)	84	(19.0)	
Good	369	(30.8)	234	(30.8)	135	(30.6)	
Fair	348	(29.0)	233	(30.7)	115	(26.1)	
Poor	244	(20.3)	179	(23.6)	65	(14.7)	
Number of comorbidities							<.001
0	598	(49.8)	347	(45.7)	251	(56.9)	
1	447	(37.3)	300	(39.5)	147	(33.3)	
2+	155	(12.9)	112	(14.8)	43	(9.8)	
Functional impairment	362	(30.2)	261	(34.4)	101	(22.9)	<.001
Extreme sleep problems	336	(28.0)	234	(30.8)	102	(23.1)	<.001
Lifestyle variables							
Physically active	606	(50.5)	336	(44.3)	270	(61.2)	<.001
Alcohol use	377	(31.4)	142	(18.7)	235	(53.3)	<.001
Dependent variable							
Health services use							<.001
No	203	(19.2)	112	(16.2)	91	(25.0)	
Yes	852	(80.8)	579	(83.8)	273	(75.0)	

household income. Significant interactions between marital status and income (*married* × *household income*) and also with gender (*female gender* × *married* × *household income*) were found. Results specifically indicated that differences in use of health services across marital status were less at higher levels of household income (aOR = 0.355, 95% CI: 0.137–0.924). However, females who were married and had higher household incomes were over 8 times (95% CI: 1.233–61.296) as likely to report use of health services compared with their male counterparts who were married with higher household income.

Discussion

Gender disparities in use of health services, especially in later life, have been controversial for many years and often remain without satisfactory explanation. This is especially true in

Table 2. Bivariate analyses for use of health services among older Ghanaian adults.

	All		Non-use of health care		Health care use		
	n	(%)	*n*	(%)	*n*	(%)	*P values*
Sample	1200	(100%)	348	(29.0)	852	(71.0)	-
Sociodemographic							
Gender							<.001
Women	691	(65.5)	112	(55.2)	579	(68.0)	
Men	364	(34.5)	91	(44.8)	273	(32.0)	
Age group (years)							<.001
50–59	354	(33.6)	95	(46.8)	259	(30.4)	
60–69	307	(29.1)	59	(29.1)	248	(29.1)	
70–79	236	(22.4)	31	(15.3)	205	(24.1)	
80+	158	(15.0)	18	(8.9)	140	(16.4)	
Ethnicity							.341
Other	906	(85.9)	177	(87.2)	729	(85.6)	
Akan	149	(14.1)	26	(12.8)	123	(14.4)	
Religious affiliation							.054
Others	917	(86.9)	181	(89.2)	736	(86.4)	
Christianity	138	(13.1)	22	(10.8)	116	(13.6)	
Married	444	(42.1)	106	(52.2)	338	(39.7)	<.001
Level of schooling							<.001
Never-being-to-school	538	(51.0)	79	(38.9)	459	(53.9)	
Primary	379	(35.9)	90	(44.3)	289	(33.9)	
Secondary	82	(7.8)	24	(11.8)	58	(6.8)	
Tertiary	56	(5.3)	10	(4.9)	46	(5.4)	
Employed	469	(44.5)	116	(57.1)	353	(41.4)	<.001
Income (higher)	238	(26.0)	66	(38.2)	172	(23.1)	<.001
Health-related variables							
Self-rated health							<.001
Excellent	47	(4.5)	20	(9.9)	27	(3.2)	
Very good	148	(14.0)	58	(28.6)	90	(10.6)	
Good	314	(29.8)	46	(22.7)	268	(31.5)	
Fair	314	(29.8)	51	(25.1)	263	(30.9)	
Poor	232	(22.0)	28	(13.8)	204	(23.9)	
Number of comorbidities							<.001
0	478	(45.3)	127	(62.6)	351	(41.2)	
1	428	(40.6)	66	(32.5)	362	(42.5)	
2+	149	(14.1)	10	(4.9)	139	(16.3)	
Functional impairment	340	(32.2)	20	(9.9)	320	(37.6)	<.001
Extreme sleep problems	316	(30.0)	62	(30.5)	254	(29.8)	.621
Lifestyle variables							
Physically active	505	(47.9)	104	(51.2)	401	(47.1)	.421
Alcohol use	306	(29.0)	93	(45.8)	213	(25.0)	<.001

LMICs, where considerable demographic aging is currently occurring. Using data from a 2016/17 Aging, Health, Psychological Wellbeing and Health-seeking Behavior Study and with a representative sample of older cohorts randomly drawn from spatially and socio-economically diverse settings, the results of this study provide insights into the differences by gender in the use of health care services among community-dwelling older Ghanaians. Our analyses produced interesting and somewhat counter-intuitive findings. First, we hypothesized that females will be more likely to use health services than their male counterparts. However, after controlling for theoretically health-related and socioeconomic confounding variables, the findings showed no significant difference in use of health care between older men and women, despite a somewhat higher use rate among females. This is in line with earlier studies on the use of complementary and alternative therapies among the general population, which showed that women's and men's consumption rates were not significantly different (Gyasi et al. 2018).

Table 3a. Adjusted odds ratios (aOR) and their 95% confidence intervals (CI) from multivariate logistic models of gender differences in use of health services.

	Model 1			Model 2			Model 3			Model 4		
Variables	β	aOR	95% CI	β	aOR	95% CI	β	aOR	95% CI	β	aOR	95% CI
Female gender	0.189	1.208	(0.757–1.929)	0.255	1.291	(0.814–2.049)	0.288	1.333	(0.817–2.175)	0.132	1.141	(0.663–1.964)
Gender × Marital status				−1.126	0.324	(0.146–0.718)***				−0.902	0.406	(0.155–1.063)
Gender × Income							0.627	1.871	(0.825–4.242)	0.432	1.540	(0.588–4.037)
Marital status × Income										−1.035	0.355	(0.137–0.924)*
Gender × Marital status × Income										2.163	8.695	(1.233–61.296)**
Model fitting information												
Log-likelihood			−495.612			−418.561			−413.608			−411.998
Hosmer-Lemeshow χ^2			13.560(0.094)			16.441(0.036)			13.183(0.106)			13.295(0.102)
Nagelkerke (R^2)			0.063			0.087			0.104			0.109

β = Beta values, aOR = Adjusted Odds Ratio, representing the exponentiated coefficient; CI = Confidence Interval.

Model 1 was adjusted for all theoretically demographic (age, ethnicity, religious affiliation, and marital status), socioeconomic (level of schooling, employment, and income level) and health-related (self-rated health, comorbidities, functional status, sleep problems, physical activity, and alcohol intake) covariates; **Model 2** included Model 1 and the interactions between gender and marital status (Gender × Marital status); **Model 3** included Model 1 and the interactions between marital status and income (Gender × Income); and **Model 4** included Model 1, Model 2, Model 3 and the interactions among gender, marital status and income (Gender × Marital status × Income).

***$p < .001$; **$p < .005$; *$p < .05$.

Table 3b. Adjusted odds ratios from multivariate logistic models of gender differences in use of health services, stratified by effect modifying variables (marital status and income).

	Marital status						Income level					
	Not married			Married			Lower			Higher		
Variables	β	aOR	95%CI	β	aOR	95%CI	β	aOR	95%CI	β	aOR	95%CI
Age (years)												
50–59		1.00	Reference		1.00	Reference		1.00	Reference		1.00	Reference
60–69	−0.481	0.618	(0.348–1.098)	−0.505	0.604	(0.344–1.060)	−0.562	0.570	(0.358–0.908)*	−0.712	0.490	(0.200–1.203)
70–79	−0.374	0.688	(0.380–1.248)	−0.728	0.483	(0.230–1.016)	−0.490	0.613	(0.360–1.045)	−1.143	0.319	(0.107–0.951)*
80+	−0.471	0.624	(0.315–1.237)	0.443	1.558	(0.508–4.778)	−0.600	0.549	(0.295–1.021)	1.046	2.847	(0.703–11.520)
Gender (Ref: Male)												
Female	0.138	1.148	(0.646–2.039)	−0.181	0.835	(0.483–1.444)	−0.279	0.757	(0.484–1.182)	0.141	1.152	(0.490–2.705)
Ethnicity (Ref: Others)												
Akan	−0.200	0.819	(0.392–1.710)	−0.783	0.457	(0.212–0.985)*	−0.787	0.455	(0.258–0.804)**	0.958	2.606	(0.570–11.917)
Religious affiliation (Ref: Others)												
Christianity	−0.764	0.466	(0.197–1.102)	0.206	1.229	(0.571–2.644)	−0.720	0.487	(0.260–0.910)*	2.146	8.548	(1.602–45.620)*
Marital status (Ref: Married)												
Not married	-	-	-	-	-	-	−0.006	0.994	(0.676–1.461)	−0.367	0.693	(0.304–1.581)
Level of schooling												
Never		1.00	Reference		1.00	Reference		1.00	Reference		1.00	Reference
Basic schooling	0.059	1.061	(0.642–1.752)	−0.400	0.670	(0.374–1.201)	−.0483	0.617	(0.402–0.948)*	1.508	4.520	(1.870–10.926)***
Secondary	0.005	1.005	(0.398–2.536)	−0.800	0.449	(0.178–1.132)	0.181	1.199	(0.524–2.744)	−0.524	0.592	(0.148–2.372)
Tertiary	3.123	22.708	(2.418–213.259)**	0.334	1.396	(0.542–3.597)	0.956	2.600	(0.779–8.678)	1.635	5.128	(1.522–17.276)**
Employment (Ref: not employed)												
Employed	−0.795	0.451	(0.280–0.728)***	0.186	1.204	(0.696–2.084)	−0.307	0.736	(0.495–1.094)	−0.739	0.478	(0.203–1.122)
Income level (Ref: Lower)												
Higher	−0.928	0.395	(0.233–0.671)***	−0.986	0.373	(0.219-.635)***		-	-	-	-	-
Self-rated Health												
Excellent		1.00	Reference		1.00	Reference		1.00	Reference		1.00	Reference
Very good	−1.178	0.308	(0.050–1.895)	0.495	1.641	(0.584–4.607)	0.038	1.039	(0.381–2.831)	0.423	1.527	(0.308–7.576)
Good	−0.789	0.454	(0.078–2.638)	1.382	3.982	(1.515–10.467)**	0.477	1.612	(0.624–4.164)	1.369	3.931	(0.778–19.857)
Fair	−0.620	0.538	(0.092–3.151)	1.288	3.627	(1.300–10.123)*	0.677	1.968	(0.747–5.185)	0.687	1.987	(0.387–10.197)
Poor	−0.248	0.780	(0.128–4.741)	1.743	5.715	(1.881–17.365)***	1.148	3.152	(1.130–8.789)*	1.438	4.210	(0.717–24.708)
Comorbidities												
0		1.00	Reference		1.00	Reference		1.00	Reference		1.00	Reference
1	0.999	2.716	(1.710–4.314)***	0.918	2.504	(1.494–4.199)***	1.095	2.988	(2.006–4.451)***	0.031	1.031	(0.488–2.178)
2+	−0.123	0.884	(0.480–1.630)	0.384	1.468	(0.645–3.340)	−0.055	0.946	(0.556–1.610)	0.240	1.271	(0.420–3.846)
Functionally limited	0.251	1.285	(0.750–2.202)	0.672	1.958	(1.033–3.711)*	0.328	1.388	(0.872–2.208)	0.713	2.040	(0.833–4.998)
Severe sleep problems	−0.028	0.972	(0.627–1.509)	−0.874	0.417	(0.237-.733)***	−0.341	0.711	(0.488–1.037)	−0.781	0.458	(0.187–1.122)
Physically active	−0.126	0.882	(0.513–1.517)	−0.305	0.737	(0.389–1.400)	0.025	1.025	(0.644–1.632)	−0.653	0.520	(0.214–1.263)
Current alcohol user	−0.314	0.730	(0.440–1.211)	−0.643	0.526	(0.303-.913)*	−0.427	0.653	(0.429–0.992)*	−0.963	0.382	(0.168–0.866)*
Model fitting information												
2 Log-likelihood	−603.452		−462.003		−807.550		−244.325					
Hosmer-Lemeshow	13.824(0.086)		19.935(0.011)		8.408(0.395)		6.876(0.550)					
Nagelkerke (R^2)	0.207		0.300		0.170		0.395					

β = Beta values, aOR = Adjusted Odds Ratio, representing the exponentiated coefficient; CI = Confidence Interval.
***$p < .001$; **$p < .005$; *$p < .05$.

The finding of the present study appears unique and remains inconsistent with most observational studies and epidemiologic data regarding the relationship between gender and use of health services, especially in richer countries. While some studies hold that females are regular users of health care (Acheampong, Osei, and Adusei-Nkrumah 2016; Glaesmer et al. 2012; Roy and Chaudhuri 2012; Valeeva and Bracke 2018), many others report male-dominated consumption patterns of health care among populations (Cameron et al. 2010; Manuel 2018; Quashie 2018; Wang et al. 2013). Taken together, our finding suggests that the use of health care may not differ by gender, but two processes may be involved. First, a burst of demand for health care may occur by both males and females with advancing age. Old age has been noted to present strong linkages with functional and cognitive impairments and chronic comorbidities, which may require effective use of health care across genders (Gyasi and Phillips 2018b; McCracken and Phillips 2017; WHO 2015). Second, the introduction and systematic improvements of the National Health Insurance Scheme, as well as the exemption of some older adults from premium payments in both rural and urban Ghanaian communities (Gyasi, Phillips, and Buor 2018; National Health Insurance Authority 2017), may provide 'some' free and accessible health care irrespective of gender differences. Nonetheless, it is important to recognize that our measures of use of health care may not have fully captured the specifics of health care domains such as emergency services, hospitalization, specialty care, outpatient services and preventive health behaviors of older people.

Interestingly, these analyses revealed that gender differences in use of health services were strongly modified by the demographic and socioeconomic circumstances, including marital status and income levels of older men and women. This suggests that research findings indicating extreme gender differences are more *suggestive* than *definitive*, which tend to be based on average statistical associations and considerations that perhaps fail to account for the possibility of variation and heterogeneity across marital conditions and socioeconomic status. We found significant interaction of gender with marital status in relation to use of health services, such that women who were married had lower odds of reporting use of health care than married men, validating our second hypothesis. Similarly, those who were married and had higher incomes were, perhaps counter-intuitively, less likely to use health care. These observations may be explained by the conceptual framework, incorporating the view that financial capabilities and marriage provide a clear sense of cohesion, security and coping through gains in health-relevant resources, which could potentially enhance psychological wellbeing and reduce vulnerability to stressors, especially for females (Gyasi and Phillips 2018a; Lee et al. 2015). Moreover, socioeconomic empowerment and marriage among females could potentially reduce the differential power relations between males and females and at least revise the *status quo* by providing some sort of independence for females, especially in such an African setting (Gyasi et al. 2018).

Counter-intuitive to the above observation and also in line with our third hypothesis, income levels and marital status significantly interacted with gender. Married women with higher household income reported a higher likelihood of use of health care than married women with lower household income. These associations suggest that females were major consumers of health care if they were married and also had higher income levels compared with men. These findings provided preliminary evidence that marital resources with higher socioeconomic status may have a significant

association beyond that of female gender *per se* in use of health care in this population of older adults.

Despite the strength and novelty of these contributions, the study had limitations. First, our measures were based on retrospectively reported cross-sectional data. This prevented us from establishing temporal and thus potentially causal relationships of income and marital status with use of health care. Our conclusions were therefore limited to empirical associations. We thus propose that further studies should attempt longitudinal analyses of this relationship. Second, potential recall bias could also have resulted in overestimation or underestimation, often a problem in such studies. Third, the potential pathways linking gender differences and specific use of health care, such as outpatient consultations, hospitalization and use of various forms of preventive health care, were not evaluated in this study. Future studies should examine the various modalities of health care in relation to gender to identify the specific patterns and associations among older people. Finally, our findings may not be generalizable to other population cohorts, such as adolescents and youth, who are likely to present distinct demographic, social, economic and health-related characteristics from the older people and whose gendered and health care circumstances are also crucial in providing guidelines for health policy discourses in LMICs.

Conclusions and implications

This study has contributed to the extant literature by examining the relation between gender and use of health services among a large representative sample of older adults in Ghana. This study was among the first to examine later life gender disparities in use of health care using a robust research design. The findings provide additional nuanced information on gender disparities in health services use. They demonstrated that gender differences in use of health care are not universal but closely linked with marital status and income levels of older adults, which play critical modifying roles in the relationship of gender to use of health care. This study, therefore, suggested important policy implications, that the analyses of gender differences within health systems research and planning, especially among older people, should consider the potential modifying effect of socioeconomic and marital statuses among older people, especially in LMICs. Further, health care professionals should not assume inequalities based on the long-held belief that women principally consult health care professionals more than men in the planning and delivery of health care.

Disclosure statement

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