Gender Difference in the Prevalence and Socio-demographic Correlates of Mobility Disability among Older Adults in Nigeria

Saliu Adejumobi Balogun[1], Aravinda Meera Guntupalli[2]

[1] Menzies Institute for Medical Research, University of Tasmania, Australia
Saliu.balogun@utas.edu.au; Saliu.balogun@yahoo.co.uk

[2] Faculty of Health and Social Care, The Open University, United Kingdom
Aravinda.guntupalli@open.ac.uk; Aravindaguntupalli@gmail.com

Abstract

The aim of the current study is to examine gender differences in mobility disability among older people in Nigeria, and to explore factors associated with gender differences in mobility disability in later life. Data were used from the first (2010-2011) wave of the Nigeria General Household Survey-Panel, which included 3,586 respondents aged 50 years and above. Mobility disability was assessed as self-reported difficulty in walking 100 meters, walking 1 kilometre, walking uphill, running, bending or stooping, and climbing stairs. Regression analyses were used to estimate the extent to which socio-demographic conditions contribute to gender differences in mobility disability.

We observed a higher prevalence of mobility disability among women compared to men (20.1% versus 12.5%, $P < 0.001$). The prevalence ratios (PR) of mobility disability for women versus men was 1.61 (95% CI: 1.38 – 1.88, $P < 0.001$), after adjusting for age, marital status, place of residence, self-reported health status and cognitive difficulties, the PR was 1.55 (95% CI: 1.30 – 1.85, $P < 0.001$). In the fully adjusted model, mobility disability still remained significantly higher among women (PR 1.60, 95% CI: 1.32 – 1.93, $P < 0.001$). The marginal effects of socio-demographic and health factors were stronger for women than for men. Socio-demographic and health variables considered in this study explained between 19.3% (men) and 22.3% (women) of variance in mobility disability suggesting that additional factors beyond those considered in this study warrant further investigation, so that differences in mobility disability between older men and women in Nigeria can be fully understood.

Keywords: Disability, Mobility, Gender inequality, Nigeria, Self-reported health

Introduction

Mobility is vital to healthy ageing, and it has been intimately linked with the quality of life of older people (Miszkurka et al. 2012). Older adults who lose independent mobility are more susceptible to social isolation, depression and reduced or delayed access to healthcare (Bruce 2001; Satariano et al. 2012). With a growing population of older people (aged 65 or over) in Nigeria, one which is estimated to increase from 5 million in 2015 to about 10.7 million in 2040 (United Nations Population Division 2015), the number and proportion of older adults with mobility disability is likely to increase further in the immediate future.

Gender differences in mobility disability have previously been examined in several studies (Beckett et al. 1996; Grundy and Glaser 2000; Oman et al. 1999), with most studies in the field reporting a higher prevalence of mobility disability among women, compared to men (Beckett et al. 1996). However, a few studies have reported a higher incidence of disability in men aged between 55 and 70 (Grundy and Glaser 2000), whilst Oman et al. (1999) found no gender difference in mobility disability, in USA, after adjustment for covariates. These studies have largely been conducted in high income countries, with data from developing countries, particularly sub-Saharan African countries being rare. In designing interventions that would help prevent mobility disability among the growing population of older people in Nigeria, it is essential to understand why some women may be at a higher risk of mobility disability than men. This is very crucial given that gender inequality in social and economic domains has been the subject of national debate in Nigeria, with the World Economic Forum Gender Gap Index ranking Nigeria as one of the countries with a large gender gap, 106 out of 136 countries in the world (World Economic Forum 2013). The bias against women in Nigeria ranges from inequality in access to, and control over resources, to exclusion from decision-making positions (British Council Nigeria 2012). One area worthy of note is gender inequality in education among older people in Nigeria where only 17 percent of older people aged 60 and above are educated (Global Age Watch Index 2015). Although gender gap in educational opportunities in the form of school enrolment has showed considerable decrease in the last decade, women still lag behind men in literacy and enrolment in basic and post-secondary school education (Adeyemi and Akpotu 2004; Akinbi and Akinbi 2015). Such gender disparity in education could limit women's opportunities for engagement in formal employment and from making informed decisions about preventive health measures. It is not

clear whether this gender inequality translates into differences in mobility disability between older men and women in Nigeria.

A cross-national study using data from 70 countries across Africa, the Americas, Europe, the Eastern Mediterranean, South-East Asia and the Western Pacific showed that regions with more bias against women are more likely to report higher gender inequality in mobility disability (Mechakra-Tahiri et al. 2012). Another global study on disability from 57 countries including low and middle income countries showed that prevalence of disability among women aged 50 and above was substantially higher (40.1%) compared with men aged 50 and above (23.8%). Further decomposition analysis showed that 45% of this gender inequality could be attributed to socio-demographic factors such as employment, education, marital status and household economic situation between men and women (Hosseinpoor et al. 2012). Although Nigeria was not included in these global studies, previous research conducted in eight states in South-Western Nigeria also reported higher disability among women (Gureje et al. 2006). Whether disability observed in the South-Western part of Nigeria applies to the entire country remains unclear. Hence, using nationally representative data from the first wave (2010 – 2011) of the Nigeria General Household Survey-Panel (GHS-Panel) will assist in answering this question. In particular, this paper aimed to examine gender differences in mobility disability among older adults in Nigeria as a whole. In addition, this study aimed to explore the extent to which socio-demographic variables contribute to gender difference in relation to mobility disability among Nigerian older adults.

Data and Methods

Nigeria GHS-Panel is a nationally representative household survey conducted by the Nigerian National Bureau of Statistics, with support from the World Bank (World Bank 2012). The survey provides a reliable estimate of key socio-economic variables for the six geopolitical zones in Nigeria (World Bank 2012). The Nigeria GHS-Panel was carried out twice in each wave, once after the planting season (post-planting visit), and the other after the harvest season (post-harvest visit). Data collected from both the post-planting (August-October, 2010) and post-harvest (February- April 2011) visits were used in this study. Response rates at the first (post-planting) and second (post-harvest) visits were 99.7% and 97.0% respectively, constituting excellent participation rates, and therefore supporting the robustness of the data.

The Nigeria GHS-Panel survey used a multi-stage sampling technique that randomly selected 5,000 households, involving 27,533 household members. A total of 3,586 adults aged 50 and above were selected for analysis in this study. Age 50 was selected as the cut-off for old age in this study, as this threshold has been used previously in studies from other Sub-Saharan African (here after SSA) countries (Mudege and Ezeh 2009; Onadja et al. 2013). The use of age 50 as the cut-point for old age is also logical given that life expectancy is low (i.e. 57 years) in SSA countries, with the average life expectancy at birth for men and women in Nigeria only being 52 and 52.6 years respectively (United Nations Population Division 2015).

Outcome measure: Self-reported mobility disability

The measures of mobility disability used in this study are in accordance with the World Health Organisation (WHO) International Classification of Function, Disability and Health (ICF) definition of mobility limitation (Yong 2012). Mobility disability was initially assessed using 6 self-reported difficulties with movement. These included difficulty: walking 100 meters; walking 1 kilometre (km); walking uphill; running; bending or stooping; and climbing stairs. Response to each of these questions were dichotomised into '0' no difficulty and '1' some or more difficulty. For consistency with previous studies in the field, difficulty walking 1km was used as the mobility disability indicator for statistical analyses (Melzer and Parahyba 2004). We also performed a sensitivity analysis to examine whether gender difference in mobility persists when different measures of mobility disability were used as the outcome (refer to supplementary Table 1). The results of the sensitivity analysis highlighted that the mobility indicator selected was a robust indicator to utilise, as the results of these analyses were similar, and the the strengths of the explanatory variable did not change substantially across the different outcome measures.

Explanatory variables

Socio-demographic variables were measured by gender, household expenditure, age, marital status and education. Gender is used in this study to represent sex-linked characteristics, and the social norms and identities of men and women (Miszkurka et al. 2012).

Socioeconomic status and living standard was assessed using household expenditure – expressed as tertiles, and was adjusted for household composition (i.e. the number of people in the same home). Household expenditure represents the total expenses paid for food and

non-food items (i.e. health, housing, electricity and other goods and services) in each household. The household expenditure data was collected twice in the survey (during the post-planting and post-harvest visits); hence, aggregated household expenditure (i.e. the average household expenditure for both visits combined) was used as a measure of socioeconomic status and living standard. Household expenditure as captured in this paper is a direct measure, and is therefore the preferred measure for living standards, as the collection of expenditure data is more reliable than utilising a measure such as income. That is because households in countries like Nigeria will have multiple sources of income, and these change constantly. In addition, some income sources might be undisclosed due to a large informal economy.

Self-reported ill-health was assessed based on a participant's response to a question asking whether the respondent suffered from any injury or illness in the last four weeks preceding the survey and responses were dichotomised (0 = no, 1 = yes). *Cognitive difficulties* were assessed by the respondents reported difficulty remembering or concentrating on things, with responses dichotomised (0 = no, 1 = yes).

Education was assessed based on a participant's response to the question, 'Have you ever attended school?' Response to this question was dichotomised (0 = attended school, 1= never attended school).

Marital status at interview was dichotomised (0 = currently married, 1 = not currently married). Participants who were widow/widower (20%), divorced (0.7%), separated (1.9%) or never married (0.7%) were merged into the 'not currently married' category because of their low sample. Other explanatory variables were age and place of residence (0 = urban, 1 = rural).

Data analysis

Descriptive statistics for each explanatory variable were compared for men and women to describe the characteristics of the study sample. Chi-squared tests were used to examine the gender differences in mobility disability in later life for the whole sample, and for three older adult age sub-groups (50 - 59, 60 - 69, and 70 years and above). We estimated prevalent ratios (PR) of mobility disability using generalised linear model as outlined by Thompson et al. (1998). Initially we assessed the unadjusted effect of each potential confounder on

mobility disability, thereafter, we used four regression models. In the first model; gender, age and place of residence were included as the covariates. In the second model, marital status was added to examine whether this factor could explain gender differences in mobility disability. In the third model, self-reported health and cognitive difficulties were included as potential explanatory variables. In the fourth and final model, we included education and socioeconomic status. Socioeconomic status was derived from household expenditure, but as smaller households are likely to have lower expenditure than larger households, we adjusted for household size in the final adjusted model. To ensure the robustness of the analysis, a test of statistical interaction between gender and each explanatory variable was examined on an additive scale as explained by Buis (2010). We first predicted the average probabilities using marginal standardisation technique related to the logistic regression. Using the Stata margins command, we have estimated the average predicted probabilities of mobility disability by gender for each risk factor. Risk differences between men and women were calculated to illustrate the direction and significance of the gender difference. Interaction is said to be present on an additive sale when the joint effect of the risk factor for mobility disability differ from the sum of the individual effect for men and women. Moreover, multicollinearity was evaluated among all the covariates to identify possible collinearity bias. There was no variance inflation factor of greater than 10, suggesting no cause for multicollinearity in the models (Field 2013). $P < 0.05$ was considered statistically significant. Data analysis was performed using Stata version 12.

Results

Table 1 presents descriptive statistics for each explanatory variable. The proportion of women in each age group was significantly lower than men ($P < 0.001$). Fewer women were currently married (55.5% vs. 93.5% in men, $P < 0.001$), had attended school (35.6% vs. 60.8% in men, $P < 0.001$), own a home (80.2% vs. 82.9% in men, $P < 0.001$), and were in the middle and highest household expenditure tertiles (61.8% *vs.* 70.7% in men, $P < 0.001$). However, there was no significant difference in rural-urban residence between men and women ($P = 0.129$). Table 2 shows the prevalence of self-reported mobility disability in the sample. Women were found to have higher prevalence of mobility disability than men, and a gender difference was observed in all three of the older adult age sub-groups. The results clearly showed that gender inequality increased with age, with a 16% point gap in prevalence observed among people aged 70 and above. The prevalence of mobility disability using the

difficulty in walking 1km variable along with other five self-reported measures is presented in Figure 1. The prevalence of mobility disability was higher in women, and it ranged from 12.3% to 37.5%. In men, the prevalence of mobility disability ranged from 8.9% to 25.3%.

Table 3 shows the association between mobility disability and each explanatory variable. The gross effects model (Table 3, column 2) shows the independent association of each explanatory variable with mobility disability. After adjusting for age and place of residence, the prevalence ratios of mobility disability in women was 1.73 (95% CI: 1.49-2.00). Adjusting for marital status attenuated the prevalent ratios of mobility disability among women (Model 2, Table 3). Further adjustment for self-reported health and cognitive difficulties reduced the estimate of the prevalent ratios for women (Model 3, Table 3). After adjusting for education and household expenditure, the prevalent ratio of mobility disability remained significant among women compared to men (Model 4, Table 3). Ownership of a home was not included in the regression models as we found no significant association between mobility disability and ownership of a home (mobility disability 15.7% vs. no mobility disability 17%, $P = 0.304$).

A test for the additive interaction between gender and other explanatory variable is presented in Table 4. The marginal effect of age and other socio-demographic variables was significantly higher for women than for men suggesting that the effect of the various socio-demographic variables on mobility disability was greater for women than for men. For instance, excess risk of mobility for older women was 0.05 (95% CI: 0.03 – 0.06, P < 0.001), 0.09 (95% CI: 0.07 – 0.12, P < 0.001), 0.19 (95% CI: 0.14 – 0.24, P < 0.001) in the 50 – 59, 60 – 69 and 70 years and above age categories respectively. Furthermore, risk difference in mobility disability was higher in women irrespective of their marital status. The excess risk of mobility disability in women was higher among respondents who were not currently married 0.09 (95% CI: 0.05 – 0.12, P < 0.001) compared to those who were married 0.02 (95% CI: –0.0003 – 0.05, P = 0.053).

Discussion

Mobility is fundamental to human functioning, and loss of mobility represents one of the early stages of the disablement process (Verbrugge and Jette 1994). To our knowledge, this is the first study to examine the prevalence of mobility disability using a large nationally

representative sample of older people in Nigeria. We found a higher prevalence of mobility disability among older women, and this gender difference in mobility disability persists across different measures of mobility disability. The gender gap in mobility disability remained significant after adjusting for socio-demographic and health variables.

The higher prevalence of mobility disability observed among women in this study has been reported in studies previously conducted in West Africa (Miszkurka et al. 2012; Onadja et al. 2013), and other low and middle income countries (Khadr and Yount 2012; Melzer and Parahyba 2004; Zunzunegui et al. 2009). In the 2010 health and demographic survey in Burkina Faso, older women were found to have 51.7% mobility disability, compared to 25.5% in older men (Onadja et al. 2013). This gender difference remained significant after adjusting for certain social and health conditions. Similar findings were also found in a cross-sectional study of mobility disability in Burkina Faso, Mali and Senegal. In this study, Miszkurka et al. (2012) observed that irrespective of age, women in these three countries have a significantly higher prevalence of mobility disability compared to men. These findings are supportive of our own results, and emphasize the notion that gender appears to be a strong risk factor for disability in west-African settings (Onadja et al. 2013).

Despite being on average younger than men, women in this study were found to have a higher prevalence of mobility disability. The reasons for this observation is unclear, potentially, it could be a reflection of some forms of female disadvantage. For example, in our sample, women were less likely to be educated, own a home, and more women were in the lowest household expenditure tertile compared to men. However, even after controlling for household expenditure, the gender difference in disability stayed significant. Hence, there might be other factors that could explain the unexplained component of gender inequality in Nigeria. For instance, our aggregated household expenditure could mute gender differences in health and food expenditure. This could be captured only with data that collects information on intra-household allocation on crucial aspects of expenditure such as health.

There was a slight decrease in gender differences in mobility disability after controlling for marital status. This could stem from three factors. Firstly, older women without partners are more likely to have a disability. Secondly, it is likely that women who are currently unmarried are poor. Finally, divorced and widowed women might feel more disabled compared to currently married women, due to the social discrimination and loss of status or

respect they face due to being widowed or separated from a male spouse. This finding underscored the importance of a husband as a form of social protection and economic wellbeing in patriarchal societies like Nigeria. Given their poorer access to education, and other productive assets such as the ownership of a home, older women living without a partner are at particular risk of poverty (World Bank 2001). The presence of a male partner for these women could be source of economic resources, which in turn lead to better access to health care and nutritious food. Gender difference in mobility disability has been shown to be higher in regions where there are marked difference in opportunities between men and women (Mechakra-Tahiri et al. 2012). In the World Economic Forum (2013) Gender Gap Index, Nigeria was ranked among the lowest 30 countries in the world in terms of gender inequality. Our analysis also showed that adjusting for education and household expenditure increases women's prevalence ratios of mobility disability, although the increase was only minimal. Differential economic opportunities between men and women could limit women's access to financial resources necessary to cater for their health (Adebowale et al. 2012). Potentially, this could contribute to the higher prevalence of mobility disability among older women.

The prevalence of mobility disability increases with age for both men and women. Notably, the gender gap in mobility disability also increases with age. In particular, differences in the prevalence of mobility disability between men and women was 4.7 percent points in the youngest age groups (50-59 years), 9.8 percent points in the 60-69 year old age category, and 16 percent points in the oldest age group (i.e. for those 70 years and above). This increase in the gender difference observed in relation to mobility disability with age could suggest that women, as they grow older, experience an increasingly higher rate of mobility disability compared to men. In high income and middle income countries, previous studies have suggested that the higher incidence of disability among women is due to female advantage in life expectancy. In case of Nigeria, female life expectancy is only a few months more than male life expectancy and this lack of female advantage in Nigeria is poorer compared to average African life expectancy where females live at least three years more than males (60.7 females *vs.* 57.6 years males) (He et al. 2016). This illustrates that the gender gap in mobility disability in Nigeria is less likely to stem from the possibility that men with disability die earlier whereas females with disability might continue to live longer with disability. However, longitudinal data examining changes in mobility disability among men and women in Nigeria along with detailed health statistics would be required to confirm this finding.

The test for additive interaction suggests that the associations between mobility disability and the various socioeconomic and demographic factors included in this study were stronger in women than in men. Even in households of similar economic status, mobility disability was higher in women than in men. This finding could be attributed, in part, to the fact that women are more likely to report disability than men (Mechakra-Tahiri et al. 2012). Moreover, it may be suggestive of some forms of inequality between men and women. For instance, inequality in access to, and control over intra-household resources prevent women from receiving their 'fair share' of available household resources (Findlay and Wright 1996). This may explain why men and women in similar economic position have a varying degree of mobility disability. As suggested by Findlay and Wright (1996), some women living in non-poor households may in fact be poor which could be masked by the household expenditure data that do not help us study individual consumption in a household. This may be the case in our study as we observed a similar average predicted probability of mobility disability for women residing in the lowest (0.23, 95% CI: 0.21 – 0.26, $P < 0.001$) and the highest tertile (0.20, 95% CI: 0.17 – 0.22, $P < 0.001$) of household expenditure. The finding that the impact of poor health and cognitive difficulties on mobility disability was stronger in women than men was not surprising. Men and women may experience similar health challenges but the impact may be greater in women, potentially due to the difficulties that women face in accessing the health care that they need (World Health Organization 2009). In addition, women's burden of care work, their low status in society and the violence that they experience may worsen their disability due to mental health challenges (World Health Organization 2009). The paper also showed that the impact of education on mobility disability was stronger in women than in men. Among men and women who were educated, the odds of mobility disability were higher in women than men. Education and income are closely related, representing one of the most consistent predictors of health. However, regardless of their educational qualifications women in Nigeria earn less than their male counterparts, and income inequality in the formal employment sector has grown since 1999 (British Council Nigeria 2012). Women tend to face higher health costs than men due to their greater demand for health care services (World Health Organization 2009); however, income inequality creates financial barriers for women to access the healthcare they need.

This study has a number of strengths which include: its large sample size and a very high response rate; the use of multiple measures of mobility disability; and, the use of a nationally representative dataset, which increases the generalizability of our findings. A notable limitation of this study is the absence of data on chronic health conditions, such as arthritis, pain, obesity and other cardiovascular diseases. These variables may be particularly important to investigate, as previous studies have attributed excess mobility disability among women to selected health conditions (Mechakra-Tahiri et al. 2012; Whitson et al. 2010). The subjective measures of mobility disability, determined by a participant's self-report, could be influenced by differences in the way in which men and women perceive their health and functioning. Women are more likely to report mobility disability (Miszkurka et al. 2012), and some of the gender differences in mobility disability observed in this study could be due to a gender-related reporting bias. However, several studies have shown that self-reported measures of disability were highly correlated with objective assessments (Merrill et al. 1997; Rahman and Liu 2000). In addition, our aggregated household expenditure variable assumed that the expenditure is equally distributed between men and women within a household, which is unlikely in a country with pro-male gender discrimination. Lastly, due to the cross-sectional nature of this study, we cannot establish temporal relationships between the various exposure variables and mobility disability. Of note, socio-demographic and health variables considered in this study explained between 12.4% and 22.8% of variance in mobility disability. Future studies incorporating socio-behavioural and objective health variables could offer additional explanations and details about the gender gap in mobility disability observed in this study. Despite these limitations, this study provides the first nationally representative data on gender differences in mobility disability among older men and women in Nigeria. Findings from this study could provide baseline information for researching trends in mobility disability among older people in Nigeria.

Acknowledgement:
The authors would like to thank the Nigeria Bureau of Statistics and the World Bank for granting access to use data from the first (2010-2011) wave of the Nigeria General Household Survey-Panel. The authors would also like to thank the anonymous reviewers for their valuable comments.

Conflict of interest:
The authors declare no conflict of interest

References:

Adebowale S, Atte O, Ayeni O (2012) Elderly Well-being in a Rural Community in North Central Nigeria, sub-Saharan Africa Public Health Research 2:92-101 doi:10.5923/j.phr.20120204.05.

Adeyemi K, Akpotu N (2004) Gender analysis of student enrolment in Nigerian universities Higher Education 48:361-378

Akinbi JO, Akinbi YA (2015) Gender Disparity in Enrolment into Basic Formal Education in Nigeria: Implications for National Development African Research Review 9:11-23

Beckett La et al. (1996) Analysis of change in self-reported physical function among older persons in four population studies. American journal of epidemiology 143:766-778

British Council Nigeria (2012) Gender in Nigeria Report 2012: Improving the lives of girls and women in Nigeria. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/67333/Gender-Nigeria2012.pdf. Accessed 18/09/2014

Bruce ML (2001) Depression and disability in late life: directions for future research The American Journal of Geriatric Psychiatry 9:102-112

Buis ML (2010) Stata tip 87: Interpretation of interactions in non-linear models The Stata Journal 10:305-308

Field A (2013) Discovering Statistics using IBM SPSS Statistics. Sage, London

Findlay J, Wright RE (1996) Gender, Poverty and the intra-household distribution of resources Review of Income and Wealth 42:335-351

Global Age Watch Index (2015) AgeWatch report card: Nigeria. http://www.helpage.org/global-agewatch/population-ageing-data/country-ageing-data/?country=Nigeria. Accessed 09/04/2016

Grundy E, Glaser K (2000) Socio-demographic differences in the onset and progression of disability in early old age: a longitudinal study. Age and Ageing 29:149-157

Gureje O, Ogunniyi A, Kola L, Afolabi E (2006) Functional disability in elderly Nigerians: Results from the Ibadan Study of Aging. Journal of the American Geriatrics Society 54:1784-1789 doi:10.1111/j.1532-5415.2006.00944.x

He W, Goodkind D, Kowal P (2016) U.S. Census Bureau, International Population Reports, P95/16-1, An Aging World: 2015. Washington DC

Hosseinpoor AR, Williams JS, Jann B, Kowal P, Officer A, Posarac A, Chatterji S (2012) Social determinants of sex differences in disability among older adults: a multi-country decomposition analysis using the World Health Survey Int J Equity Health 11:52

Khadr Z, Yount K (2012) Differences in Self-Reported Physical Limitation Among Older Women and Men in Ismailia, Egypt The Journals of Gerontology Series B: Psychological Sciences and Social Sciences 67:605-617

Mechakra-Tahiri SD, Freeman EE, Haddad S, Samson E, Zunzunegui MV (2012) The gender gap in mobility: a global cross-sectional study. BMC public health 12:598 doi:10.1186/1471-2458-12-598

Melzer D, Parahyba MI (2004) Socio-demographic correlates of mobility disability in older Brazilians: results of the first national survey Age and Ageing 33:253-259

Merrill SS, Seeman TE, Kasl SV, Berkman LF (1997) Gender differences in the comparison of self-reported disability and performance measures The Journals of Gerontology Series A: Biological Sciences and Medical Sciences 52:M19-M26

Miszkurka M, Zunzunegui MV, Langlois EV, Freeman EE, Kouanda S, Haddad S (2012) Gender differences in mobility disability during young, middle and older age in West African adults. Global public health 7:495-508 doi:10.1080/17441692.2011.630676

Mudege NN, Ezeh AC (2009) Gender, aging, poverty and health: Survival strategies of older men and women in Nairobi slums. Journal of aging studies 23:245-257 doi:10.1016/j.jaging.2007.12.021

Oman D, Reed D, Ferrara a (1999) Do elderly women have more physical disability than men do? American Journal of Epidemiology 150:834-842

Onadja Y, Atchessi N, Soura BA, Rossier C, Zunzunegui M-V (2013) Gender differences in cognitive impairment and mobility disability in old age: a cross-sectional study in Ouagadougou, Burkina Faso. Archives of gerontology and geriatrics 57:311-318 doi:10.1016/j.archger.2013.06.007

Rahman MO, Liu J-h (2000) Gender differences in functioning for older adults in ruralBangladesh. The impact of differential reporting? Journal of Gerontology 55:M28-M33

Satariano WA, Guralnik JM, Jackson RJ, Marottoli RA, Phelan EA, Prohaska TR (2012) Mobility and Aging : New Directions for Public Health Action American Journal of Public Health 102:1508-1516 doi:10.2105/AJPH.2011.300631

Thompson ML, Myers J, Kriebel D (1998) Prevalence odds ratio or prevalence ratio in the analysis of cross sectional data: what is to be done? Occupational and Environmental Medicine 55:272-277

United Nations Population Division (2015) World Population Prospects: The 2015 Revision, Volume I: Comprehensive Tables (ST/ESA/SER.A/379). United Nations. http://esa.un.org/unpd/wpp/Publications/Files/WPP2015_Volume-I_Comprehensive-Tables.pdf.

Verbrugge LM, Jette AM (1994) The disablement process Social Science & Medicine 38:1-14

Whitson HE, Landerman LR, Newman AB, Fried LP, Pieper CF, Cohen HJ (2010) Chronic medical conditions and the sex-based disparity in disability: the Cardiovascular Health Study The Journals of Gerontology Series A: Biological Sciences and Medical Sciences:glq139

World Bank (2001) Engendering Development: Through Gender Equality in Rights, Resources, and Voice (World Bank policy research report). World Bank Group,

World Bank (2012) Living Standard Management Study http://go.worldbank.org/UEUPQ5ZIW0 Accessed 18/09/2014

World Economic Forum (2013) The Global Gender Gap Report 2013. http://www3.weforum.org/docs/WEF_GenderGap_Report_2013.pdf. Accessed 05/03/2014

World Health Organization (2009) Women and health: today's evidence tomorrow's agenda. World Health Organization,

Yong V (2012) Mobility limitations. In: Stone J.H. Blouin M. (ed) International Encyclopedia of Rehabilitation Retrived from http://cirrie.buffalo.edu/encyclopedia/en/article/259.

Zunzunegui M-V, Alvarado B-E, Béland F, Vissandjee B (2009) Explaining health differences between men and women in later life: A cross-city comparison in Latin America and the Caribbean Social Science & Medicine 68:235-242