Prevalence and Predictors of Hypertension History among Ghanaian Men

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Abstract

Background: Hypertension is one of the leading causes of mortality and morbidity around the world and has become a public health problem. Meanwhile, information on predictors of hypertension in Ghana seldom focuses on men. This study, therefore, sought to determine the prevalence and predictors of hypertension history among Ghanaian men. We derived data for the study from the 2014 Ghana Demographic and Health Survey. Data from 4,387 men aged 15-59 years were analysed. Stata (version 12) was used to process the data. Cross-tabulations were done to ascertain the prevalence while logistic regression was applied to determine the predictors of hypertension history among respondents. Mean age was 32.2 years and 90% had at least primary education. The overall prevalence of hypertension history among Ghanaian men was 5.7%. Age group, educational level, marital status, number of wives/partners, work status and smoking status were significantly associated with hypertension history. Rich men and men from Eastern and Upper East regions were independently associated with hypertension history. Higher risk of hypertension history was thus observed among respondents in older age groups, men with higher education and men who are widowed/divorced/separated, non-working men and men who did not smoke. Hypertension is a health concern among men in Ghana. It is, therefore, imperative that hypertension interventions for Ghanaian men should target the higher risk factors.

Keywords: Prevalence, predictors, hypertension history, Ghanaian men

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Background

Hypertension, which is also referred to as high blood pressure, is a condition in which the blood vessels persistently receive high pressure. Thus, the higher the pressure in the blood vessels, the harder the heart has to work in order to pump blood (Word Health Organisation [WHO], 2013). Hypertension is one of the leading causes of mortality worldwide. The WHO's 2016 Global Health Observatory (GHO) data estimated that high blood pressure would cause 7.5 million deaths, about 12.8% of the total of all deaths. This accounts for 57 million disability-adjusted life years (DALYS) or 3.7% of total DALYS (WHO, 2016). Raised blood pressure is also a major risk factor for coronary heart disease and ischemic as well as hemorrhagic stroke (WHO, 2016).

Until recently, hypertension was mainly associated with more affluent regions of the world. However, the condition is increasingly emerging in low and middle-income countries (Van de Vijver et al., 2013). The situation in Africa is worse, as countries struggle with both communicable and non-communicable diseases. Whereas high blood pressure was almost non-existent in African societies in the first half of the twentieth century, estimates now show that in some places in Africa, more than 40 percent of adults are hypertensive (Bygbjerg, 2012). In Ghana, hypertension was identified to be the second leading cause of outpatient morbidity among adults beyond 45 years (Ministry of Health, 2006). Besides, non-communicable diseases including hypertension and their associated complications accounted for more than two-thirds of all medical admissions in the leading teaching hospitals and over 50% of all deaths in the country (Ministry of Health, 2006). A number of hypertensive conditions go undetected, and therefore, people are unaware of the risks they face, which is a recognized major impediment to the control of the condition (Joshi et al., 2014).

Globally, a number of studies have been conducted on hypertension (Temmar et al., 2007; Van den Berg et al., 2013; Williams et al., 2013; El Bcheraoui et al., 2014; Saeed et al., 2014; Yang et al., 2014; Alam et al., 2015; Chen et al., 2015; Laxmaiah et al., 2015; Ugwuja et al., 2015; Khanam et al., 2015). For instance, Alam et al. (2015), Laxmaiah et al. (2015), and Ugwuja et al. (2015), among others, have found that hypertension has a significant association with respondents' age and that advanced or older age is a risk factor for hypertension. Also, similar studies such as Temmar et al. (2007), Williams et al. (2013), Saeed et al. (2014), Yang et al. (2014) and Chen et

al. (2015) have all found hypertension to be significantly associated with level of education of respondents, with low educational status expected to be a risk factor for hypertension.

It was also observed by Saeed et al. (2014) that hypertension was predicted by work status of respondents, and people who were unemployed or unable to work were expected to be likely to have hypertension. A significant association was also observed between hypertension and smoking status among respondents by a number of studies. For instance, in a study by Alam et al. (2015), hypertension and smoking status had a significant inverse association whereby non-smokers were surprisingly expected to have hypertension, while in the studies by Yang et al. (2014), Laxmaiah et al. (2015), and Chen et al. (2015), there was a significant positive association between hypertension and smoking status of respondents, so that smokers were expected to be at risk of hypertension. The aforementioned studies have all examined a number of socio-demographic and economic factors, among others, which have informed the selection of most of the independent variables for this study.

However, in Ghana, inadequate studies have been conducted on hypertension. The few available studies conducted in Ghana have focused on gender in general and have been done on sub-populations such as rural communities in the Ga District and Northern Ghana; and for this reason, they are not nationally representative (Addo et al., 2006; Kunutsor, & Powles, 2009). While a study was conducted among the female population in Ghana (Nyarko, 2016), none currently exists on the male population in the country. Moreover, according to Addo et al. (2012), the relatively limited available information on hypertension may lead to an increasing prevalence in both urban and rural settings as well as poor detection, treatment and control rates. Consequently, the purpose of this study was to determine the prevalence and predictors of hypertension history among Ghanaian men using nationally representative data. The research questions that come from this study will, therefore, be as follows: what is the prevalence of hypertension history among men in Ghana, and what are the factors that predict hypertension history among men in Ghana?

Methods

The study used secondary data from the 2014 Ghana Demographic and Health Survey (2014 GDHS). The 2014 GDHS is the sixth and the latest in a series of population and health surveys conducted by the Ghana Statistical Service (GSS) and the Ghana Health Service (GHS), as part of

the global Demographic and Health Surveys (DHS) Program. It provides data on malaria treatment, prevention, and prevalence among children aged 6-59 months; blood pressure among adults; and anemia among women and children, among others (Ghana Statistical Service (GSS), Ghana Health Service (GSS), ICF International, 2015).

A nationally representative sample of 4,388 men aged 15-59 from 11,835 households participated in the survey. However, a missing response for the outcome variable resulted in a sample size of 4,387. The 2014 GDHS used a two-stage sample design to select the respondents for the survey. The first stage involved selecting the clusters that consist of enumeration areas used by the 2010 Population and Housing Census and the second stage involved systematic sampling of households (Ghana Statistical Service (GSS) et al., 2015). The 2014 GDHS is a nationally representative survey and for this reason, its findings can be generalised. It used three questionnaires – the household questionnaire, the women's questionnaire, and the men's questionnaire. While the household questionnaire was used to list all the members of a household, the women's and men's questionnaires were used to collect data on women and men, respectively (Ghana Statistical Service (GSS) et al., 2015). As a result, it does not provide data for both women and men in the same data set, which may be a limitation depending on what one seeks to achieve with it.

Hypertension history was derived from a question as to whether respondents had ever been told by a doctor or any health personnel that they had high blood pressure or hypertension. In view of this, respondents provided yes or no answers. This was therefore used as the dependent (outcome) variable for the study. A number of covariates such as age group, education level, religious affiliation, ethnicity, wealth, marital status, work status, smoking status, number of wives, type of residence and region of residence which have the potential of being risk factors for hypertension history were selected for the study.

Stata (version 12) was used to process the data to achieve the objectives of the study. Cross-tabulations were used to present the prevalence of hypertension history in percentages for the selected covariates. Binary logistic regression analysis was also used to ascertain the potential predictors of hypertension history among respondents, with statistical significance set at $p<0.05$. The results were therefore presented in tables for analysis and discussion. All results in the tables were weighted with a sample weight factor. This was done to adjust for clustering during sampling and to ensure that the results are nationally representative.

Results

Background characteristics of respondents

Table 1 presents a summary of the background characteristics of respondents. There were 4,387 men included in the analysis. The mean age was 32.2 years (standard deviation (SD): 12.4 years). The majority (50.2%) were between 20 and 39 years, while nearly one-fifth were adolescents (15-19 years). Nearly 90% had some form of formal education, with about 8 in 10 attending up to secondary school level or higher. The majority (72.5%) were Christians, more than half belonged to the Akan ethnic group, and 52% were married or cohabiting, with about 8% having two or more wives/partners.

Table 1: Background characteristics of respondents

Characteristics	Frequency	Percentage
Age		
15-19	854	19.5
20-29	1,177	26.8
30-39	1,026	23.4
40-49	811	18.5
50-59	519	11.8
Education level		
No formal education	469	10.7
Primary education	590	13.4
Secondary +	3,328	75.9
Religious affiliation		
Christian	3,183	72.5
Muslim	771	17.6
Traditionalist	162	3.7
No religion	271	6.2
Ethnicity		
Akan	2,238	51.0
Ga-Dangme	395	9.0
Ewe	594	13.5
Mole-Dagbani	630	14.4
Others	530	12.1
Marital status		
Never married	1,864	42.5
Married/living together	2,290	52.2
Widowed/divorced/separated	233	5.3
Number of wives/partners*		
1	2,112	92.2
2 or more	178	7.8
Wealth status		
Poor	1,530	34.9
Middle	835	19.0

Rich	2,022	46.1
Work status		
Working	3,691	84.1
Not working	696	15.9
Smokes cigarettes		
Yes	210	4.8
No	4,177	95.2
Type of residence		
Urban	2,285	52.1
Rural	2,102	47.9
Region of residence		
Western	502	11.4
Central	421	9.6
Greater Accra	922	21.0
Volta	336	7.7
Eastern	428	9.8
Ashanti	791	18.0
Brong Ahafo	364	8.3
Northern	356	8.1
Upper East	167	3.8
Upper West	100	2.3
Total	4,387	100

NB: *only married men

About 84% reported working, though more than one-third (34.9%) were within the poverty bracket. Only about 5% were current smokers. More than half were living in urban areas. Greater Accra and Ashanti regions constituted the majority of respondents (21% and 18% respectively), while Upper East and Upper West regions had the least number of respondents.

Prevalence of hypertension history by characteristics of respondents

Table 2 shows the prevalence of hypertension history by characteristics of respondents. The overall prevalence of hypertension history among Ghanaian men aged 15 to 59 was 5.7%. The prevalence rate was highest (16.4%) among the aged (50-59 years) and nearly 1% of adolescents were considered hypertensive. Nearly 7% of men with the highest educational level (secondary or higher) had hypertension history, whereas 2.5% of men without formal education reported having hypertension history.

Prevalence of hypertension history was highest (6.3%) among Christians and lowest (2.3%) among Traditionalists. The Ga-Dangme and Ewe respondents had the highest rate of hypertension history (7.4% and 7.3% respectively), while the lowest rate (3.1%) was found among the Mole-Dagbani ethnic group. With regard to marital status, hypertension history was found to be more prevalent

among men who ever got married (8.4% among past married men and 8.1% among men currently married or cohabiting) compared to 2.4% among men who had never married and were not currently living with a partner.

History of hypertension among men with 2 or more partners was slightly higher compared with men with 1 partner (8.9% versus 8.0%). For wealth status, the prevalence of hypertension history was highest (9%) among the rich and lowest (2.7%) among the poor. Also, working men had higher (6.2%) prevalence than non-working men (2.8%), while non-smokers had a higher hypertension rate (5.8%) compared with current smokers (2.5%). Eight percent of the men in urban areas had a history of hypertension compared with 3% in rural areas. Greater Accra Region had the highest rate (8%) of hypertension history followed by Ashanti Region (7.4%), while Northern, Brong Ahafo, and Upper West Regions had the lowest rate (1.9%, 2.7%, and 2.6% respectively).

Table 2: Prevalence of hypertension history among men by characteristics

Characteristics	Proportion of men with hypertension history	Number of men
Age		
15-19	0.9	854
20-29	3.4	1,177
30-39	5.6	1,025
40-49	7.4	811
50-59	16.4	519
Education level		
No formal education	2.5	469
Primary education	3.0	590
Secondary +	6.6	3,328
Religious affiliation		
Christian	6.3	3,183
Muslim	5.1	771
Traditionalist	2.3	162
No religion	2.8	271
Ethnicity		
Akan	6.0	2,238
Ga-Dangme	7.4	395
Ewe	7.3	594
Mole-Dagbani	3.1	630
Others	4.4	530
Marital status		
Never married	2.4	1,864
Married/living together	8.1	2,290
Widowed/divorced/separated	8.4	233
Number of wives/partners*		
1	8.0	2,112
2 or more	8.9	1,778

Wealth status		
Poor	2.7	1,530
Middle	3.3	835
Rich	9.0	2,022
Work status		
Working	6.2	3,691
Not working	2.8	696
Smokes cigarettes		
Yes	2.5	210
No	5.8	4,177
Type of residence		
Urban	7.5	2,285
Rural	2.8	2,102
Region of residence		
Western	4.1	502
Central	6.3	421
Greater Accra	8.0	922
Volta	4.8	336
Eastern	6.3	428
Ashanti	7.4	791
Brong Ahafo	2.7	364
Northern	1.9	356
Upper East	4.8	167
Upper West	2.6	100
Total	5.7	4,387

NB: *only married men

Predictors of hypertension history among Ghanaian men aged 15-59.

A summary of the logistic regression results on hypertension history among Ghanaian men is presented in Table 3. It was found that age, education, marital status, number of partners, and work status, as well as smoking status, were significantly associated with hypertension history. Hypertension history was also significantly associated with rich men (AOR: 4.14; $p<0.000$) as well as men from the Eastern (AOR: 2.21; $p<0.043$) and Upper East Region (AOR: 3.73; $p<0.015$). The odds of hypertension were higher among men aged 50-59 (AOR: 20.93; $p<0.000$), 40-49 (AOR: 9.84; $p<0.000$), 30-39 (AOR: 6.99; $p<0.000$) and 20-29 (AOR: 3.35; $p<0.004$) compared to men aged 15-19. Also, the odds were higher for men who had secondary or higher education (AOR: 2.72; $p<0.003$) and men who had primary school education (AOR: 2.46; $p<0.029$) compared to their counterparts who had no formal education. Men who were divorced, separated or widowed (AOR: 4.80; $p<0.000$) and men who were married or living together with a partner (AOR: 3.99; $p<0.000$) also had higher odds of hypertension compared to men who had never married.

Table 3: Logistic regression of hypertension history among men aged 15-59.

Variables	Adjusted Odds Ratio (AOR)	P- value	95% Conf. Interval
Age			
15-19 (Ref)	1		
20-29	3.35	0.004***	1.47 – 7.63
30-39	6.99	0.000***	3.15 – 15.49
40-49	9.84	0.000***	4.46 – 21.68
50-59	20.93	0.000***	9.57 – 45.76
Level of education			
No formal education (Ref)	1		
Primary	2.46	0.029*	1.09 - 5.52
Secondary/higher	2.72	0.003**	1.40 - 5.29
Religious affiliation			
Christian (Ref)	1		
Muslim	1.05	0.876	0.57 - 1.91
Traditional/spiritualist	0.47	0.142	0.17 - 1.28
No religion	0.33	0.051	0.10 - 1.01
Ethnicity			
Akan (Ref)	1		
Ga/Dangme	0.92	0.829	0.46 - 1.87
Ewe	1.65	0.182	0.79 - 3.46
Mole-Dagbani	1.05	0.913	0.44 - 2.46
Other	1.71	0.192	0.76 - 3.81
Marital status			
Never married (Ref)	1		
Married/Living together	3.99	0.000***	2.77 - 5.76
Widowed/divorced/separated	4.80	0.000***	2.70 - 8.53
Number of wives/partners			
1 (Ref)	1		
2 or more	2.07	0.020*	1.12 - 3.82
Wealth status			
Poor (Ref)	1		
Middle	1.33	0.386	0.69 – 2.55
Rich	4.14	0.000***	2.02 – 8.46
Work status			
Not working (Ref)	1		
Working	0.20	0.017*	0.05 - 0.75
Smokes cigarettes			
No (Ref)	1		
Yes	0.22	0.050*	0.04 – 0.99
Place of residence			
Urban (Ref)	1		
Rural	1.32	0.351	0.73 - 2.35
Region of residence			
Western (Ref)	1		
Central	2.06	0.118	0.83 - 5.12
Greater Accra	1.44	0.356	0.66 - 3.15
Volta	1.67	0.313	0.61 - 4.52
Eastern	2.21	0.043*	1.02 - 4.77

Ashanti	1.59	0.218	0.75 - 3.34
Brong Ahafo	1.19	0.698	0.49 - 2.86
Northern	1.38	0.550	0.47 - 3.97
Upper East	3.73	0.015*	1.29 - 10.83
Upper West	1.48	0.512	0.45 - 4.88

Ref= Reference Category   NB: * $p \leq 0.05$; **$p \leq 0.01$; *** $p \leq 0.001$

Additionally, men who had 2 or more wives ($p < 0.020$) had 2.07 times odds of being diagnosed with hypertension, compared to their counterparts who had one wife. The odds of men who were working (AOR: 0.20; $p < 0.017$) were lower compared to men who were not working. Likewise, men who smoked (AOR: 0.22; $p < 0.050$) had unusually lower odds of hypertension compared to those of men who had never smoked.

Discussion

This study sought to ascertain the prevalence and predictors of hypertension history among Ghanaian men aged 15 to 59. It was found that close to six percent of the study population had hypertension history. This was substantially lower compared to the current total prevalence of 15.0 percent reported by GSS et al. (2015) among men aged 15-59. The prevalence of hypertension history was much lower than current prevalence or disease burden for a number of reasons. For instance, the current prevalence was derived from measurements taken on the field by survey interviewers and therefore captured people who were unaware of their condition, perhaps because they did not attend any health facility or they had not been told about it by health personnel. Also, per international recommended guidelines, individuals were considered hypertensive if they had a normal average blood pressure reading but were taking antihypertensive medication (GSS et al., 2015).

It was further found that age group, education level, marital status, the number of partners, work status and smoking status had a significant association with hypertension history among the respondents. The risk of hypertension increased with advancing age among respondents. Hence, being a younger man becomes a protective factor against having a hypertension history. This is consistent with myriads of studies worldwide (Bosu, 2010; Williams et al., 2013; Alam et al., 2015; Laxmaiah et al., 2015; Ugwuja et al., 2015). The higher odds of hypertension among older respondents may be due to the waning cardiovascular resistance or functions that humans experience as a result of aging. Inactive or sedentary lifestyles which have been identified as a risk factor for hypertension (Laxmaiah et al., 2015) may also be prevalent among the older men.

It was further found that the odds of hypertension increased with level of education among respondents. This implies that respondents with secondary school or higher education were more likely to have hypertension history compared to those without formal education. However, it is quite unclear as to why respondents who were highly educated were more prone to hypertension than their counterparts who were less or not educated. A number of studies across the globe also confirm that literacy or level of education is significantly associated with hypertension (Temmar et al., 2007; Williams et al., 2013). However, all these studies have mixed findings as to whether the level of education is negatively or positively associated with hypertension.

Respondents who were married or cohabiting and those who were previously married (divorced, separated, widowed) were found to have a higher risk for hypertension history compared to their counterparts who had never married. However, it becomes difficult to explain why married men or men who were previously married were more likely to experience hypertension than their counterparts. This may be linked to the likely challenges of matrimonial life and the trauma that may be concomitant with a broken marriage. It may be fair to assert that unlike this study, current studies on this subject seldom examine the marital status of respondents in relation to hypertension, and this may be one of the gaps in research that this study sought to fill.

Additionally, among married men, it was found that men who were married to 2 or more wives had higher odds for hypertension history compared to men with one wife. Thus, the risk of hypertension history increased with the number of wives a man had. It is possible that the practice of polygyny among men exposes them to a number of matrimonial responsibilities that may overwhelm them. Men with many wives may also be tempted to multitask, do many jobs or work extra hard to cater for their large family. These may strain or overwhelm them and may explain why married men with many wives in this study had a higher risk for hypertension history.

It was also revealed that men who were currently working had lower odds for hypertension history compared to their counterparts who were currently unemployed. The risk of hypertension was 80 percent lower for working men than for the unemployed ones. In a similar study, it was found that unemployment and inability to work predicted hypertension (Saeed et al., 2014). Even though the effect of work status on hypertension history has seldom been considered by studies globally, it is reasonable to speculate that the higher risk of hypertension history among unemployed men may be due to the potential socio-economic pressures associated with being an unemployed man.

We also found that men who smoked cigarettes or tobacco had lower odds of having a hypertension history compared to their counterparts who did not smoke. It is quite unusual to find men who smoke have a lower risk of hypertension than their colleagues who did not smoke. It is unclear why this is so, but there could be some intervening factors accounting for this situation, such as the low number of observed smokers among the sample or the likelihood that smokers modified some other aspects of their lifestyle. Globally, a number of studies have come out with a significant association between smoking and hypertension (Alam et al., 2015; Laxmaiah et al., 2015; Yang et al., 2014; Chen et al., 2015). However, while some came out with an inverse relationship between smoking and hypertension (Alam et al., 2015), the majority also found a positive relationship between the two (Laxmaiah et al., 2015; Yang et al., 2014; Chen et al., 2015). The study further found that men who were from rich households were independently associated with hypertension history. This is quite contrary to what Alam et al. (2015) and Laxmaiah et al. (2015) found: that wealth or socio-economic status is significantly associated with hypertension, with people from poor households having a higher risk for hypertension. However, this seems to be quite understandable when we talk about someone's hypertension history instead of current status. Also, men from the Eastern and Upper East regions were found to be significantly associated with hypertension history, and therefore had a higher risk for hypertension. However, the possible reasons for the significant results in these two regions are quite complicated.

This notwithstanding, we caution that in this study hypertension history relied on respondents' recall of diagnosis, which may have an effect on the total prevalence of hypertension among the respondents. Consequently, the prevalence of hypertension history could be lower compared to the total hypertension burden among men aged 15 to 59 in the country. Nevertheless, we strongly believe that this provides a fair knowledge about the hypertension history situation among men in the country.

Conclusion

History of hypertension among men aged 15 to 59 in Ghana was predicted by myriads of factors such as age, education, marital status, number of wives/partners and work as well as smoking status. Coming from a rich household, of from the Eastern and Upper East region of the country also predicted hypertension history among the respondents. While the prevalence of hypertension history may seem low among men, there were some considerable disparities among the various

categories of the variables. The implication may be that hypertension is a serious health concern among some men in Ghana. Interventions to tackle this condition could focus on behavioural or lifestyle modifications as well as other high-risk factors such as advanced age, higher education, broken or unbroken marriage, polygamy, and work. This can be started by intensifying public education on hypertension and the need to go for regular check-ups and to be provided with knowledge of what to do in order to control and manage the condition over time.

Acknowledgements

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