Relationship between blood pressure, body mass index and health promoting lifestyle practices of women in selected rural communities in Osun State Nigeria.

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Abstract

Objevtive: Globally, studies have shown that the trend of overweight and obesity has increased astronomically and there is a close link between body mass index and blood pressure. This study determined the link between the body mass index (BMI), blood pressure and health promoting practices of women in rural and sub-urban communities.

Methods: Multi-stage sampling technique was employed to select 394 women from three rural/semi-urban communities purposively selected from Osun State for this cross sectional study. Interviewer's administered questionnaire was used to collect data such as socio- demographic data, blood pressure, anthropometric indices and health promoting lifestyle practices of the respondent. Data analysis was done using SPSS version 17 software and level of statistical significance was set at $p < 0.05$.

Result: The mean age of the respondents was 40.28±16.03 years and majority earned average monthly income of between N1000-5000 ($5-25). The mean BMI was 28.04±5.449 kg/m^2 and about 20% 0f respondent were obese The mean systolic blood pressure was 114.14±17.835 mmHg while diastolic blood pressure was 71.04±12.99 mmHg and about 10% of respondents had hypertension. There was positive and significant relationship between BMI and blood pressure ($r = 0.15$, $p=0.01$). The study demonstrated no significant relationship between the health promoting lifestyle practices of the respondents BMI and blood pressure.

Conclusion: The significant relationship between BMI and hypertension validate the need for health promoting lifestyle intervention programme for rural women and similar population in order to control the increasing prevalence of non-communicable diseases.

Keywords: blood pressure, body mass index, rural community, Health Promoting Lifestyles practices, women and socio-economic status

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Relation entre la pression artérielle, indice de masse corporelle et de promotion de la santé des habitudes de vie des femmes dans les communautés rurales sélectionnées dans l'Etat d'Osun au Nigeria.

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Résumé

Objectif: À l'échelle mondiale, des études ont montré que la tendance de surpoids et d'obésité a augmenté astronomiquement et il y a un lien étroit entre l'indice de masse corporelle et la pression artérielle. Cette étude a déterminé le lien entre l'indice de masse corporelle (IMC), la pression artérielle et les pratiques de promotion de la santé des femmes dans les communautés rurales et suburbaines.

Méthodes: technique d'échantillonnage à plusieurs étages a été employé pour sélectionner 394 femmes de trois communautés rurales / semi-urbaines téléologique choisis dans l'Etat d'Osun pour cette étude transversale. Le questionnaire administré de l'intervieweur a été utilisé pour recueillir des données telles que les données socio-démographiques, la pression artérielle, des indices anthropométriques et des habitudes de vie favorisant la santé de l'intimé. L'analyse des données a été effectuée à l'aide du logiciel SPSS version 17 du logiciel et le niveau de signification statistique a été fixé à $p < 0,05$.

Résultat: L'âge moyen des répondants était 40,28 ± 16,03 années et de majorité revenu mensuel moyen entre N1000-5000 (5-25 $) gagné. L'IMC moyen était de 28,04 ± 5,449 kg / m2 et environ 20% 0f répondant étaient obèses La moyenne pression artérielle systolique était 114,14 ± 17,835 mmHg tandis que la pression artérielle diastolique était 71.04 ± 12,99 mmHg et environ 10% des répondants avaient l'hypertension. Il y avait relation positive et significative entre l'IMC et la pression artérielle ($r = 0,15$, $p = 0,00$). L'étude a démontré aucune relation significative entre les habitudes de vie favorisant la santé des répondants IMC et la pression artérielle.

Conclusion: La relation significative entre l'IMC et l'hypertension valident le besoin de promotion de la santé programme d'intervention de style de vie pour les femmes rurales et la même population afin de contrôler la prévalence croissante des maladies non transmissibles.

Mots-clés: la pression artérielle, indice de masse corporelle, la communauté rurale, la santé des pratiques Style de vie Promouvoir, les femmes et le statut socio-économique

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IINTRODUCTION

Increasing burden of preventable non-communicable diseases (NCDs) has led to high morbidity, debility and mortality and it now has become a major challenge of development especially in developing countries (1, 2). It has been documented that as high as 60% of NCDs related death occurred in people below the age of 60 years in low and middle income countries (3,4,5&6). In Nigeria, high prevalence of cardio-metabolic risk factors in rural population has been documented (5). These NCDs especially the cardio-metabolic diseases, growing epidemic proportion are said to be driven by unhealthy lifestyles, rapid urbanization and demographic aging compounded by poor health promotion, , poor referral protocol, poverty resulting to inability of many people to afford cost of health care, poor access and poor utilization of health care facilities among others (7,8).

A study have shown that rural residents defined health as the ability to work and carry out their usual tasks and that they are less concerned with comfort, cosmetic, and life-prolonging aspects of care (4). This may imply that they do not deliberately engage in health promoting behaviour. That is, women have the tendency to neglect their health needs as they are usually occupied with the burden of caring for their family.

Hypertension is often referred to as silent killer and it can only be detected through blood pressure measurements . Hypertension is an important public health burden in both urban and rural settings of sub-Saharan African population (9). Sixty million people in the United States and one billion individuals' worldwide have hypertension (10). Several researchers have demonstrated relationship between BMI and blood pressure (11,5).

In the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure, it was said that for BP beginning from 115/75 mm Hg, CVD risk doubles for each increment of 20/10 mm Hg. People who are normotensive at 55 years of age will have a 90% lifetime risk of developing hypertension, Pre hypertensive individuals (systolic BP 120–139 mm Hg or diastolic BP 80–89 mm Hg) were also stated to require health-promoting lifestyle modifications to prevent the progressive rise in blood pressure and CVD (11,12)

Fernald & Adler (13) in a study among women in Mexico, showed that contrary to traditional assumptions and results of previous studies about the associations between socio economic status and better health, women in low-income rural populations who are at the upper end of the income spectrum within their community were found to be more likely to have higher Systolic BP. However, a review of the literature from several developing countries including Chile, Brazil and Colombia also showed that increased socio-economic status was associated with decreased blood pressure (13)

Overweight and obesity are important determinants of health and lead to adverse metabolic changes, including increase in blood pressure, unfavourable cholesterol levels, hypertriglyceridaemia, diabetes and increased resistance to insulin action, and greater prevalence of metabolic syndrome (14). Body mass index (BMI) is recommended by the World Health Organization as the most useful epidemiological measure of obesity (9,14)

Several studies have link some diseases (hypertension, type 2 diabetes, cardiovascular diseases, arthritis, disability and cancer) with overweight and obesity (14,15,16 &17). Despite the fact that excess bodyweight has been recognized as a major public health concern, studies conducted in 960 countries and territories revealed that, mean BMI has increased since 1980 globally. The trends since 1980, and mean population BMI in 2008, varied substantially between nations (18,19).

Various studies showed that lifestyle modifications like weight loss, reduced sodium intake, increased physical activity, diet rich in fruit, vegetables, and low-fat dairy products reduced in total and saturated fat are effective in lowering blood pressure (10). Therefore, failure to engage in health promoting lifestyle consistently may be associated with the increasing prevalence of preventable non-communicable diseases. This present study is focused on the exploration of the link between the cardimetabolic indicators of NCDs such as blood pressure (BP) and BMI with the health promoting lifestyle practices among women in rural and sub-urban communities in Osun State.

METHODOLOGY

The study was conducted in Osun State, Southwest, Nigeria with an estimated population of 4,137,627 in 2005 (20). Osun State is largely 'a rural state', with 19 out the 30 local government areas being non-urban local government councils as indicated by the 1991 National Population and Housing Census. There is documented disparity in accessibility to health care facilities and health

care providers in the State of Osun (21). For this study, three communities were purposively selected from Ile-Ife Zone out of the 6 administrative zones in Osun State. Two of these communities (Wanikin and Koola) are rural communities while the third community: Aba Iya Gani (Surulere) community has gradually developed into suburban settlement because of the influx of civil servants and academics from the University and the University Teaching Hospitals who built houses in the community.

The total population of the women residents in Aba Iya Gani was 918, in Koola community was forty-two (42) (twenty-one (21) of them are residents, eleven (11) usually come in the early hours of morning and return to town in the evening while nine (9) usually spend some days before going to town) and in Wanikin was 493. Proportional equation was used to select 249 women from Aba Iya Gani, 133 women from Wankin and 12 women from Koola based on the community population. The first house in each community was randomly selected after then every third house was selected. Women in the selected house that are 19 years and above in each of the three communities, irrespective of their educational level, marital status and occupation, were included in the study.

Data were collected using an interviewer-administered questionnaire to obtained demographic characteristics and the health promoting lifestyle using the Health Promotion Lifestyle Profile II (HPLPII). The HPLPII was first developed by Walker, et al. in 1987 and it was revised by Walker & Hill-Polerecky in 1997 (4, 22). HPLPII has been used extensively in research and reported to have sufficient validity and reliability for use among various populations. The adapted health-promoting lifestyle profile component of the questionnaire has 40 items divided into the six subscales covering Nutrition (N - 6 items), Physical Activity (PA – 3 items), Health Responsibility (HR – 8 items), Stress Management (SM – 9 items), Interpersonal Relations (IR - 8 items) and Spiritual Value (SV - 6 items). The items were assessed on four-level likert scale of never (1); sometimes (2); often (3) and routinely (4). Ten women were drawn from a rural farming community in another local government area to assess the reliability of the instrument using test re-test method. The Cronbach"s α coefficient of the subscales are: Health Responsibility (0.76); Physical Activity (0.76); Nutrition (0.76); Spiritual Belief (0.70); Interpersonal Relationships (0.80) and Stress Management (0.84). The total score of all the subscales was 0.72. The anthropometry parameters which consist of height and weights were measured using standard techniques and the blood pressure measurement using standard techniques was done by the investigators. The health promoting lifestyle profile II questionnaire translated to Yoruba language (and later translated back to English to ensure validity of test items). The body mass index (BMI) was calculated as weight in kilogrammes divided by the square of height in meters. Under weight was defined as BMI < 18.5 kg/m^2; Normal weight (BMI 18.5 – 24.9 kg/m^2); Over weight (BMI 25.0 – 29.9 kg, m2); Obesity (BMI 30.0 – 30.9 kg/m^2) and severe obesity (40 kg/m^2 and above). Blood pressure was measured using an aneroid sphygmomanometer. Blood pressure was defined as normal (systolic < 120 and diastolic < 80mmHg); pre-hypertension (systolic 120-139 and diastolic80 -89 mmHg); hypertension stage 1 (systolic 140 - 159 and diastolic 90 – 99 mmHg) and hypertension stage 2 (systolic > 160 and diastolic > 100 mmHg) (12). Two research assistants were recruited and trained to facilitate the data collection process. The first research assistant is a registered nurse who is conversant with the contents of the instruments being used and also has work experience in rural communities. The second research assistant was an undergraduate student who has stayed among the rural women for some time and she demonstrated a high understanding of the contents of the instruments. Both assistants were fluent in the local language (Yoruba).

Ethical clearance: Ethical clearance for this study was obtained from Obafemi Awolowo University Institute of Public Health Ethical Review Board (IPHOAU/12/04) and consent of the community heads and individuals were obtained. Data collected were coded and entered into statistical package for social sciences (SPSS) version 17.0 and analyzed using descriptive and inferential statistics. Level of statistical significance was taken as p-value less than 0.05.

RESULTS

The mean age of the respondents was 40.28±16.03 years and less than half (44.4%) had secondary education (table 1). Many of the respondents (52%) were traders with average monthly income of minimum of N1000 and maximum of N80,000 with mean income of N14,222 ±17,378.18, although, majority (35.8%) earned average monthly income of between

N1000-5000 (table 1).

Observing the three communities independently, none of the women in Koola community (though with very low population with a total of 42 women) is neither underweight nor severely obese (figure 1). However, the study showed significant relationship between the respondents' study location and their BMI (χ^2= 24.787; df= 8; p= 0.002).

The mean systolic blood pressure was 114.14±17.835 mmHg and majority (82.7%; 66.7% and 77.4%) from Aba Iya Gani, Koola and Wanikin respectively had normal systolic blood pressure (figure 2). In addition, mean diastolic blood pressure was 71.04±12.991mmHg while majority (87.6%; 83.3% and 86.5%) from Aba Iya Gani, Koola and Wanikin respectively had normal diastolic blood pressure (figure 3). Statistical analysis revealed significant relationship between the study locations and blood pressure of the study population (χ^2= 15.767; df= 6; p= 0.015). In addition table 2 revealed significant relationship between the age of the study population and their blood pressure χ^2 = 44.12, df = 6 and p value = 0.000. Likewise, age demonstrated statistically significant relationship with body mass index χ^2 = 19.83, df = 8 and p value = 0.01 (table 2).

Highest level of education, occupation and average monthly income were the parameters used to assess the socio-economic status of the respondents. Table 3 revealed positive and significant relationship between BMI and blood pressure (*r* = 0.145*, p=0.004).Body mass index showed significant relationship with all the three parameters used to assess socio economics status (table 3). Furthermore,* blood pressure showed significant but negative relationship with both highest educational level and occupation of the study population. However, the relationship between blood pressure and average monthly income was merely positive but not statistically significant (table 3).

Also table 4 revealed the health promoting lifestyle practices of the women across the study locations. The most practiced of HPLP of the respondents was spiritual belief with mean score of 3.14-3.75 and Koola community had the highest mean score (3.75) while the least practiced was health responsibility with mean score of 1.83 among the Koola community. Physical activity was also not optimally practiced with mean scores of 2.02 and 2.38. Health promoting lifestyle practices as a variable had no statistical significant relationship with respondents' BMI and blood pressure at 0.05 significant levels (table 5).

DISCUSSION

The age range of respondents was between 19 and 87 years with ±SD (40.28±16.03) years. The findings from the study showed that more respondents were in the age range of 19-29 years in sub-urban settlement (Aba Iya Gani) compared to the other two typical rural communities; this may be due to the fact that some of the respondents within these age range are either students or civil servants that need to stay close to their schools or work places. The highest formal education of most of the respondents was secondary school. The challenge of low education of women translates to poor socioeconomic status and poor developments and this low education account for lower percentage of women in all professions including academics (19). Increased number of illiterate women in the society, especially in the rural communities are associated with teenagers who drop out of school or not allowed to go to school at all who eventually grow into women that will be involved in nations development agenda (23). Previous study showed that women in rural areas are older, poorer, less educated, have greater financial hardship (14). In our study, (52.0%) of the respondents were petty traders and 15.0% were farmers. Women generally work as subsistence farmers, small-scale entrepreneurs, unpaid workers on family farms or casual wage labourers and they may take on all or a number of these activities at different times (8). Globally, more than one third of the female workforce is engaged in agriculture, while in regions like Sub-Saharan Africa and South Asia, more than 60 per cent of all female employment in the rural area is in this sector (8)

The average income of majority of our respondents per months was between N1000 - N5000 ($4-20). **There is a** high level of poverty among families headed by women (24). Rural women are particularly vulnerable to poverty, according to the World Bank, 75 per cent of the poor in developing countries live in rural areas (8). In a previous health screening study conducted in 12 villages in rural Nigeria revealed that people live on less than $2 (N300) per day, making it nearly impossible for them to travel to a hospital or clinic to access health care if needed (25). The situation may be getting worse in recent times with the poor economic situation of the state and the country.

Rising prevalence of obesity is a worldwide health concern because it forecasts an

increased burden of several diseases, most notably cardiovascular diseases, diabetes, and cancers (19,26). Studies have shown that risk factors for non-communicable diseases are poor diet, physical inactivity, smoking and excessive alcohol consumption as well as overweight and obesity (10). Hence adopting healthy lifestyle practices such as healthy diet, regular exercise and avoidance of alcohol and tobacco smoking can prevent and control non-communicable diseases and its complication (27). Our study showed variations in weight patterns of respondent in rural and sub-urban communities. Women in Koola compared to the other two communities have relatively better anthropometric indices. This could be explained from the nature of the extensive and heavy farming work and long walk associated with street trading engaged in by over 70% of the women in Koola Community. Our study subjects practiced health responsibility poorly implying that they might not have been taking active responsibility for health sustenance and health check-up, a critical issue in control of non-communicable diseases. The findings also demonstrated high rate of obesity among the study population and there is also significant relationship between body mass index and blood pressure. Therefore measures have to be put in place to ensure effective health promoting programmes that can encourage the women in the rural community to maintain healthy weight because of the burden of diseases associated with obesity. Studies conducted in the USA and UK revealed that by year 2030 with the trend of obesity in these countries there will be 65 million more obese adults in the USA and 11 million more obese adults in the UK, consequently accruing an additional 6–8·5 million cases of diabetes, 5·7–7·3 million cases of heart disease and stroke, 492 000–669 000 additional cases of cancer, and 26–55 million quality-adjusted life years forgone for USA and UK combined (17). The combined medical costs associated with treatment of these preventable diseases are estimated to increase by $48–66 billion/year in the USA and by £1·9–2 billion/year in the UK by 2030 (17).

Stage 1 and stage 2 hypertension have a high prevalence rate among our respondents in the age group of 41 to 87 years. It has been documented that those who are normotensive at 55 years of age will have a 90% lifetime risk of developing hypertension (4). Our study suggested that the socio-economic status of our study population might have contributed to the prevalence of overweight, obesity and hypertension.

CONCLUSION

Our study has shown that about 10% of women in each of the rural community had hypertension while about 20% of these women were also obese. There was low level of health promoting lifestyle practices in all our studied communities, more strikingly important is our study finding which showed that blood pressure and body mass index have no relationship with the level of health promoting lifestyle practices of our respondents.

Effective health promotion programmes should be encouraged among rural women as such will help in preventing most common non communicable diseases especially hypertension, cerebro-vascular disease, diabetes. Doing these also have economic benefits as healthier rural women will be more productive in their farming activities and thus contribute more to the development of the country through agriculture. Women are pivotal in maintaining healthy generations as they are the caregivers of the family. They play key role in promoting and maintaining family health in all cultures and it is important that they have optimum physical, mental and social wellbeing.

Conflict of Interest: None.

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Table 1: Socio-demographic Characteristics of the Respondents

SOCIO DEMOGRAPHIC VARIABLES	**COMMUNITY**		
	ABA IYA GANI(N=249)	KOOLA (N=12)	WANIKIN (N=133)
AGE RANGE	19-85	29-87	19-80
MEAN AGE	38.96	55.00	41.41
STD. DEVIATION	15.642	17.607	15.982
AGE			
19-40	152 (61.0%)	3 (25.0%)	70 (52.6%)
41-64	81 (32.5%)	5 (41.7%)	47 (35.3%)
65 and above	16(6.4%)	4 (33.3%)	16 (12.0%)
HIGHEST EDUCATIONAL LEVEL			
No formal education	27 (10.8%)	9 (75.0%)	34 (25.6%)
Primary	35 (14.1%)	1 (8.3%)	34 (25.6%)
Secondary	111 (44.6%)	1 (8.3%)	63 (47.4%)
Tertiary	76 (30.5%)	1 (8.3%)	2 (1.5%)
OCCUPATION			
Farming	10 (4.0%)	3 (25.0%)	46 (34.6%)
Trading	129 (51.8%)	9 (75.0%)	68 (51.1%)
Student	40 (16.1%)	0 (.0%)	9 (6.8%)
Civil servant	43 (17.2 %)	0 (.0%)	4(3.0%)
Artisan	27 (10.8%)	0 (.0%)	6 (4.5%)
AVERAGE INCOME IN A MONTH			
1000-5000	64 (25.7%)	3 (25.0%)	74 (55.6%)
6000-10000	85 (34.1%)	7 (58.3%)	43 (32.3%)
11000-20000	52 (20.9%)	0 (.0%)	11 (8.3%)
21000-40000	22 (8.8%)	2 (16.7%)	4 (3.0%)
41000 and above	26 (10.4%)	0 (.0%)	1 (0.8%)

Table 2: Relationship between Blood Pressure, Body Mass Index and Age of the Respondents

	Age			Total
Blood pressure (BP)	19-40	41-64	65-87	
Normal blood pressure	174(44.2)	74(18.8)	20(5.1)	268(68.0)
Pre-hypertension	37(9.4)	21 (5.3)	9(2.3)	67(17.0)
Hypertension stage 1	9(2.3)	20(5.1)	3(0.8)	32 (8.1)
Hypertension stage 2	3(0.8)	18 (4.6)	6 (1.5)	27 (6.9)
Total	223 (56.6)	133 (33.8)	38 (9.6)	394 (100)
$\chi^2 = 44.12$, df = 6 and p value = 0.000				
Body Mass Index (BMI)	Age			Total
	19-40	41-64	65-87	
Under weight	2(0.5)	1(0.3)	2(0.5)	5(1.3)
Normal weight	85(21.6)	28(7.1)	11(2.8)	124(31.5)
Overweight	77(19.5)	50(12.7)	13(3.3)	140(35.5)
Obesity	51(12.9)	50(12.7)	11(2.8)	112(28.4)
Severe obesity	8(2.0)	4(1.0)	1(0.3)	13(3.3)
Total	223 (56.6)	133 (33.8)	38 (9.6)	394 (100)
$\chi^2 = 19.83$, df = 8 and p value = 0.01				

Table 3: Blood pressure, Body Mass Index (BMI) and Socio-economic Status of Respondents

	BMI	blood pressure	Highest educational level	Occupation	Average monthly income
BMI	1.000				
r- blood pressure	0.145	1.000			
sig.	0.004*				
r- Highest educational level	0.103	-0.100	1.000		
sig	0.040*	0.047*			
r- Occupation	-0.137	-0.115	0.426	1.000	
sig	0.006*	0.022*	0.000*		
r- Average monthly income	0.272	0.084	0.206	-0.091	1.000
sig	0.000*	0.098	0.000*	0.071	

Note: *.Correlation is significant at the 0.05 level

Table 4: Descriptive Analysis of Health Promoting Lifestyle and Location of Respondents

Health-promoting lifestyle	Sub-urban Community (Aba Iya Gani)			Rural Community (Koola)			Rural Community (Wanikin)		
	Mean	± (std. error)	SD	Mean	± (std. error)	SD	Mean	± (std. error)	SD
Nutrition	3.18	0.02	0.38	3.08	0.08	0.29	3.14	0.03	0.35
Physical Activity	2.02*	0.05	0.81	2.08	0.23	0.79	2.38*	0.08	0.93
Health Responsibility	2.11	0.04	0.65	1.83	0.11	0.39	2.02	0.05	0.53
Stress Management	2.63	0.04	0.70	2.42	0.23	0.79	2.58	0.06	0.68
Interpersonal Relationship	2.78	0.04	0.56	3.08	0.19	0.67	2.65	0.07	0.75
Spiritual Value/Belief	3.27*	0.03	0.53	3.75*	0.13	0.45	3.14*	0.05	0.61

*. Significant at the 0.05 level

Table 5: Correlate of Blood pressure, Body Mass Index (BMI) and Health Promoting Lifestyle Practices of Respondents

			Blood pressure	BMI	HPLS
Spearman's rho	Blood Pressure	Correlation Coefficient	1.000		
		Sig. (2-tailed)	.		
	BMI	Correlation Coefficient	.143	1.000	
		Sig. (2-tailed)	0.004	.	
	HPLS	Correlation Coefficient	-.021	0.079	1.000
		Sig. (2-tailed)	0.671	0.118	.

Note: *.Correlation is significant at the 0.05 level

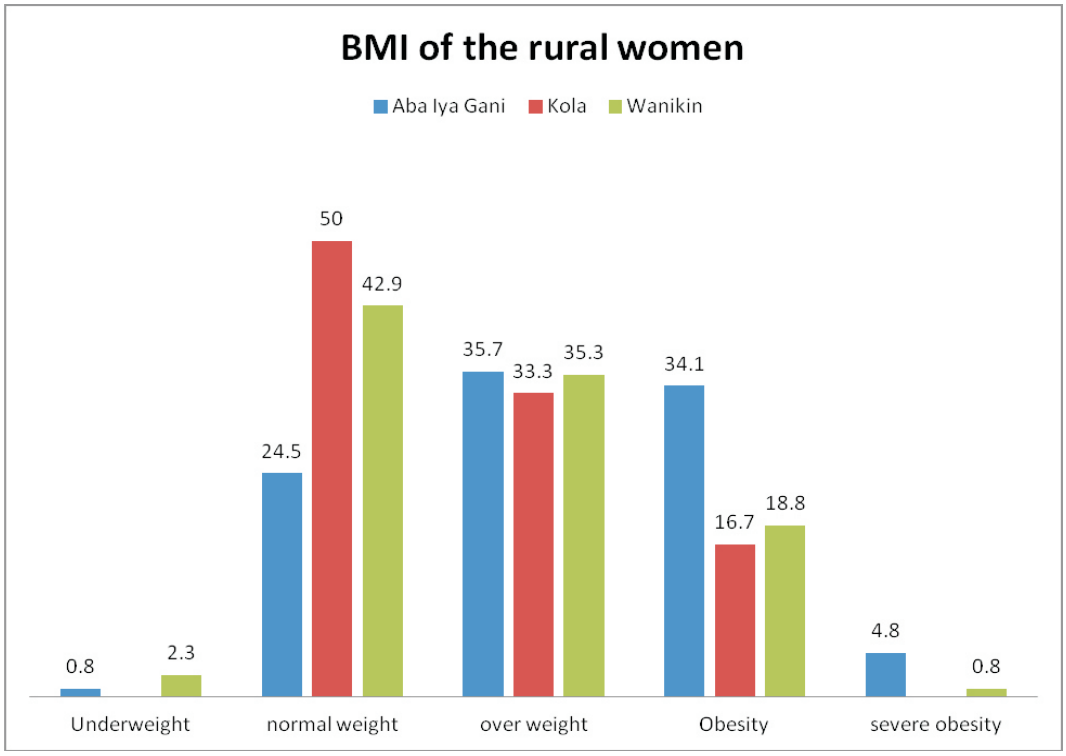

Figure 1: Body Mass Index of the Respondents

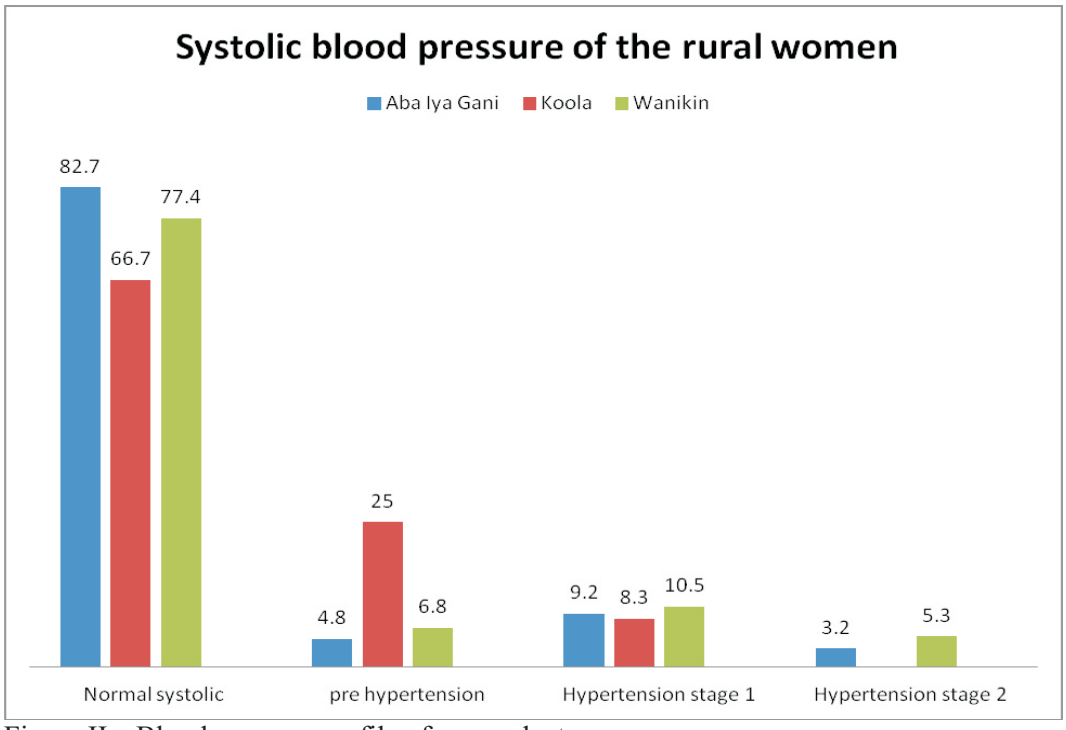

Figure II – Blood pressure profile of respondents

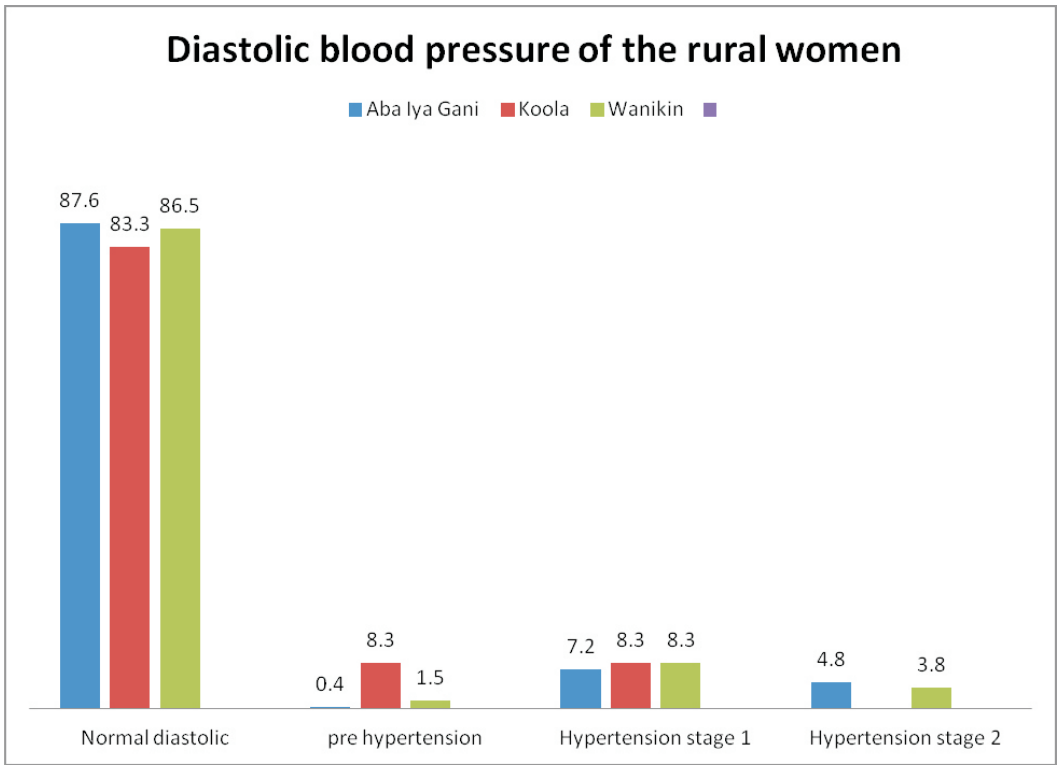

Figure 3: Diastolic blood pressure profile of respondents