



World NCD Federation

IJNCD

International Journal of Noncommunicable Diseases

An Official Publication of World NCD Federation

Volume 6 / Issue 3 / July-September 2021

www.ijncd.org

Political economy framework and the occurrence of noncommunicable diseases. “Framing dietary practices in Ghana as the receptacle”

Brenyah Joseph Kwasi¹, Tannor Elliot Koranteng², Brenyah Florence³, Edusei Anthony⁴

¹Department of Global and International Health, School of Public Health, ²Department of Medicine, ³Biochemistry and Biotechnology,

⁴Health Promotion, Education and Disability, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

ABSTRACT

Context: Noncommunicable diseases (NCDs) such as cardiovascular diseases, cancers, hypertension, kidney diseases, and diabetes account for sizeable proportion of global deaths. The proximate causes aside biological and genetics are behavioral risk factors include dietary practices. Unhealthy dietary practice leading to the occurrence of NCDs blamed for the drawback of social and economic development of lower- and middle-income countries.

Aims: This research focuses on establishing links among the political economy framework (education, occupation, income, residential place, and mass media), dietary practices, and the occurrence of NCDs in Ghana.

Settings and Design: It adopted a mixed method approach using the Ghana Demographic and Health Survey (2014), with a sample of 4122 and 32 qualitative interviews from four regions.

Subjects and Methods: In-depth, key informant interviews, focus groups discussions, and secondary data were used. The qualitative arm was analyzed using the thematic content analysis.

Statistical Analysis Used: Descriptive statistics and probit regression were used to ascertain the influences of the constituents of political economy using individual's dietary intakes.

Results: The present study found that, differences in income levels ($P < 0.05$), residential place of stay ($P < 0.05$), and access to mass media ($P < 0.05$) were statistically significant to dietary practices and had major implications for NCDs occurrence. The qualitative outcome revealed that, educational and occupational status of individuals may influence dietary practices. The regression revealed that females are exposed to unhealthy dietary practices by 6.2% points. Moreover, rural dwelling had moderate influence on unhealthy dietary practices (3.3% points) than urban dwelling. Again, professionals, sales, and service categories have 5.8%, 5.7%, and 7.6% points unhealthy practices, respectively.

Keywords: Dietary practices, framing, Ghana, noncommunicable diseases, political economy framework, receptacle


Introduction

Noncommunicable diseases (NCDs) such as cardiovascular diseases, cancers, hypertension, and diabetes account for sizeable proportion of global deaths yearly with about two-thirds occurring in developing countries.^[1,2] Aside genetic orientation, acquiring NCDs may be influenced

Address for correspondence: Dr. Joseph Kwasi Brenyah, Department of Global and International Health, School of Public Health, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.
E-mail: jkbrenyah@knust.edu.gh

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

Access this article online	
Website: www.ijncd.org	Quick Response Code 
DOI: 10.4103/ijncd.ijncd_30_21	

How to cite this article: Brenyah JK, Tannor EK, Florence B, Anthony E. Political economy framework and the occurrence of noncommunicable diseases. “Framing dietary practices in Ghana as the receptacle.” Int J Non-Commun Dis 2021;6:122-8.

Submitted: 24-May-2021 **Accepted:** 17-Sep-2021

Published: 22-Nov-2021

by the nature of the political economy framework, which have implications for individuals dietary practices.^[2,3] The political economy framework made up of income status, educational level, occupational status, residential place of stay, and access to media are important, particularly in developing countries. Chronic NCDs are no longer diseases of rich economies but also becoming widespread in poor countries. This article, therefore, seeks to portray how the political economy framework, and dietary practices as a “receptacle” predisposes individuals to NCDs in Ghana.

Empirical literature

Unhealthy dietary practices have been found to be one of the major risk factors of NCDs. For healthy living, fruits and vegetables are pencilled as one of the regular required nutrition. Habib and Soma^[4] have highlighted the daily required intake of fruits and vegetables to be 400 g. However, the elements of the political economy framework and other confounding factors may either promote food insecurity, unhealthy dietary practices or vice versa in many households.^[5,6] For instance, in Malawi, about 40% of the population lacked vegetable and fruits intake.^[7]

Again, the educational status of individuals has influence on dietary practices. For instance, research outcomes have revealed that, peoples fat intake is over 30% of total energy intake, carbohydrates is below the recommended 55%–75% and added sugar is mostly above the recommended 10%.^[4,8] Many people are not privy to this information due to ignorance. People therefore continues to consume more than the recommended 5%–6% of saturated fats in diets and exceed the recommended 5 g of salt intake per day which has implicatons for the prevalence of cardiovascular diseases.^[4,9,10]

Majority of the middle and high income earners have resorted to the intake of excessive meat, milk, ice cream, solid fats, butter, cakes, and saturated oil. All these are precursors of NCDs.^[4,11]

Again, geographical area of location has implications for dietary practice. Globally, more than half of population stay in the urban areas and there are projections that 70% of the population may be living in urban areas by 2050.^[12,13] This trend has implication on food access, quality of prepared foods, and dietary practices such as consumption of saturated fats, junk food, canned products, frozen foods, salt intake, late night eating among others.^[9,14]

In addition, healthy media projections form the basis of a healthy information environment that can help the

world deal with dietary diseases. The media projects food and beverages intake within the population. The active projections of imported and other locally manufactured food items by the media raise public awareness about the existence of those products.^[15,16] This becomes serious if those items concerned are injurious to health as people patronize with implications for cancers, diabetes, and kidney conditions.

Many countries have mounted dietary intake guidelines and policies to reduce the incidence of NCDs.^[7,14] In Ghana, for instance, the Ministry of Health (MOH) outlined Programmes of Work from 1997 to 2011, the National Health Policy, 2007, and the Regenerative Health and Nutrition Policy in 2008. The health sector also launched the NCDs Policy Documents in 2011.^[17]

However, measures put forth in these policies and programs to reduce the spread of NCDs are clinically biased despite the evidence that, the nature of the political economy framework of Ghana has consequential effects on dietary practices.^[18-20] Therefore, the verdict on the implementation of new health care programs for improving dietary practices and fighting the spread of NCDs is that, they are yet to demonstrate the desired results as NCDs prevalence continuous to increase and remain the major cause of hospital admissions and deaths yearly.^[17,21-24]

Subjects and Methods

The study adopted mixed methods to address the objective. The qualitative arm was primarily the first hand information obtained from the in-depth interviews while the quantitative arms employed the data of the 2014 Ghana Demographic and Health Survey which was basically secondary data.^[25]

Qualitative study

A total of 32 qualitative interviews were conducted to ascertain the pattern on how the elements of political economy framework influence dietary practices. This section also sought to identify the various themes emerging out of the study.

Quantitative study

The quantitative approach employed the Ghana Demographic and Health Survey (2014) to ascertain the associations among the elements of the political economy framework, dietary practices, and manifestation of NCDs. This survey is the sixth in a series of population and health

data collected in Ghana involving 9396 women and 4388 men from 11,835 interviewed households. The primary purpose of the GDHS was to generate reliable information on health indicators within the population every 5 years.

Sampling

The sample for the qualitative studies involved 15 in-depth interviews from patients living with at least one NCD condition, 11 key informant interviews involving 6 health care professionals, and 5 health-care policy-makers, and 6 focus groups discussions (FGDs) conducted in gender dynamics among community members who may not necessarily be NCD patients. The NCDs patients were selected by simple random sampling technique using the NCDs patients' hospital attendance list. The patients were therefore selected at the hospital and contact numbers taken. The actual interviews took place in their homes at their convenient time. The key informants such as doctors, nurses, pharmacists, NCDs focal persons, and health directors were purposely recruited using their knowledge and authority in NCDs issues. The FGD respondents were purposefully selected using age status, gender, socioeconomic status, residential status, occupational status, and among others.

Relating to the quantitative samples of 13,784 respondents involved in the GDHS, 2014, our study filtered the total sample data using age limit of 30 years and above, the political economy elements, dietary practices, and NCDs status to obtain 4,122 respondents.

Ethical considerations

The study was approved by the hospitals where qualitative respondents were selected. The study followed all the ethical principles from the selection of samples within the population, interview process, data management, and data analysis. All respondents consented to participate in the study voluntarily and were given consent forms to sign and date.

Data extraction

The qualitative interviews were done using interview guides. The voices of respondents were recorded, transcribed, and coded. The qualitative data were extracted based on themes guided by the study objectives. In extracting the quantitative data, the main questionnaire of the 2014 GDHS was consulted. Variables such as age of respondents, geographical location of stay, educational level, occupational status, income level, access to media, perspectives of government regulation on manufacturing, sales and importation of food products, and among others were noted and re-coded. The diseases status

of individuals such as having an NCD or not, the kind of NCD afflicting respondent, knowledge of the cause of the NCD in question were also noted and re-coded. Again, dietary-related issues such as contents of food frequently patronized, how such foods were acquired, how such foods are prepared, possible knowledge of the ingredients, eating times of respondents within the day, and among others were noted and re-coded. At the end of this exercise, the researchers had considerable information of socioeconomic status of respondents, the diseases status of respondents and the dietary practices of the respondents.

Analysis

First, thematic analysis was employed to ascertain the pattern on how the elements of political economy framework and dietary practices predispose individuals to NCDs in Ghana. The global themes were broken down into organizing themes using the objectives of the study. We also looked at the emerging themes relating to the coded transcription and related them to the organizing themes. Where appropriate, sample quotations from the voices of the respondents were quoted to support the basic theme. Second, the Chi-square test was applied on the 2014 GDHS data to examine the nature of the association between statistically significant variables in the political economy framework and dietary practices using $P < 0.05$. Third, probit regression was used to establish the marginal effects of a change in a variable of the political economy framework on dietary practices.

Results

Wealth Status and Dietary Practices

The GDHS (2014) data noted that, there is significant association between wealth quintiles and dietary practice ($P < 0.05$), as shown in Table 1.

Table 1: Wealth Quintiles and dietary practices

Wealth Index	Healthy Dietary Practice			Total
	No	Yes	N/A	
Absolute Poor	15 (12.2)	28 (8.6)	0 (0.0)	43 (9.5)
Poorer	19 (15.5)	31 (12.5)	1 (12.5)	51 (11.2)
Middle	28 (22.8)	77 (23.8)	2 (25.0)	107 (23.5)
Richer	30 (24.4)	90 (27.8)	2 (25.0)	122 (26.8)
Richest	31 (25.2)	98 (30.3)	3 (37.5)	132 (29.0)
Total	123 (100)	324 (100)	8 (100)	455 (100)
	Pearson Chi ² (8)=6.143			$P=0.000^{***}$
	likelihood-ratio Chi ² (8)=6.670			Pr=0.00
	Fisher's exact=0.614			

Source: GDHS, (2014). Significance Level: 1% (***)

The FGDs also revealed that, wealth quintiles have influence on dietary practice and the rich people are perceived to have poor dietary practices because, aside from the patronage of junk foods, they consumed protein and other minerals in excess which are injurious to health. Two respondents said these below:

“Rich people have higher chances of acquiring the NCDs. At first people called it “Diseases of the rich” because they have money to enjoy all the junk foods, cow meat or canned beef. They will not go to the market to buy smoked fish so within a short while they are weak. So, the rich acquire NCDs much more than the poor...”{Diabetic Patient_Male_Apatrapa_Kumasi_Ahanti Region

NCDs does not respect socio-economic status. All manner of persons can be inflicted with NCDs. These days poor people are increasingly becoming affected with NCDs. In some years to come, the ratio of NCDs occurrence between the rich and the poor may be equal. All we need to do is to take good care of our diets, stop the consumption of junk food, do exercise and we shall live NCDs free life.....’{Health Care Policy Maker_MOH_Accra

Educational status and dietary practices

The outcome of the GDHS data did not associate educational status to dietary practices. The implication is that, the educational level of a individual does not influence healthy or unhealthy dietary practice. However, the outcome of the qualitative perspective revealed that, even though educated people have knowledge of nutritional contents and have access to dietary guidelines, their dietary practices are poor. These are the views of some respondents:

“The educated ones living in the urban areas would work for long hours in their offices and when they come home they will feed on the junk food but an illiterate in the rural area comes back from the farm to eat cocoyam leaves sauce (‘Kontomire’). So, the illiterates are much stronger and healthier than the educated ones....”(Diabetic Patient_Female_Apatrapa_Kumasi)

“I do not need to explain. It is just westernization because we are eating all the junk foods and the educated individuals are mostly involved. Everything is fast, that is the fried rice and so on. So that is the main problem. The soft drinks and others are also part. At first our mothers and grandparents walked long distances before they get to their farmlands but right now within the shortest distance you will prefer to sit in a car. Few people prefer eating ‘kontomire’ (cocoyam leaves) but right now, to many people, everything is

“KFC”(restaurant) [Laughing].....(NCDs Specialist, Regional Hospital_Sunyani)

Place of Residence and Dietary Practices

Again, the result in the GDHS, (2014) indicated that, place of stay was not significant to dietary practices ($P = 0.035$). The implication is that, living in the rural or urban area does not influence people to adopt healthy or unhealthy dietary practices. However, almost all the respondents in the qualitative interviews agreed that, living in a rural area is less associated with NCDs due to good dietary intakes. They revealed that, urban dwellers aside the pressure of meeting official and unofficial work schedules, they are faced with poor eating habits and may have higher rates of NCDs acquisition. A stroke patient had this to say:

“Those living in the rural areas eat a lot of fresh leaves and vegetables “Kontomire”, “Nkwaansusua”. When they go to the farm they will get natural pepper (mesewa) “domo and sasear” (mushroom) which will served as the pepper and fish but those of us living in the urban areas will prefer frozen meat and chicken which is not good health. So, living in the urban area is not healthy...”{Stroke Patient_Female_Apatrapa_Ashanti Region }

Occupational status and dietary practices

The quantitative study revealed no statistically significant association between occupational status and dietary practices ($P > 0.05$). However, PLWNCDs and other non-NCDs afflicted persons interviewed stated that, their occupational status had influence on their dietary practices. Below is a feedback from FGDs:

“Our diet is the cause of all these NCDs. Doctors have explained several times that, we are not supposed to eat heavy food after 6 pm. But nowadays, we keep long at our workplaces, do all our errands and go home around 9 pm even to eat “fufu”(cassava mixed with plantain, yam or cocoyam and pounded). They have explained that if you eat “fufu” late in the night. it will be difficult for it to digest so the excess will turn into glucose that goes to build up the diabetes. So, our activities are impacting negatively on our eating habits {FGDs_Male_Kwatiri_Sunyani_Brong Ahafo Region}

Access to media and dietary practices

The GDHS, 2014 established that, access to media has statistically significant association to dietary practices ($P < 0.05$), as shown in Table 2.

Table 2: Access to Media and Dietary Practices

Access to Media	Healthy Dietary Practice			Total
	No	Yes	N/A	
Not at all	15 (12.2)	40 (12.4)	0 (0.0)	55 (12.1)
At least once a week	30 (24.4)	72 (22.2)	0 (0.0)	102 (22.4)
More than once a week	78 (63.4)	212 (65.4)	8 (100.0)	298 (65.5)
Total	123 (100.0)	324 (65.4)	8 (100.0)	455 (100.0)
	Pearson Chi ² (4)=4.5342			P=0.009***
	likelihood-ratioChi ² (4)=7.0855			Pr=0.031
	Fisher's exact=0.471			

Source: GDHS, (2014). Significance Level: 1% (***)

Table 3: Regression of Political Economy Variables and Dietary Practices

Political Economy Variables	dy/dx	Standard. Error.	t-Statistics
Demographics			
Gender	0.062	0.013	4.68***
Social Factors			
Places of Residence			
Rural	0.033	0.015	2.22**
Economic Factors			
Wealth Quintiles			
Poorer	0.010	0.017	0.60
Middle	-0.020	0.019	-1.07
Richer	-0.035	0.021	-1.61***
Richest	-0.024	0.024	-1.02
Occupational Status			
Professional	0.058	0.029	1.97**
Clerical	0.006	0.051	0.13
Sales	0.057	0.024	2.46**
Agricultural-SE	0.047	0.024	2.30***
Agricultural-E	0.026	0.076	1.15
Services	0.076	0.039	2.84**
Skilled	0.002	0.026	0.67

Source: GDHS, (2014). Significance Level: 1% (***)

The qualitative outcome revealed that, the media projection can either positively or negatively influence dietary practice. Some PLWNCDs confirmed the positive role the media plays in demystifying NCDs occurrence per the voice below:

“Media reporting on NCDs are good for us. At first when I prepare the soup, I do not take much but when I listened to the discussions on the television, I take a lot of soup now. I was laying in my couch while they were showing it on the television. But after applying it, I realized it has helped me. When I take more soup, I feel like I have gained extra energy. So, when I wake up early in the morning, I will be stretching myself.....”{Diabetic Patient_Female_Apatrapa_Kumasi_Ashanti Region }

Regression of political economy variables and dietary practices

The current study found that, the elements of political

economy framework had influenced the dietary practices of individuals by some percentage points. The study found gender (6.2% points), staying in rural area (3.3% points) and individuals within the richer quintiles (3.5% points), as shown in Table 3.

Discussion

The current study associated wealth quintiles to dietary practice ($P = 0.000$). Both the descriptive statistics and the regression seem to portray that, people in the rich category particularly those within the richer brackets are associated with unhealthy dietary practice. The qualitative respondents equally attributed unhealthy dietary practices to the rich people as they patronize junk food, frozen food, fastfoods especially canned products and many more. This finding may perhaps be due to the fact that, the members of the rich category can afford any food substance. FAO^[26] reports that, about 800 million (20%) of people in developing countries have NCDs that are linked to nutrition related conditions. The results of the current study are broadly consistent with the study outcomes revealing that socioeconomics status of people may influence the kinds of foods they patronize.^[2,27]

Again, educated people may be aware of the nutritional benefits of macro and micro nutrients. However, excessive use of some nutritional ingredients such as fats, salt, and salt-preserved foods may result in NCDs such as hypertension and cancers.^[4,9] In the absence of intensive public education, this information may not be available to the nonliterate person. Backholer *et al.*,^[28] and López-Olmedo *et al.*,^[29] have established that, there is statistically significant association between educational status and dietary practices. Even though the qualitative outcome of our study corroborates this assertion, the quantitative outcome had contrary results as $P > 0.05$.

Furthermore, the quantitative arm of the current study did not establish significant association between area of residence and dietary practices. However, the qualitative respondents gave the impression that, area of residence, with reference to urban living has negative influence on dietary practices. Argument on this borders on quality of available food, ingredients of food substances, unscheduled dietary patronage times and among others. This finding is consistent with the study outcome of Eckert,^[30] Angkurawaranon^[31] and Juma *et al.*,^[32] who reported of negative consequences of global urbanization on dietary behavior and with considerable implications for NCDs incidence.

Again, the GDHS data revealed that, occupational status was not significant to dietary practice but the qualitative outcome had contrary results. Healthy dietary practices encompass the acquisition of the right quantum of food and the right combination of food nutrients. The qualitative respondents argued that, occupational stress may act as an inhibiting factor in healthy dietary practices. This is especially so when ones occupational schedule encourages irregular and late eating. Therefore, occupational stress levels, work schedules and scope may influence dietary practices and predispose individuals to NCDs.^[33,34] For instance, occupational stress may promote low fruit and vegetable in-take below the 400 g needed per day.^[4,35] Our study noted that, most of the PLWWNCDs are not in any gainful occupation but they face unhealthy dietary practices due to their inability to purchase fruits and vegetables.

The study found that, the media plays crucial role in public education about NCDs, especially about dietary practices ($P < 0.05$). This is consistent with the study outcomes of L'Abbe, Stender, and Skeaff,^[15] and Foster, Hillsdon, and Jones,^[16] From the GDHS (2014), it was revealed that, about 65.4% of the respondents had access to media more than once a week. Most media houses have special programs tailored for the health needs of the population. If the media could sustain its positive dietary recommendations in the society, the incidence of NCDs may reduce.

Again, from the Table 3, females are exposed to unhealthy dietary practices by 6.2% points. Moreover, residential place of stay; rural has moderate influence on unhealthy dietary practices by 3.3% points. The implication is that, urban dwellers have higher percentage points in unhealthy dietary practices and hence NCDs occurrence are more likely to be high in urban areas. Furthermore, occupational category in relation to unhealthy dietary practices found that, people in the Professionals, Sales and Service categories have 5.8%, 5.7%, and 7.6% points, respectively. This may probably be due to professionals working times schedules, busy customer drive and the act of commercial and service workers paying much attention to clients and these activities distorts their eating pattern and content of food they take.

Conclusion

Dietary practice is “receptacle” to educational status, geographical location (rural or urban dwelling), occupational status, wealth quintiles and access to media (Political Economy Framework). Living a flourishing life in urban areas means changes in dietary practices. Sedentary lifestyles such as patronizing junk food, excessive intake of fatty

foods, red meat, soft drinks, confectionaries and among others are characteristic of people living in urban areas. The study found that, even though NCDs occurrence cut across the elements of the political economy framework, the incidence fall on the rich more than the poor as the rich have bad dietary practices which act as “receptacle” and may be leading to higher levels of cholesterol, kidney diseases, hypertension, obesity, and among others. Rural folks are not affected so much by NCDs as compared to their urban dwellers partly due to the nature of their dietary intakes holding all other confounders constant.

Recommendations

The need for promotion of daily dietary requirement for healthy living is due. Health stakeholders should form multidisciplinary teams to promote healthy living in different local languages. This can be possible if multidisciplinary teams undertake collective efforts to educate the people and regulate the manufacturing of junk foods. Again, Dietherapy and Occupational Health Services should be made available in most organizations to regulate stress- and work-related unhealthy dietary practices. In all these, the role of the media should be keen in mounting programmes aimed at demystifying the effects of each of the political economy variables on diet, reducing advertisement on unwholesome foods, and bringing devastating outcoms to the public domain.

Acknowledgments

The authors' thank the opinion leaders of communities, the Heath Professionals of the various hospitals, the Policy Makers, the In-depth Respondents and the FGD members involved in this study in the four regions in Ghana for their time and contributions.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Miranda JJ, Kinra S, Casas J, Davey G, Ebrahim S. Non-communicable diseases in low and middle-income countries: Context, determinants and health policy. *Trop Med Int Health Policy* 2008;12:1225-34.
2. Hosseinpoor RA, Bergen N, Kunst A, Harper S, Guthold R, Rekve D, et al. Socioeconomic inequalities in risk factors for non-communicable diseases in low-income and middle-income countries: Results from the world health survey. *BMC Public Health* 2012;12:1-13.
3. WHO. Global Action Plan and the Prevention and Control of Non-Communicable Diseases 2013-2020. Geneva: WHO.
4. Habib SH, Soma S. Burden of non-communicable disease: Global overview. *Diabetes Metab Syndr Clin Res Rev* 2010;4:41-7.

5. Rutten M, Verma M. The Impacts of Reducing Food Loss in Ghana; A Scenario Study Using the Global Economic Simulation Model MAGNET. Vol. 42. Wageningen: LEI Wageningen UR (University and Research Centre) LEI Report 2014-035; 2014. p. 17.
6. Schutter DO. The political economy of food systems reforms. *Eur Rev Agric Econ* 2017;44:705-31.
7. WHO. Global Strategy on Diet, Physical Activity and Health. Geneva: WHO; 2013.
8. Popkin BM, Du S. Dynamics of the nutrition transition toward the animal foods sector in China and its implications: Worried perspective. *J Nutr* 2013;133:1-3.
9. Fang Z, Puhong Z, Lu Z, Wenyi N, Jianmei G, Lixin L, *et al.* Consumption and sources of dietary salt in family members in Beijing. *Nutrients* 2015;7:2719-30.
10. Wang Y, Guglielmo D, Welsh AJ. Consumption of sugars, saturated fat, and sodium among US children from infancy through preschool age, NHANES 2009-2014. *Am J Clin Nutr* 2018;108:868-77.
11. Hyseni L, Atkinson M, Bromley H, Orton L, Lloyd-Williams F, McGill R, *et al.* The effects of policy actions to improve population dietary patterns and prevent diet-related non-communicable diseases: Scoping review. *Eur J Clin Nutr* 2017;71:694-711.
12. UNDP. Addressing the Social Determinants of Non-Communicable Diseases. Discussion Paper; 2013. p. 1-96.
13. United Nations. Revision of World Urbanization Prospects. New York: United Nation Department of Economic and Social Affairs; 2018.
14. WHO. Global Status Report on Non-Communicable Diseases. Geneva: WHO; 2010.
15. L'Abbe MR, Stender S, Skeaff CM. Approaches to removing trans fats from the food supply in industrialised and developing countries. *Eur J Clin Nutr* 2009;63:50-67.
16. Foster C, Hillsdon M, Jones A, Grundy C, Wilkinson P, White M, *et al.* Objective measures of the environment and physical activity – Results of the environmental and physical activity study in English adults. *J Phys Act Health* 2009;6:70-80.
17. Bosu WK. A comprehensive review of the policy and programmatic response to chronic non-communicable diseases in Ghana. *Ghana Med J* 2012;46:69-78.
18. Narain JP. Integrating services for non-communicable diseases prevention and control using primary health care approach. *Indian J Community Med* 2011;36:S67-71.
19. Jacobs B, Hill P, Bidgeli M, Men C. Managing non-communicable disease at health district level in Cambodia: A systems analysis and suggestions for improvement. *BMC Health Serv Res* 2016;16:1-6.
20. Tenkorang EY, Kuuire VZ. Non-communicable diseases in Ghana: Does the theory of social gradient in health hold? *Health Educ Behav* 2016;43:25S-36.
21. Agyei-Mensah S, de-Graft AA. Epidemiological transitions and the double burden of diseases in Accra, Ghana. *J Urban Health* 2010;87:879-97.
22. Komfo Anokye Teaching Hospital. Annual Performance Reviews Data. Kumasi: KATH Planning, Monitoring and Evaluation Unit; 2011-2015.
23. Korle Bu Teaching Hospital. Annual Performance Reviews Database. Accra: KBTH Planning, Monitoring and Evaluation Unit; 2011-2015.
24. Ghana Health Service. Annual Performance Reviews Database. Accra: Planning Unit; 2011-2015.
25. Ghana Demographic and Health Survey, 2014. p. 1-530
26. FAO. The State of Food Security and Nutrition in the World. FAO; 2019. p. 239
27. Pechey R, Monsivais P. Socioeconomic inequalities in the healthiness of food choices: Exploring the contributions of food expenditures. *Prev Med* 2016;88:203-9.
28. Backholer K, Spencer E, Gearon E, Magliano DJ, McNaughton SA, Shaw JE, *et al.* The association between socio-economic position and diet quality in Australian adults. *Public Health Nutr* 2016;19:477-85.
29. López-Olmedo N, Popkin BM, Taillie LS. Association between socioeconomic status and diet quality in Mexican men and women: A cross-sectional study. *PLoS One* 2019;14:e0224385.
30. Eckert S, Kohler S. Urbanization and health in developing countries: A systematic review. *World Health Popul* 2014;15:7-20.
31. Angkurawaranon C, Wisetborisut A, Rerkasem K, Seubsman SA, Sleigh A, Doyle P, *et al.* Early life urban exposure as a risk factor for developing obesity and impaired fasting glucose in later adulthood: Results from two cohorts in Thailand. *BMC Public Health* 2015;15:902.
32. Juma K, Juma PA, Shumba C, Otieno P, Asiki G. Non-communicable diseases and urbanization in African cities: A narrative review; 2019. DOI: 10.5772/intechopen.89507.
33. Hall J, Moore S, Harper SB, Lynch JW. Global variability in fruits and vegetable consumption. *Am J Prev Med* 2009;36:402-9.
34. Rie T, Mayumi T, Keiko A, Ayako S, Eiji S, Koichi K, *et al.* Variation in men's dietary intake between occupations, based on data from the Japan environment and children's study. *Am J Mens Health* 2016;12:1621-34.
35. Se-Young J, Yoo KP. Low fruit and vegetable intake is associated with depression among Korean adults in data from the 2014 Korea national health and nutrition examination survey. *BMC Nat J Health Popul Nutr* 2019;38:39.