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Diabetes peer-education on food choices part II: Adoptability of menu plans in low-mid income communities

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Abstract

Background: It is agreed that diabetes mellitus can be successfully managed, and complication prevented by making life styles changes such as improving diet. Studies have focused on absolute number servings of fruits and vegetables being less than required.

Objective: The study purposed to critically review a food menu plan being used in a company's staff clinic with a view to identify what, when and how much to eat certain types.

Methods: A critical narrative review of an existing plan was performed. A purposive research design was used to select volunteer clients living with diabetes (N=38); and survey of their eating patterns were carried out. Using the company's menu plan as reference point, relative frequencies of consumed foods including food items not recommended in the menu plan were determined.

Results: Review of the food menu plan shows that most of what should be eaten are accessible and/or affordable in the local communities, but some indigenous alternatives need to be incorporated. An average of 38% of what the respondents eat differ from the menu plan in when-to-eat. The relative frequency evaluation of how-much-to-eat show significantly higher consumption of carbohydrate by approximately 2%, whereas fruits and vegetables are eaten less than required by more the 14% ($p<0.01$).

Conclusion: The available food menu plan is adoptable for education on food choices to improve on dietary aspect of diabetes self-management. Necessary adjustment regarding what, when and how much to eat using the menu plan as a standard is discussed.

Introduction

Diabetes can be successfully managed, and complications prevented, especially when detected early and by making lifestyle changes, such as improving diet. The primary goals in the treatment of diabetes are for patients to maintain proper metabolic control and to reduce the risks of health complications [1]. However, to achieve an optimum metabolic control, patients are to exhibit diabetes self-management (DSM) behaviours such as eating healthy diet, and this requires family and social support [2,3]. Hence, there has been a shift among healthcare professionals in the management of diabetes to establishment of programmes that educate patients about DSM as a means to acquire the necessary skills of taking responsibility in the day-to-day DSM of their condition [4,5]. There is also added emphasis on family and social support that now involves the concept of peer-education [6-8].

However, implementing peer-education for DSM in low-mid income communities such as Delta State of Nigeria will be challenging, because there are no existing diabetes associations in communities or public hospitals. There is also no data regarding what, when and how food items should be eaten. Several studies have reported on deficient consumption of fruits and vegetables in terms of number of servings. It is yet to be elucidated for different communities with distinct indigenous foods:

- Whether any existing suggestion of food menu plan is adoptable.
- If *what to eat* in the menu plan are commonly accessible locally, and vice versa.
- If *when to eat* certain food items are comparable with local eating habits.
- The relative frequencies of food types in menu, especially *how much* of carbohydrate foods as well as fruits and vegetables make up the whole menus.

In a previous study, which assessed the pattern of lifestyle-related habits that predispose to cardiovascular disease risk in Delta State, it was identified that approximately 53% of the participants consumed less than 5-servings of fruits and/or vegetables each day [9]. The broad aim of this piece of investigation is to critically review adoptability of

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an existing diabetes food menu plan operated by the Staff clinic of a corporate company in Delta State, Nigeria. First of the two specific objectives is to assess whether the menu includes all necessary food items commonly consumed in the community. The second objective is to evaluate how the absolute and relative frequency of food consumed by the people compares with the recommendation in the menu plan.

Methods

This study was designed to be critical review of a diabetes menu plan. Purposive sampling was done to recruit volunteers living with diabetes (N=38) in hospital setting. The volunteers were surveyed for their breakfast, lunch and dinner eating patterns using a questionnaire modified from the WHO STEP wise instrument [10]. Modification of the questionnaire instrument on this occasion was mainly substitution of local food choices. Frequencies of food items in the reviewed menu plan were determined; and among volunteers' indication of consumption collected. Statistical analysis was limited to absolute and relative frequencies.

In this study, absolute frequencies were defined as percentage fraction of 38 choices constituted by the choice of every participant surveyed, or 14 choices of the week comprising two recommendations/day in the menu plan. Also, relative frequencies were defined as the proportion out of total 100% of choices for either survey or referenced menu plan.

Results

Critical review of the food menu plan shows that no butter/margarine, 'fried food', or red meat is on the menu list. Tea is recommended with skimmed milk and 'no sugar' for every breakfast. No tea indicated for lunch or dinner; but vegetables and fruits with every lunch and dinner, respectively. Cassava flour (garri or eba) is not mentioned, but amala in the menu is subsumed to be cassava-based. Most of the food items on the menu plan are accessible and/or indigenous, but some are

- Foreign i.e. not locally produced e.g. carrot, cabbage, and Irish potato
- Seasonal e.g. water yam
- Not staple e.g. chicken and pasta/spaghetti

The 'N=38' volunteer participants included 58% males as well as comprised various educational attainment and varied occupations (Table 1). Some food choices by respondents are unfounded in the menu plan. For instance, 66% frequency of wheat fufu among respondents but the food item is never recommended for breakfast any day of the week (Table 2).

Table 1. Descriptive statistics of respondents

Factor	Category	N	Frequency
Gender	Males	22	58%
	Females	16	42%
Highest educational level	Primary	10	26%
	Secondary	14	37%
	Diploma/First degree	12	32%
	Postgraduate	2	5%
Occupation	Civil Servants*	6	16%
	Business owners	12	32%
	Artisans	13	34%
	Others**	7	18%

*Including healthcare workers; **Including farmers

Table 2. Foods commonly consumed in the community, but not in corporate menu plan

Time	Food item	Absolute frequency
Breakfast	Wheat fufu	66%
	Pasta/spaghetti	37%
	Rice	34%
	Poultry	34%
	Butter/margarine	32%
	Cassava based food	24%
	Yoghurt	18%
Lunch	Tea	74%
	Potato	58%
	Meat (non-poultry)	47%
	Plantain	45%
	Maize- based food	40%
	Oats/cereals	34%
	Yoghurt	34%
	Eggs	26%
	Bread/bakery	24%
	Milk/dairy products	24%
	Butter/margarine	18%
Dinner	Tea	66%
	Meat (non-poultry)	66%
	Wheat fufu	61%
	Oats/cereals	42%
	Eggs	40%
	Bread/bakery	37%
	Butter/margarine	21%
	Milk/dairy products	18%
	Yoghurt	18%

On dichotomous categorization of foods being consumed that are in-plan or not-in-plan of the food menu; 38% of the foods items by the participants are not in the referenced food menu plan (Figure 1). Comparison of the relative frequencies of foods consumed that are in-plan versus not-in-plan of the reference menu plan indicates statistical significance ($p<0.01$).

Discussion

It is speculated that behavioural changes towards western diet is a factor to consider, but addressing this issue is confounded by poverty status [11,12]. The data presented here provides evidence that up to a third of the persons living with diabetes attest to consuming fatty foods not recommended in an existing albeit corporate menu plan. For instance, 32% consume butter/margarine during breakfast, 34% take yoghurt at lunch and 37% eat high glycaemic index food for dinner (Table 2). Further, the data on Table 2 show that the common staple foods being cassava-based products is giving way to wheat meals and pasta. Interestingly, while wheat fufu is not recommended in the breakfast or dinner of referenced menu plan, over 61% of the respondents are consuming it at these times. This suffices the need for concerted articulation of education of DSM food choices.

Evaluation of the foods being commonly consumed show that relative frequency of food items in-plan is more than those not-in-plan ($p<0.01$); with 62% constituting foods in-plan. This implies that most of the food items in the corporate food menu plan are accessible and affordable in the community (Figure 1). However, 38% of the foods items consumed by the participants being not in the referenced food menu plan highlight the food habit of the people that is out of sync with the corporate plan. This is the essence of the review for adoptability; and two points of discussion are imperative. First is the concept of

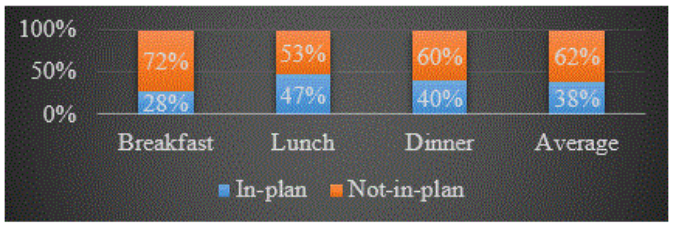

Figure 1. Relative frequencies of food items in-plan vs. not-in-plan ($p<0.01$)

affordances (accessibility and affordability) for the staple foods not being in the corporate menu plan. The second is medical nutrition therapy concept (reasons for or against) in terms of what and when to eat.

Affordances: In consideration of accessibility; some of the food items in the corporate menu plan are either foreign or seasonal. For instance, cassava, maize and yam are the local carbohydrate food crops. Cassava products are available every time of the year. On the other hand, Irish potato is foreign and water yam is seasonal. While these two items are never be found in several local markets or villages, there are accessible alternatives indigenous to the people such as cassava-based fufu and tapioca; maize-based foods (e.g. maize flour fufu, '*tuwo masara*' for lunch, and steamed corn pudding); and other varieties of yam as alternative to water-yam. The significance of this discourse lies in the fact that adoptable healthy food menu plan strongly dependent on accessibility [12]. In consideration of affordability; virtually all of the food items in the corporate menu plan are eaten by some of the respondents albeit at different meal times. For instance, food items eaten at breakfast that appear not-in-plan are in-plans of lunch or dinner. However, some of the items in-plan such as Irish potato is replaced with local alternative due to reason of accessibility. It has been reported that not all foods available at low cost are necessarily culturally acceptable even by the low-income consumers [13,14]. Therefore, affordability as a problem is arguably confounded in this evaluation. Hence, affordability can be less of a concern that accessibility in food menu planning.

Medical nutrition therapy: Most of what is consumed but not-in-plan for breakfast, lunch or dinner is a matter of when (not necessarily what) to eat. For instance, chicken is not-in-plan for breakfast, but lunch and dinner; consumed by 34%, 26% and 42%, respectively, of the participant. Non-poultry meat is in-plan for breakfast, but not lunch and dinner; consumed by 55%, 47% and 66%, respectively. Further, butter/margarine and yoghurt are never recommended in the corporate menu plans but consumed by a minimum of 18% of the respondents at all meal times (Table 2). This is a matter of what to eat and it is pertinent to point out that reviewed food menu plan is agreement with South African food-based dietary guidelines [15], and other dietary guidelines to manage chronic diseases [16]. Therefore, while affordability may be less of a concern, reasons for what and when to eat needs to be espoused for educational purposes, if any food menu plan is to be adopted as standard. In particular, a very good explanation is required to substantiate the exclusion of locally produced garri (cassava flour) and inclusion of imported wheat fufu in the food menu plan for people living in Delta State of Nigeria. This is given the comparable nutritional compositions [14], plus the fact that garri has a reasonably lower glycaemic index than wheat and potatoes [14,17-19]. Also, in addition to locally produced sweet potato being an alternative to imported Irish potato, garri has been indicated to increase HDL-cholesterol and decrease the LDL-cholesterol [20].

On the evaluation of frequencies of food items consumed by respondents compared to occurrence in the referenced menu plan (Figure 2); results show that consumption of carbohydrate foods is always way higher than the frequency in plan, while fruits and vegetables are less. When viewed in absolute frequencies, carbohydrate consumption by respondents is significantly higher at all three meal times than contained in the menu plan. On the basis of relative frequencies i.e. proportions of food item in menu; fruits and vegetables show apparent gradient reduction (from 33% at dinner to 21% at breakfast) in proportions for menu plan, but much less minimal (from 9% at dinner to 7% at breakfast) for survey. Higher carbohydrate consumption achieved statistical significance only at dinner time. This is quantified level of malnutrition being elucidated a little further – that necessary education on 'what, when and how much to eat' must go beyond absolute frequency (i.e. servings) of food items consumed among study/survey participants; and assess client or community needs to articulate

- What food item is being eaten too little or too much
- When the food item of interest is eaten too little/much.
- How much of the food needs to be reduced or increased?

For instance, results show that using reviewed food menu plan as a standard recommendation, 45% of surveyed volunteers eat carbohydrate foods for dinner (Figure 2), but on average the carbohydrate component of participants' dinner menu constitutes only 5% and higher than the standard by 2% (Figure 2). Also, fruits and/or vegetables at breakfast is supposed to be 100% as per standard and consumed by only 82% of participants; but on average the fruits and vegetables component of participants' breakfast menu constitute 9% instead of 33% in standard. That is, it can be suggested for this community that proportion of carbohydrate in dinner menu can be reduced by 2%; while fruits and vegetables in breakfast menu is increased by 24%. These observations

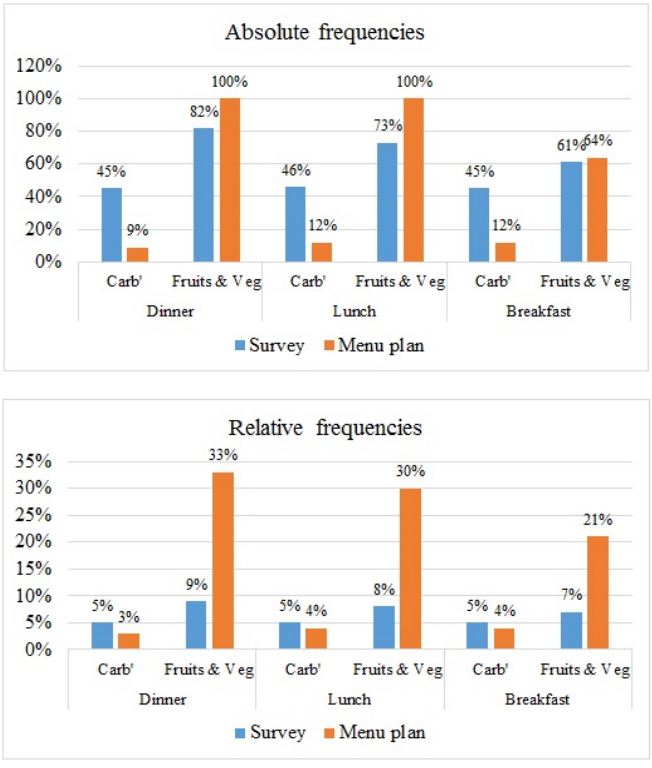

Figure 2. Frequencies carb & fruit-vegetable consumption vs. menu plan advice

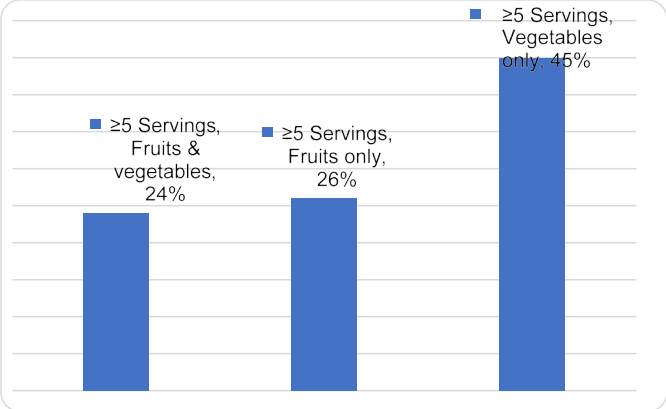

Figure 3. Proportion of daily consumers eating ≥5 servings per day

of differences in nutritional content of popular dietary pattern in Delta State of Nigeria is quite similar to the inadequacy and inconsistency observed in the comparison of Omni Heart menu plans with popular diets [16].

Further evaluation show that only 24% of the respondent affirmed to consistently consume fruits and/or vegetables on everyday basis. Among this subgroup of daily consumers, 26% and 45% consumes up to 5-servings or more of fruits and vegetables, respectively (Figure 3). This provides evidence base that76% of the people have yet to develop a habit of having vegetable at breakfast and/or fruits with their dinner menu recommend. In addition, it provides evidence that more than half of those who often eat fruits and vegetables take less than their daily requirement. This emphasizes the need for education on food choices in the community.

Conclusion

This study has reviewed a food menu plan operated by a company's staff clinic as a presumptive standard and assessed whether the plan includes all necessary food items commonly consumed in the community. The results show that most foods consumed by the surveyed participants are contained in the plan, though there are local substitutes to incorporate. 38% of what is eaten could be questioned in terms of *what and/or when to eat*. In terms of *how much to eat*, the relative frequencies of carbohydrate proportion of foods consumed at breakfast, lunch and dinner are significantly higher than in the menu plans by up to 2%; whereas fruits and vegetables are always lower at least 14%. This report provides a quantified indication of *how much* carbohydrate and fruits/vegetables foods need to be reduced and increased, respectively.

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References

1. Simo R, Hernandez C (2002) Treatment of diabetes mellitus: General goals, and clinical practice management. *Rev Esp Cardiol* 55: 845-860. [Crossref]
2. Miller TA, Dimatteo MR (2013) Importance of family/social support and impact on adherence to diabetic therapy. *Diabetes Metab Syndr Obes* 6: 421-426. [Crossref]
3. Rintala TM, Jaatinen P, Paavilainen E, Astedt-Kurki P (2013) Interrelation between adult persons with diabetes and their family: A systematic review of the literature. *J Fam Nurs* 19: 3-28. [Crossref]
4. Rutten G (2005) Diabetes patient education: Time for a new era. *Diabet Med* 22: 671-673. [Crossref]
5. Khunti K, Gray LJ, Skinner T, Carey ME, Realf K, et al. (2012) Effectiveness of a diabetes education and self-management programme (DESMOND) for people with newly diagnosed type 2 diabetes mellitus: Three-year follow-up of a cluster randomised controlled trial in primary care. *BMJ* 344: e2333.
6. Debussche X, Besançon S, Balcou-Debussche M, Ferdynus C, Delisle H, et al. (2018) Structured peer-led diabetes self-management and support in a low-income country: The ST2EP randomised controlled trial in Mali. *PLoS One* 13: e0191262. [Crossref]
7. Gatlin TK, Serafica R, Johnson M (2017) Systematic review of peer education intervention programmes among individuals with type 2 diabetes. *J Clin Nurs* 26: 4212-4222. [Crossref]
8. Odgers-Jewell K, Ball LE, Kelly JT, Isenring EA, Reidlinger DP, et al. (2017) Effectiveness of group-based self-management education for individuals with Type 2 diabetes: A systematic review with meta-analyses and meta-regression. *Diabet Med* 34: 1027-1039. [Crossref]
9. Oguoma VM, Nwose EU, Skinner TC, Richards RS, Bwititi PT (2018) Diet and lifestyle habits: Association with cardiovascular disease indices in a Nigerian sub-population. Diabetes Metab Syndr 12: 653-659. [Crossref]
10. World Health Organization (2017) The WHO STEPwise instrument for noncommunicable disease risk factor surveillance. STEPS Manual, v30: World Health Organization, 2017. Accessed 30th March, 2018. Available at: http://www.who.int/chp/steps/manual/en/.
11. Solomons NW (2003) Diet and long-term health: An African diaspora perspective. *Asia Pac J Clin Nutr* 12: 313-330. [Crossref]
12. Delisle H (2010) Findings on dietary patterns in different groups of African origin undergoing nutrition transition. *Appl Physiol Nutr Metab* 35: 224-228. [Crossref]
13. Darmon N, Drewnowski A (2015) Contribution of food prices and diet cost to socioeconomic disparities in diet quality and health: A systematic review and analysis. *Nutr Rev* 73: 643-660. [Crossref]
14. Fasanmade AA, Anyakudo MMC (2007) Glycemic indices of selected Nigerian flour meal products in male type 2 diabetes subjects. *Diabetologia Croatica* 36: 33-38.
15. International Diabetes Federation (2017) IDF clinical practice recommendations for managing type 2 diabetes in primary care. Accessed 30th October 2018. Available at https://www.idf.org/e-library/guidelines/128-idf-clinical-practice-recommendations-for-managing-type-2-diabetes-in-primary-care.html.
16. de Souza RJ, Swain JF, Appel LJ, Sacks FM (2008) Alternatives for macronutrient intake and chronic disease: A comparison of the OmniHeart diets with popular diets and with dietary recommendations. *Am J Clin Nutr* 88: 1-11.
17. Olamijulo S (2012) Furore over cassava flour, diabetes link. Google Groups. Accessed 29th Sep 2016. Available at https://groups.google.com/forum/#!topic/yorubaaffairs/CovRZB7KIV8.
18. Beidler J (2015) Is cassava a diet alternative for diabetics? Accessed 14th February, 2017. Available at http://www.livestrong.com/article/314844-cassava-as-diet-alternative-for-diabetics/.
19. Swai AB, Mclarty DG, Mtinangi BL, Tatala S, Kitange HM, et al. (1992) Diabetes is not caused by cassava toxicity. A study in a Tanzanian community. *Diabetes Care* 15: 1378-1385. [Crossref]
20. Trinidad TP, Sagum RS, Mallillin AC, Borlagdan MS, de Leon MP, et al. (2013) Sweet potato and cassava can modify cholesterol profile in humans with moderately raised serum cholesterol levels. *Food and Nutrition Sciences* 4: 491-495.