Published in final edited form as:

AIDS Care. 2018 May ; 30(5): 586–590. doi:10.1080/09540121.2017.1420137.

Implementation of the nutrition assessment, counseling and support program is not associated with body mass index among people living with HIV in Accra, Ghana

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Abstract

In spite of the important role nutrition plays in the management of HIV, access to nutrition services is inadequate, especially in resource limited settings. In addition, nutrition programs for people living with HIV (PLWH) have not been sufficiently evaluated for efficacy and this study was conducted to address this gap. This study aimed to evaluate the implementation of the nutrition assessment, counseling and support (NACS) program in Accra, Ghana, and to assess whether the level of implementation of NACS was associated with the body mass index (BMI) of PLWH. A cross-sectional study was conducted in six HIV clinics (3 NACS designated and 3 non-NACS). Study participants were 152 adult PLWH at least 6 months on antiretroviral therapy and not pregnant or breastfeeding. Using a NACS implementation scale developed for this study ranging from 0–8 (a higher score indicating better NACS implementation), median NACS implementation score was not different between NACS-designated, and non-NACS HIV clinics (5 vs 4, $p=0.14$). Almost half (47%) of the respondents were overweight or obese. A higher score on the NACS implementation scale was not significantly associated with overweight or obesity (BMI >24.9 kg/m²) after adjusting for other covariates. It was concluded that, there was poor implementation of NACS in the NACS designated HIV clinics surveyed with no nutrition counseling offered nor food support available to those who might need it.

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Accra: 5.6037° N, 0.1870° W

Disclosure statement

All authors declare no conflict of interest.

Introduction

Nutrition plays an important role in the management of HIV but hasn't been a routine and widely accessible part of HIV management in Ghana (Sicotte et al., 2014; Tiyou et al., 2012) which has an adult HIV prevalence of 1.6% (UNAIDS, 2016). To address nutrition-related issues in HIV management, the United States Agency for International Development (USAID) through the Food and Nutrition Technical Assistance (FANTA) project developed the nutrition assessment, counseling and support (NACS) concept to provide nutrition services to people living with HIV (PLWH) (FANTA, 2012).

NACS is made up of three components the first of which is to provide nutritional assessment (anthropometric and dietary assessments) to PLWH (FANTA, 2012). Nutritional counseling then utilizes the information obtained from the nutrition assessment to develop a feasible plan to improve nutritional status of the patient (FANTA, 2012). The third component in NACS is to provide therapeutic foods to those found to be either moderately or severely undernourished (FANTA, 2012). NACS has been implemented by a dozen countries mostly in Africa (Tang et al., 2015). In Ghana, NACS was introduced in 2009 and is offered in 83 health facilities that provide antiretroviral therapy (ART) services (FANTA, 2014) with the Ministry of Health planning to expand its reach.

Since the introduction of NACS in the country, evaluation of its implementation and impact on nutrition outcomes such as body mass index (BMI) has not been carried out. This study was conducted to evaluate the implementation of NACS and its association with BMI of program recipients.

Methods

Study design and data collection

For this pilot study, a cross-sectional design was utilized in six HIV clinics (3 NACS-designated and 3 non-NACS). A clinic was designated as a NACS HIV clinic by the NACS program office in the Ghana Health Service (GHS) if staff from that clinic had received training on implementing NACS. To protect the identities of the staff of participating HIV clinics, the names of their clinics have been de-identified. The six clinics were chosen because their patients came from the same catchment areas and had similar socioeconomic backgrounds.

Eligible participants had to be HIV positive, between 18 and 65 years, and at least 6 months on ART. Data collection took place between October and December 2015. Ethical approval was obtained from Tufts Health Sciences IRB and the Ghana Health Service Ethical Review Committee. Written informed consent was obtained from subjects and HIV clinic staff.

A laptop-based questionnaire was interviewer administered and all study activities took place privately within the HIV clinics to maintain confidentiality. A digital scale and stadiometer were used to measure the weight and height to the nearest 0.1kg and 0.01m respectively.

NACS Implementation

To assess NACS implementation, a checklist (developed from the training manual used to train health workers in Ghana on NACS implementation) was used to collect information on the availability of nutrition assessment equipment and food support (MOH, 2013). Five randomly selected counseling sessions in each clinic were directly observed to ascertain whether nutrition counseling was offered. The number five was arrived at during meetings held with clinic staff before data collection and based on factors such as willingness to have their private sessions observed.

Eight indicators based on the NACS training manual were developed by the research team to score NACS implementation at the HIV clinic level:

1. Presence of a functioning weighing scale
2. Presence of a height board/stadiometer
3. Presence of at least one adult mid upper arm circumference (MUAC) tape
4. Availability of food support (Plumpy nut/corn soya blend)
5. How many of 5 patients observed had their weight measured
6. How many of 5 patients observed had their weight correctly measured.
7. How many of 5 patients observed had ever had their height measured
8. How many of 5 patients observed were offered nutrition counseling

For indicators 1–4, a score of 1 was assigned if the condition is met and 0 otherwise. For indicators 5–8, a score of 0.2 was assigned for each patient observed where the indicator was met giving a maximum score of 1 each for those indicators. A total score was calculated by summarizing scores from all eight indicators and had a range from 0 to 8, with a higher score indicating better implementation. The two indicators that were expected to distinguish NACS from non-NACS HIV clinics were the offer of nutrition counseling and the availability of food support.

Statistical analysis

Demographic characteristics of participants were summarized using means $\pm$ SD's and percentages for continuous and categorical variables respectively. Two logistic regression models were used to measure the association between NACS and odds of being overweight/obese. The first used the NACS implementation score as the main independent variable whilst the second used NACS status of the clinic. The outcome was a binary BMI variable categorized as: normal BMI=18.5–24.9 kg/m² and overweight/obese BMI>25 kg/m². Both models adjusted for HIV clinic (to account for clustering of participants). We tested for interactions between the NACS variables and other covariates separately and since none of the interaction terms were significant, they were removed from the final models. The discrimination ability and fit of both models were assessed using the C-statistic and Hosmer and Lemeshow's goodness of fit tests respectively. SAS 9.3 was used for all analyses, and a p-value < 0.05 was used to test for statistical significance.

Results

One NACS designated HIV clinic had no staff trained in NACS.

Participants had a mean BMI of 25.8kg/m² with 26.5% of them being overweight, 20.5% being obese and 3.3% of them being underweight and 84% were female (Table 2).

There was no significant difference in the median NACS implementation score of the NACS designated clinics compared to the non-NACS clinics (5 vs 4) (p=0.14). In all observed counselling sessions, no nutrition counseling was offered, and no food support was available in any of the sites (Table 3).

A third (33.5%) of the participants had not disclosed their HIV positive status to immediate family (defined here as spouse or children) (Table 4).

Neither the NACS implementation score (aOR; 0.90 95% CI; 0.45, 1.80) nor the NACS status of the HIV clinic (aOR; 0.26 95% CI; 0.05, 1.24) were associated with odds of being overweight/obese after adjusting for other covariates. A year increase in age was associated with 1.06 times increase (aOR; 1.06 95% CI; 1.01, 1.12) whilst earning less than GHC300/month was associated with 0.31 times decrease (aOR; 0.31 95% CI; 0.12, 0.82) in the odds of being overweight/obese (Table 5).

Discussion

This study showed poor implementation of NACS in the NACS designated HIV clinics surveyed. This was due to NACS designated HIV clinics not offering nutrition counseling nor having food support on site thus not differentiating themselves from non-NACS clinics. This supports previous work done in some NACS sites in Ghana which showed that, the emphasis during counseling sessions was more on adherence to ART medications rather than nutrition (Yakubu, 2013). The lack of equipment and adequacy of trained staff to fully implement NACS observed was also noted in NACS evaluations conducted in Namibia and Uganda (MOHSS, 2013; Nekatebeb H, 2013).

Almost half of the participants were either overweight or obese which is higher than the 35% observed among PLWH in an earlier study in Accra (Aryeetey, Esi, & Wanke, 2014). Anecdotal evidence from participants indicated that weight gain was a way of protecting themselves from HIV related stigma, since a thin figure could be associated with HIV and their positive status wasn't public. An earlier study by Wiig and Smith found a similar mindset among PLWH in Ghana (Wiig & Smith, 2007). The over-representation of women in the study could be explained by the opt-out strategy to HIV testing during pregnancy adopted by Ghana where all pregnant women are routinely offered HIV testing with the right to refuse (Nyuzaghl, Ohene, & Odoi-Agyarko, 2011).

A limitation of this study is its cross-sectional design which cannot infer causation. Another was the use of an un-validated scale to score implementation of NACS however it assessed the main components of NACS and will have been able to distinguish between NACS implementation if that was observed. The use of a natural control group of HIV clinics not

yet implementing NACS was a strength and would have allowed comparisons between the intervention and control clinics. To our knowledge this is the first study to evaluate the implementation of NACS using a score.

Conclusion

This study showed poor implementation of NACS in the study sites designated to be implementing it and therefore found no significant association between NACS variables and odds of being overweight/obese. In light of the high prevalence of overweight and obesity observed, there is a need for further research into the contributing factors and locally appropriate interventions. The NACS program office needs resources to enable them ensure NACS is being implemented as per-protocol to help the program achieve its goals.

Acknowledgments

We will like to acknowledge the support of UG-Brown AIDS Academic Partnership (UBAAP), Ghana Health Service Ethical Review Committee, staff of the study sites and research assistants.

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Table 1

Characteristics of participating hospitals.

Hospitals ^a	NACS hospital	Average number of HIV patients accessing care weekly	Number of staff who work in HIV clinic	Number of staff trained in NACS
Clinic 1	Yes	70	5	0
Clinic 2	Yes	90	3	2
Clinic 3	Yes	100	2	1
Clinic 4	No	80	7	0
Clinic 5	No	90	2	0
Clinic 6	No	80	3	0

^a HIV clinic names anonymized to protect identity of staff. NACS, Nutrition Assessment Counseling and Support.

Table 2

Demographic and anthropometric characteristics of study participants by study group.

	Overall Mean(SD)	NACS Mean(SD)	Non-NACS Mean(SD)	p
N	152	77	75	0.87
Age, y	40.0 (9.0)	38.8 (8.5)	41.1 (9.4)	0.13
Interval from HIV diagnosis, y	3.5 (3.4)	3.5 (4.1)	3.6 (2.4)	0.5
Household size	4 (2.4)	4 (3)	4 (2)	0.6
BMI, kg/m ²	25.8 (5.7)	25.1 (4.8)	26.6 (6.5)	0.11
	N (%)	N (%)	N (%)	
BMI categorized				
Underweight (BMI<18.5 kg/m ²)	5 (3.3)	2 (2.6)	3 (4.1)	
Normal weight (BMI= 18.5–24.9 kg/m ²)	75 (49.7)	40 (52.0)	35 (47.3)	0.07
Overweight (BMI= 25–29.9 kg/m ²)	40 (26.5)	25 (32.5)	15 (20.3)	
Obese (BMI>30 kg/m ²)	31 (20.5)	10 (12.9)	21 (28.3)	
Female	127 (84)	65 (84.4)	62 (82.7)	0.8
Married	70 (46.0)	31 (44.3)	39 (55.7)	0.19
Main breadwinner of the home	83 (54.6)	41 (53.3)	42 (56.0)	0.7
Highest level of education completed				
None	21 (13.8)	15 (19.5)	6 (8.0)	
Primary school	29 (19.1)	9 (11.7)	20 (26.7)	
Junior/Senior high	89 (58.6)	46 (51.7)	43 (57.3)	0.06
Polytechnic/Community college	7 (4.6)	3 (3.9)	4 (5.3)	
University	6 (3.9)	4 (5.2)	2 (2.7)	
Monthly income				
GHS0-299 (equivalent of US\$0-77)	78 (66.7)	39 (65.0)	39 (68.4)	0.69
>GHS300 (equivalent of US\$78 or more)	39 (33.3)	21 (35.0)	18 (31.6)	

NACS, Nutrition Assessment Counseling and Support; BMI, Body Mass Index; GHS, Ghana cedis.

NACS implementation score by HIV clinic.

Table 3

NACS implementation scale indicators	NACS designated HIV clinics			Non-NACS HIV clinics		
	Clinic 1 ^a	Clinic 2	Clinic 3	Clinic 4	Clinic 5	Clinic 6
1. Is there a functioning weighing scale ^b	1	0	1	1	1	1
2. Is there a height board/stadiometer ^b	1	0	1	1	1	0
3. Is there at least one adult MUAC tape ^b	0	0	0	1	0	0
4. How many of 5 patients directly observed had their weight measured ^c	1	0	1	1	1	1
5. How many of 5 patients directly observed had their weight correctly measured ^c	1	0	1	1	1	1
6. How many of 5 patients directly observed have ever had their height measured before ^c	1	1	1	1	0	0
7. How many of 5 patients directly observed were offered nutrition counseling ^c	0	0	0	0	0	0
8. Is there food support (Plumpy nut/corn soya blend) available in the HIV clinic ^b	0	0	0	0	0	0
NACS implementation score (out of 8)	5	1	5	6	4	3
NACS implementation score by NACS category, median (IQR) ^d	5(4)			4(3)		
Overall NACS implementation score, median (IQR)	4.5(2)					

^aClinic names anonymized to protect identity of staff in the HIV clinic^bScore of 1 where present and 0 where absent^cScore of 0.2 for each patient directly observed^dNo significant difference in NACS implementation score between NACS and non-NACS hospitals

NACS, Nutrition Assessment Counseling and Support; MUAC, Mid Upper Arm Circumference; IQR, Interquartile Range.

Table 4

Medical history of study participants by study group.

	Overall N (%)	NACS N (%)	Non NACS N (%)	p
I have disclosed my HIV status to immediate family	101 (66.5)	50 (64.9)	51 (68.0)	0.69
I have ever been diagnosed with tuberculosis	21 (13.8)	10 (13.0)	11 (14.7)	0.76
I have ever been diagnosed with pneumonia	4 (2.6)	1 (1.3)	3 (4.0)	0.36
I have ever smoked cigarettes	5 (3.3)	3 (3.9)	2 (2.7)	1.0
I have ever used cocaine or marijuana	4 (2.6)	2 (2.6)	2 (2.7)	1.0

NACS, Nutrition Assessment Counseling and Support.

Table 5

Logistic regression analysis of the association between NACS implementation score/NACS status and odds of being overweight/obese.

Outcome: Odds of being overweight/obese (BMI > 24.9 kg/m ²)			
	aOR (95% CI) ^a		aOR (95% CI) ^a
NACS implementation score	0.90 (0.45, 1.80)	NACS status (Yes vs No)	0.26 (0.05, 1.24)
Age (in years)	1.06 (1.01, 1.12)	Age (in years)	1.06 (1.01, 1.12)
Time since HIV diagnosis (in years)	1.06 (0.94, 1.20)	Time since HIV diagnosis (in years)	1.06 (0.94, 1.20)
Sex (female vs male)	1.87 (0.54, 6.53)	Sex (female vs male)	1.87 (0.54, 6.52)
Monthly income ^b (Low vs High)	0.31 (0.12, 0.82)	Monthly income ² (Low vs High)	0.31 (0.12, 0.82)
Clinic 1 vs 6	0.80 (0.25, 2.58)	Clinic 1 vs 6	2.80 (0.57, 13.8)
Clinic 2 vs 6	4.49 (0.13, 17.73)	Clinic 2 vs 6	1.57 (0.28, 8.91)
Clinic 3 vs 6	0.19 (0.01, 4.27)	Clinic 3 vs 6	0.81 (0.20, 3.22)
Clinic 4 vs 6	0.70 (0.11, 4.62)	Clinic 4 vs 6	0.78 (0.18, 3.35)
C-statistic=0.78 ^c			
Hosmer & Lemeshow Goodness-of-Fit Test: chi-square=10.89, df=8 p=0.21			

NACS, Nutrition Assessment Counseling and Support; OR, Odds Ratio.

^a Adjusted for NACS implementation score or NACS status, age, time from HIV diagnosis, sex and monthly income.

^b Low (0–299 GH Cedis) High (>300 GH Cedis).

^c C-statistic and Hosmer & Lemeshow Goodness-of-Fit Test for both models

* No estimate produced for clinic 5 because it was set to 0, since it was a linear combination of other clinic variables