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Nutritional Status Pre-Gestational and Gestational Among Women Living With HIV Positive in Luanda, Angola

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Abstract

Objective: To evaluate the pregestational and gestational nutritional status of HIV-positive women.

Methods: This is a cross-sectional study, conducted from August to November 2018 in which 171 HIV-positive pregnant women were selected at random, in order of arrival and submitted to nutritional assessment through the Global Subjective Evaluation, whose data collected were analyzed in a descriptive and inferential manner, using the excel and EpiInfo software version 7.2.

Results: From the main results found it was observed the presence of maternal nutritional eutrophic, considering the pre-gestational Body Mass Index (BMI) of 107 (62.56%), and the gestational BMI of 94 (54.97%). It was found 31(18.12%) of pre-gestational overweight and 54 (28.07%) of overweight during pregnancy, and it was also observed that 12 (7%) of pregnant women were obese before pregnancy and 15 (15.28%) became obese during pregnancy. A significant association was found between pre-gestational BMI and height ($p<0.0001$) and gestational BMI and current weight ($p<0.0003$) and uterine height ($p<0.005$).

Conclusion: The results of this study indicate the need to develop specialized care programs in hospital units so that pregnant women have a differentiated nutritional follow up during prenatal care, in order to ensure an adequacy of their nutritional status.

Keywords: Nutritional Status; Pregnancy; Seropositive

List of Abbreviations and Acronyms

AIDS - Acquired Immunodeficiency Syndrome

ART - Antiretroviral Therapy

ARV - Antiretroviral

AZT - Zidovudine

BMI - Body Mass Index

CD4 - Differentiation Grouping 4

CV - Viral Load

DPR - Protein-Energy Malnutrition

GIG - Great for the Gestational Age

HIV - Human Immunodeficiency Virus

INLS - National Institute for the Fight against AIDS

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ITRN - Analogue reverse transcriptase inhibitor

ITRNN - Non analog reverse transcriptase inhibitor

ITS - Sexual Transmission Infection

NVP - Nevirapine

PIG - Small for Gestational Age

PMTCT - Preventing mother to child transmission

PTV - Vertical Transmission Prevention

STD - Sexually Transmitted Diseases

TCD4 - Lymphocytes

TIP - Treatment Improvement Protocol

Introduction

This study was carried out because it was found that HIV-positive pregnant women do not have differentiated nutritional follow-up in health units in Angola, which makes it a relevant topic, which is an important contribution to the development of information that will expand the situation and help point out possible solutions. Pregnancy causes physiological changes in the woman's body, modifying her nutritional needs, as well as food intake. Individuals with HIV have an increase in energy expenditure, which can lead to malnutrition and consequent nutrient deficiency. However, pregnant women with HIV have increased energy and nutritional needs, both due to pregnancy and the disease [1].

Pregnancy in the presence of HIV does not reduce positive feelings about motherhood, but imposes many fears and strict care to prevent Vertical Transmission, particularly during birth. Experiences of guilt and fear of transmitting HIV to the child add to the health policies and actions that contribute to prophylaxis. These policies have different meanings as they both approve and create obstacles to the promotion of sexual and reproductive rights of women living with HIV [2]. Currently the prevalence of HIV in the Angolan population is 2.34% among adults aged 15-49, in the order of 2.4%. It is estimated that about 320,000 people are living with HIV, with variations between the sexes, having a higher prevalence among young women (15-24 years = 0.9%). It is estimated that between 223,350 and 290,000 adults over the age of 15 live with HIV in Angola, in addition to almost 30,000 children. It is estimated that about 15,575 pregnant women test positive for HIV each year. The national average prevalence of HIV in pregnant women in the 15-49 age group is 2.8%, being higher in the urban area (3%) than in the rural one (1.6%) [3]. The management of the pregnant woman with HIV infection depends a long-term care of the woman, which motivated this study with the main objective of to evaluate the pre-gestational and gestational nutritional status of HIV-positive women in Luanda, Angola.

Materials and Methods

Data were collected from August to November 2018, with 171 HIV- positive pregnant women who underwent nutritional assessment at a tertiary health service based in Luanda, capital of Angola. The methodology was outlined by a cross-sectional study. The N-sample was calculated considering the recommendations of Luiz and Magnani (2000) based on an estimated prevalence of 5.94% (data collected in the Department of Statistics at a tertiary health service), 95% confidence level and 5% sampling error. An increase of 20% was added for possible cases of loss or refusal. The software used for this calculation was EpiInfo version 7.2. The project was approved under the Protocol n0 1/2018, by the Committee on Ethics in Research in Human Beings of the Catholic University of Angola, with the purpose of safeguarding the rights and dignity of research subjects, and all participants signed a Term of Free and Informed Consent as a sign of acceptance of participation in the research. The sample selection procedure was simple random, in order of arrival, considering the number of pregnant women needed to compose the sample. The classification proposed by Goldstein et al. [4] was used to classify the anthropometric nutritional status. The criterion for calculating gestational age was based on the parameters of Kim, Han and Kim [5-8]. The results found were stored in a database, using the Microsoft Office Excel spreadsheet, and were treated in a descriptive and inferential manner, with the help of EpiInfo software version 7.2.

Results

According to table 1, age varied between 19 and 42 years, with 53 (93.57 %) being of Angolan nationality, 110 (67%) coming mostly from the Central Northern region, 16 (10%) coming from Eastern Angola. It should also be noted that 11 (7%) of pregnant women came from the provinces of Congo Brazzaville (3) and Congo Kinshasa (8). Of these, 147 (85.96%) were in an unrecognized partnership, and 132 (77.19%) were in paid employment, with 99 (58.48%) working in an informal activity.

Table 2 mirrors the anthropometric data of pregnant women HIV positive who participated in the study. 88 (51.45%) of the participants in the study were between 1.59 m and 1.66 m in height and the average was 162.75 m. About 71 (41.51%) weighed between 56 and 68 kg, and the average pre-gestational weight was 60.77 kg. In relation to the current weight, 83 (48.52%) being the average of 65.7 kg. A majority of pregnant women with eutrophic pre-gestational BMI were observed in 83 (62.56%), with an overweight index of 31 (18.12%). The majority of pregnant women presented an eutrophic gestational BMI in 94 (54.97%), also highlighting the rate of overweight which was 54 (28.07%). The general averages of pre-gestational BMI and gestational BMI were

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Table 1: Sociodemographic data of HIV-positive pregnant women.

Variables	*Standard*	*Frequency*	*(%)*
Age	19 to 26 years	33	19.3
	27 to 34 years	***85***	***49.71***
	35 to 42 years	53	30.99
	Angola	***160***	***93.57***
Country	Congo Kinshasa	8	5.11
	Congo Brazzaville	3	1.74
	North	14	8
	South	4	2
Region of origin	***North Center***	***110***	**67**
	West	5	3
	East	***16***	***10***
	Central Region	5	3
Marital status	Single Married	6	3.51
	Union not recognized	18	10.53
		147	**85.96**
Paid labour activity	***Yes***	***132***	***77.19***
	No	39	22.81
Type of work activity	Formal	33	20.47
	Informal	***99***	***58.48***
	Doesn't Work	39	21.05

Table 2: Anthropometric parameters of HIV-positive pregnant women

Variables	*Standard*	*Frequency*	*(%)*	*Average*	*Standard Deviation*
Height (m)	1.45-1.59	40	23.39		
	1.59-1.66	88	51.45	162.75	5.83
	1.67-1.79	43	25.16		
	36-55	59	34.5		
Pre-gestational weight (kg)	56-68	71	41.51	60.77	12.3
	69-91	41	23.99		
	39-61	60	35.09		
Current weight (kg)	62-76	83	48.52	65.7	12.39
	77-99	28	16.39		
Pre-gestational BMI	Low Weight	21	12.27		
	Eutrophic	107	62.56	22.54	4.09
	Overweight	31	18.12		
	Obesity	12	7		
Gestational BMI	Low Weight	8	4.68		
	Eutrophic	94	54.97		
	Overweight	54	28.07	24.3	4.09
	Obesity	15	15.28		
Brachial perimeter (cm)	20-26	44	25.73		
	27-32	84	49.12	29.59	4.15
	33-39	43	25.14		
Uterine height (cm)	≤25	75	43.83		
	26-32	59	34.48	25.97	7.54
	≥39	37	21.62		

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22.54 and 24.30 respectively. As for the brachial perimeter, 84 (49.12%) were between 27 cm and 32 cm, with a mean brachial perimeter of 29.59 cm. Uterine height from 11 cm to 25 cm was present in 75 (43.83%) of pregnant women, with an average of 25.97 cm.

Table 3 presents the analysis by correlation and simple linear regression between the variables related to the pre-gestational and gestational nutritional status of the study participants. There was a strong and positive correlation between the variable current weight and pre-gestational BMI (RR=0.9) and current weight and gestational BMI (RR=0.8) there was also a strong and positive correlation between the variable brachial perimeter and pre-gestational BMI (RR=0.7) and current weight and gestational BMI (RR=0.6) there was also a strong positive correlation between pre-gestational BMI and gestational BMI (RR= 0.8) the statistical association between pre-gestational and gestational BMI was ($p<0.01$). A statistically significant association was observed between pregestational BMI and height ($p<0.0001$) and current weight ($p<0.007$), and between gestational BMI height ($p<0.02$), current weight ($p<0.0003$), brachial perimeter ($p<0.002$) and uterine height ($p<0.005$).

Table 4 reflects the food consumption of pregnant women, where 143 (84%) consumed all types of food (which included carbohydrates, proteins, vitamins, lipids and minerals), 25 (14%) consumed foods from only 4 food groups (which included carbohydrates, proteins and vitamins and minerals) and 8 (2%) consumed foods from only 3 food groups (which included carbohydrates, proteins and vitamins).

Figure 1 describes that 131 (76.61%) of the pregnant women who participated in the study were aware that they were HIV positive before pregnancy and 40 (23.39%) of the pregnant women who participated in the study were aware that they were HIV positive after pregnancy.

Discussion

The study presents a description of the anthropometric, sociodemographic and clinical characteristics of pregnant women with HIV-AIDS of the prenatal care system at a tertiary health service. Taking into account the socio-demographic data of pregnant women it was highlighted that most of the participants in the study (58.48%) practiced an informal activity and were an unrecognized marriage (85.96%), which are important indicators of both the labor profile and the marital status of the majority of Angola's population. In the study conducted by Godínez et al. the majorities (73.2%) of the women were between 19 and 24 years old and lived in a consensual union (68.7%). Approximately 76.8% of

Table 3: Correlation and simple linear regression of the Body Mass Index (BMI) in relation to the other variables.

Pre-gestational BMI		***Gestational BMI***		
Variables	***r***	***P***	***r***	***P***
Pre-gestational weight	0.2	<0.07	0.1	<0.6
Current weight	0.9	**<0.007**	0.8	**<0.0003**
Brachial perimeter	0.7	<0.3	0.6	**<0.002**
Uterine height	0.09	<0.2	0.2	**<0.005**

Table 4: Food consumption of HIV-positive pregnant women registered in the prenatal care system.

Variables	**Frequency**	**(%)**
All food groups (which included carbohydrates, proteins, vitamins, lipids, and minerals)	143	84%
Just 4 food groups (which included carbohydrates, proteins, vitamins and minerals)	25	14%
Just 3 food groups (which included carbs, proteins, and vitamins)	3	2%

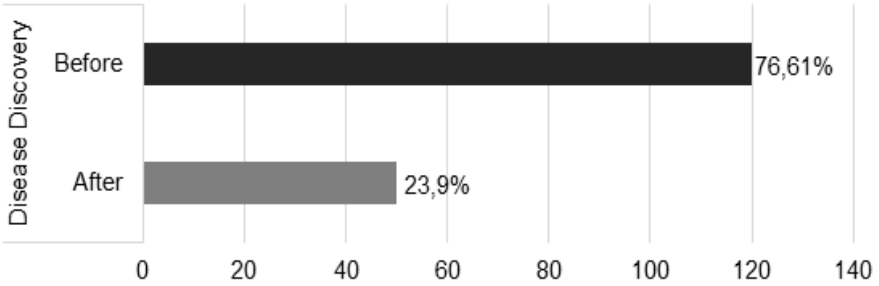

Figure 1: Data on serological knowledge of study participants before pregnancy and after pregnancy, registered in the prenatal care system.

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the women were housewives and belonged to the lowest socioeconomic strata.

According to the Ministry of Justice and Human Rights – Intersectoral Commission for the Preparation of National Human Rights Reports Angola still sees a significant difference in terms of minimum wage levels in the different sectors, in addition to verifying the lack of information available to assess whether these minimum wages are sufficient to ensure a dignified life for workers and their families. The informal economy is characterized by precarious working conditions, which include low wages, lack of workers' rights and lack of coverage or social protection [9-13]. The report by the Ministry of Justice and Human Rights lists the employed population from 2009 to 2011, which states that in 2009, 25% of women worked in wholesale and retail trade; in 2010 this number rose to 26.6% and in 2011 this number drops slightly to 25.5%. The unemployment rate among women in 2014 was 24.9% when analyzing this rate by age (36.7%) of unemployed women were aged between 15 and 19 years and 24.3% were aged between 30 and 34 years old, which represent the highest percentage of women in our study. Based on the anthropometric data of the study participants and taking into account the pre-gestational body mass index (BMI), it was observed that although the majority of women in the pre-gestational (62.56%) and gestational (54.97%,) phase were eutrophic, a good representation of pregnant women was overweight (28.07%) and obesity (15.28%), which indicates the need for supervision and nutritional counseling, since excess weight may not be associated with a balanced diet in terms of nutrients, as seen in table 4, 84% consumed all types of food that included carbohydrates, proteins, vitamins, lipids and minerals without restriction, the basis of the diet is centered on the consumption of complex carbohydrates due to the influence of cultural gastronomic habits, most of the pregnant women reported the consumption of a specific carbohydrate made with corn flour or funge (cassava flour pudding) that was usually accompanied by meat or fish that was prepared with palm oil (palm oil) and accompanied with some herb. Although the pregnant women consumed all types of food due to their low purchasing power, they reported that they did not vary their meals but were also limited by the economic factor, which limits the purchasing power of food in quantity and quality. Intersectoral National Human Rights Reporting points out that despite the process of improving social conditions since 2002, Angola still faces major challenges in reducing poverty, unemployment and increasing the unemployment rate and human development. Poverty derives from the situation of deprivation of some dimensions of citizens' well-being, such as limited access to health services, low human capital, inadequate housing, malnutrition of certain goods and services. Regarding the characteristics of maternal nutritional status, a strong and positive correlation was observed between the variable current weight and pre-gestational BMI (RR=0.9) and current weight and gestational BMI (RR=0.8), like this significant statistical differences with respect to pre-gestational BMI and current weight ($p<0.007$), and between gestational BMI and current weight ($p<0.0003$), which corroborates the pattern of food consumption of the women in the study. The study carried out by Widen et al. (2019) shows that in longitudinal models, HIV-infected women had lower weight ($p=0.003$), fat mass ($p=0.02$), fat-free mass ($p=0.01$), triceps skinfold ($p<0.001$), arm fat area ($p<0.001$) and mean arm circumference ($p=0.001$), but not arm muscle area ($p=0.34$), in all comments. Food insecurity was inversely associated with arm muscle area and mean postpartum arm circumference ($p<0.05$). Of the pregnant women who participated in the study, 131 (76.61%) were aware of their serological status before pregnancy, which can mean a positive advantage, so that most of them (99.42%) took regular antiretroviral treatment (ART) and nutritional supplementation (97.66%) (unpublished data). In the study conducted by Fouche, Niekerk and Plessis (2018) pregnant women infected with HIV 38 (51%) took ART. ART during breastfeeding represents one of four approaches to preventing mother to child transmission (PMTCT) of HIV regardless of CD4+ count (UNAIDS, 2012). In a review study in Sub Saharan-Africa reality, conducted by Nyoni, Sweet, Clark and Ward (2019) identifies correct learning and understanding about infant feeding practices in HIV positive women as a good point to the success in the breastfeeding process. For this to happen, mothers must be educated about the harm caused by HIV transmission through breast milk, since the transmission through breastfeeding still contributes to almost 50% of pediatric HIV infections every year. The mechanism that drives mothers' choice for exclusive breastfeeding is mainly the desire for child survival. But this process occurs best when the woman receives the necessary support from her partner and health professionals during the process and then when it comes time to introduce other foods, and she makes assertive choices that do not harm the child's nutrition. By the other hand, 23.39% of the pregnant women who participated in the study were aware that they were seropositive after pregnancy, showing that interventions is needed and may include better efforts to strength HIV control programs, since there are many pregnant women probably living with HIV even though they are unaware of their own infection.

Conclusion

During the elaboration of the work we could see that the pregnant women who participated in the study have their anthropometric indices measured, but they didn't receive any feedback of such information or nutritional guidance during pregnancy. So, we drew attention to the need to expand nutritional care to HIV-positive pregnant women, through the creation of a scheme of nutritional follow-up throughout the prenatal, by the presence of overweight and obesity in the

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women in the study. We also suggest carrying out studies that verify the relationship between nutritional status, associated with adherence to antiretroviral treatment and viral load measurement, as factors that favor breastfeeding by HIV positive women.

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Authors' contributions

Maura Eunice João Filipe contributed to data collection, data analysis, and drafting of the manuscript. Marli Stela Santana supervised the study and participated in the drafting of the manuscript.

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Availability of data and materials

The data sets used and/or analyzed during the current study are available with the corresponding author upon reasonable request.

Consent for publication

The authors consent to the publication of the results.

Conflicts of interest

The author declares no conflicts of interest.

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