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Factors Influencing Adherence to High Energy and Protein Supplementation (HEPS) among People Living with HIV in Lusaka, Zambia

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Abstract
The interaction between HIV infection and malnutrition presents a major public health challenge, particularly in sub-Saharan Africa. HIV increases energy requirements, reduces dietary intake, and impairs nutrient absorption, often resulting in weight loss and wasting. To address HIV-related under nutrition, Zambia has integrated High Energy and Protein Supplementation (HEPS) into HIV care programs. Despite this intervention, improvements in nutritional status among some beneficiaries remain minimal. This study assessed the social, economic, and demographic factors influencing adherence to HEPS among undernourished people living with HIV (PLWHIV) receiving antiretroviral therapy at the University Teaching Hospital Adult Infectious Disease Centre in Lusaka. A mixed-method approach combining longitudinal analysis of body mass index (BMI) records and a cross-sectional survey was employed among 100 HEPS recipients, with 72 respondents completing a structured questionnaire. The findings revealed generally poor adherence to HEPS, with alcohol consumption, low income, marital status, family support, gender, and employment status emerging as the most influential factors. The study concludes that nutritional interventions for PLWHIV must be complemented by socio-economic and behavioral support to achieve meaningful and sustained nutritional outcomes.

Keywords
HIV, Malnutrition, HEPS, Nutritional Adherence, BMI, Zambia, PLWHIV

Introduction

Malnutrition is one of the earliest and most persistent complications of HIV infection and remains a major contributor to disease progression and mortality among people living with HIV (PLWHIV). HIV infection is associated with increased resting energy expenditure, reduced appetite, gastrointestinal complications, and impaired nutrient absorption, all of which contribute to weight loss and wasting (Batterham, 2005; Colecraft, 2008; WHO, 2006). In adults, a body mass index (BMI) below 18.5 kg/m² is an established indicator of under nutrition and has been shown to predict mortality among HIV-infected populations, comparable to low CD4 cell counts (WHO, 1995; Stella Proikaki *et al.*, 2025).

Adequate nutrition is essential for maintaining immune function, supporting response to antiretroviral therapy (ART), and improving quality of life among PLWHIV (Fawzi et al., 2004). Recognizing this, many countries, including Zambia, have integrated nutritional support into HIV care services (Ministry of Health Zambia, 2017–2023). High Energy and Protein Supplementation (HEPS) is provided to undernourished PLWHIV to improve nutritional status and prevent further wasting.

However, evidence from clinical practice indicates that some beneficiaries of HEPS fail to achieve significant improvements in BMI, with some remaining undernourished despite prolonged supplementation. This raises concerns about adherence to prescribed nutritional support and highlights the need to understand the underlying social, economic, and demographic factors influencing adherence to HEPS.

Methodology

The study was conducted at the University Teaching Hospital (UTH) Adult Infectious Disease Centre in Lusaka, Zambia. A mixed research design incorporating both longitudinal and cross-sectional approaches was employed. Secondary data on BMI measurements were reviewed at three different time points to assess changes in nutritional status over time. Primary data were collected using a semi-structured, self-administered questionnaire based on a five-point Likert scale.

The study population consisted of HIV-positive adults who were undernourished, receiving antiretroviral therapy, and enrolled in the HEPS program. A purposive sample of 100 participants was selected, of whom 72 completed the questionnaire, yielding a response rate of 72%. Data were analyzed using SPSS software. One-way ANOVA was used to analyze changes in BMI, while descriptive statistics and mean ranking were used to assess and prioritize factors influencing adherence. Ethical considerations, including informed consent, confidentiality, and voluntary participation, were strictly observed.

Results and Discussion

The majority of respondents were aged between 30 and 39 years, female, unmarried, and had education levels at or below Grade 12. Overall adherence to HEPS was rated as poor by most respondents, with a large proportion indicating very poor or poor adherence (Table 1 to 6).

Table 1: Age of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	below 20 years	4	5.5	5.5	5.5
	20 - 29	12	16.4	16.4	21.9
	30 - 39	41	56.2	56.2	78.1
	40 - 49	13	17.8	17.8	95.9
	50 and above	3	4.1	4.1	100.0
	Total	73	100.0	100.0	

Table shows that majority of the PLWHIV who were receiving HEPS were in the age range 30 - 39.

Table 2: Marital status of the respondent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Married	31	42.5	42.5	42.5
	Unmarried	42	57.5	57.5	100.0
	Total	73	100.0	100.0	

Majority of the respondents were un- married as shown in table 2 above.

Table 3: Sex of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	33	45.2	45.2	45.2
	Female	40	54.8	54.8	100.0
	Total	73	100.0	100.0	

The sample size was dominated women as shown in table 3 above.

Table 4: Level of education of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Grade 9 and below	24	32.9	32.9	32.9
	Grade 12	26	35.6	35.6	68.5
	Craft certificate	8	11.0	11.0	79.5
	Diploma	10	13.7	13.7	93.2
	Degree	4	5.5	5.5	98.6
	Degree and above	1	1.4	1.4	100.0
	Total	73	100.0	100.0	

Up to 50 respondents out of 72 respondents were below grade 12 level of education as shown in table 4 above.

Table 5: Residence of the Respondent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	low density	19	26.0	26.0	26.0
	Middle density	30	41.1	41.1	67.1
	High density	24	32.9	32.9	100.0
	Total	73	100.0	100.0	

Most of the respondents were coming from middle density areas as shown in table 5 above.

Table 6: How would you rate the level of adherence to HEPS program

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	21	28.8	28.8	28.8
	Poor	35	47.9	47.9	76.7
	Average	13	17.8	17.8	94.5
	Good	4	5.5	5.5	100.0
	Total	73	100.0	100.0	

Table 6 shows that majority respondents rated their level of adherence to HEPS program as poor.

Among demographic factors, gender and marital status were found to significantly influence adherence, while age and duration on the HEPS program showed minimal effect. Female participants were more likely to adhere to HEPS than males, a finding consistent with previous studies indicating gender differences in health-seeking behavior and adherence (Mensah et al., 2015; Souza & Passos, 2015).

To establish the key demographic factors that affects patients' adherence

Table 7: Statistics

		Gender of the patient	marital status of a patient	Age affects Adherence	Date/Month started affects adherence
N	Valid	73	73	73	73
	Missing	0	0	0	0
Mean		3.03	3.64	1.89	2.04
Std. Deviation		.645	1.171	.875	1.207

Out for 4 demographic factors that were tested based on the previous interviews between the HEPS provider at UTH and the PLWHIV patients, the gender of a patient, and the marital status were found to be significant. On the other hand, age and the period/month supposed to get HEPS does not affect the adherence.

Economic factors played a critical role in adherence. Income level, employment status, and socio-economic background were strongly associated with adherence to HEPS. Participants with limited income reported difficulties maintaining regular consumption of supplements, often due to food insecurity and competing household needs. Similar findings have been reported in Ethiopia and Brazil, where low socio-economic status negatively affected adherence to food-by-prescription programs (Ayalew & Haidar, 2014; Souza & Passos, 2015).

To examine the economic factors that affects adherence to HEPS

Table 8: Statistics

		Employment status of the patient	Your Income affects adherence	Level of education respondent	Your residence affects your adherence	Your social background affects adherence
N	Valid	73	73	73	73	73
	Missing	0	0	0	0	0
Mean		2.77	3.78	1.81	2.00	2.75
Std. Deviation		1.523	.854	.680	.957	.878

5 factors were identified as affecting adherence of patients to HEPS. Only three factors were found to influence adherence, thus, employment status of the patient, social economic background of the patient and the income of the patient with mean scores of 2.77, 2.75 and 3.78 respectively as shown in table 8. Level of education and residence of the patient were not significant with mean scores of 1.82 and 2 respectively.

Social factors exerted the strongest influence on adherence. Alcohol consumption emerged as the most significant barrier, followed by inadequate family support. Alcohol use has been widely documented as a factor that interferes with adherence to both ART and nutritional interventions (Afe, 2018). Family support, on the other hand, has been shown to enhance adherence by promoting shared responsibility and emotional encouragement (Weiser et al., 2013).

To find out the social factors that influence adherence

Table9. Social factors

		Your religion affects adherence to HEPS	Your beer drinking affects your adherence	Your family support affects your adherence	Religion affects adherence to HEPS
N	Valid	73	73	73	73
	Missing	0	0	0	0
Mean		2.53	3.81	3.14	2.90
Std. Deviation		1.055	.739	1.407	0.761

To rank all the social, economic and Demographic factors that influence PLWHIV to abscond from adhering to the HEPs program

Statistics

		You r religion affects adherence to HEPS	Your beer drinking affects your adherence	You r family support affects you r adherence	marital status of a patient	Gender of the patient	Employment status of the patient	level of education respondent	Age affects Adherence	Date/ Month started affects adherence	Your Income affects adherence	Your social back ground affects adherence	Your residence affects your adherence
N	Valid	73	73	73	73	73	73	73	73	73	73	73	73
	Missing	0	0	0	0	0	0	0	0	0	0	0	0
Mean		2.53	3.81	3.14	3.64	3.03	2.77	1.81	1.89	2.04	3.78	2.75	2
Std. Deviation		1.055	0.739	1.407	1.171	0.645	1.523	0.68	0.875	1.207	0.854	0.878	0.957
Rank Position of means		8	1	4	3	5	6	12	11	9	2	7	10

Out of 12 social, economic and demographic factors that were perceived to affect adherence to HEPS by PLWHIV patients, Drinking beer is ranked first which is a social problem, income is ranked second, marital status is ranked third, family support is ranked 4th, gender of the patient is ranked 5th, employment status is ranked 7th, religion of the respondent is ranked 8th, date/period/moth they collect HEPS is ranked 9th, while residential area where the patient is coming from is ranked 10th. The 11th factor was age of the patient and the 12th was the level of education of the patient.

Conclusion

The study demonstrates that adherence to High Energy and Protein Supplementation among PLWHIV in Lusaka is influenced predominantly by social and economic factors rather than clinical or demographic characteristics alone. Alcohol consumption, low income, unstable marital relationships, and limited family support were identified as the most significant barriers to effective adherence. These findings suggest that nutritional supplementation programs cannot succeed in isolation without addressing the broader socio-economic and behavioral context of PLWHIV.

Recommendations

1. **Decentralization of services:** HEPS distribution should be brought closer to communities to reduce transport-related barriers.
2. **Economic support:** Integration of social cash transfer or livelihood programs for undernourished PLWHIV is recommended.

3. **Nutrition education:** Continuous sensitization and counseling on nutrition and HEPS adherence should be strengthened.
4. **Behavioral interventions:** Targeted strategies to reduce harmful alcohol consumption among PLWHIV should be implemented.

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