IOSR Journal of Nursing and Health Science (IOSR-JNHS)
e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 8, Issue 2 Ser. V. (Mar. - Apr .2019), PP 29-34
www.iosrjournals.org

Effect of Co-morbidity, Dietary Practices, and Socio-economic Characteristics on Health Status among People Living With HIV/AIDS in Kangundo Sub-County

Thomas Mutinda Muthama[1], Dr. Stephen Kyalo Mutiso[2]
[1](Lead Data Analyst, Centre for Statistical and Econometric Analysis, The Nog Akudos Searchtripp, Kenya)
[2](Lecturer, School of Education, University of Nairobi, Kenya)
Corresponding Author: Thomas Mutinda Muthama

Abstract: *The objectives of this study are to determine the effect of co-morbidity, dietary practices and socio-economic characteristics on health status among people living with HIV/AIDS attending Comprehensive Care Clinic in Kangundo hospital. The study was based on the health production function. The study concludes that for PLWHIV being hypertensive helps improve their health status, however having tuberculosis among PLWHIV adversely affects their health status. Dietary patterns specifically daily consumption of vitamins among PLWHIV improves their health status. In regards to socio-economic characteristics youths living with HIV/AIDS had worse health compared to the adults living with HIV/AIDS; females living with HIV/AIDS had significantly better health status compared to male living with HIV/AIDS and business persons living with HIV/AIDS had better health status than their counterparts who are either employed or unemployed. The study concludes that co-morbidity in PLWHIV, their dietary patterns, and their socio-economic characteristics do indeed influence their health status. Moreover, the three categories (co-morbidity, dietary patterns and socio-economic characteristics) have a joint effect on health status in PLWHIV. Based on the findings the study recommends that first disease co-morbidity among persons living with HIV/AIDS especially tuberculosis need to be treated quickly, as it adversely affect their health status; second, the PLWHIV more so the youths should be encouraged to be deployed by opening up businesses rather than seeking employment.*

Keywords: *Health production function, co-morbidity, Dietary practices, socio-economic characteristics*

Date of Submission: 11-03-2019 Date of acceptance: 27-03-2019

I. Introduction

Background to the study

Health as a form of human capital is crucial in the production of market and non-market commodities and it is, imperative that individuals/households invest in health as it directly influences their capacity to be productive and generate wealth [9]. The burden of hypertension and diabetes was higher among HIV- positive people according to [8]. Non communicable chronic illnesses are becoming increasingly significant causes of morbidity, disability and premature mortality both in developing and newly developed countries, placing additional burdens on already overtaxed national health budgets [10].

For people living with HIV/AIDS, eating a well-balanced diet can help them reach a healthy weight, strengthen their immune system, prevent infection and reduce hospital stays. It also helps the body build and keep muscle, allows medications to work better and enables them to handle the side effects of medications like ARVs.

Co-Morbidity

Patients living with HIV should be managed independently of the general population guidelines for common medical conditions [4] and that early diagnosis of HIV may be possible in patients presenting symptoms of associated diseases such as tuberculosis [15]. In California, co-morbidities are prevalent among people living with HIV and many of these co-morbidities relate to health habits that could be addressed with additional prevention in ambulatory care, thereby improving health outcomes and ultimately reducing costs [17]. HIV Cohort in South Brazil established that the number of comorbid conditions per person was significantly higher in the HIV group but also duration of HIV infection and time on antiretroviral were associated with increased co-morbidities [7].

Dietary Practices

Dietary practices influence the nutrition status, enhance drug metabolism and efficacy and indeed poor dietary practices plays a key role in the rapid progression of HIV and is among the key factors that determine

the quality of life among PLWHA, although they have been largely overlooked [12]. In Nepal, nutritional status was found to be positively correlated with quality of life (QoL) even though one in every five PLHIV is undernourished [16]. The diets consumed by the people living with HIV were found inadequate [1].

II. Socio-Economic Characteristics

The quality of life was found to be high among males, younger patients, married participants, higher socioeconomic status, longer duration of ART, self-motivation to take ART, and absence of opportunistic infection [3]. [9] in a study on household's health status in Machakos County established that females had an average BMI of 23.94, which was statistically greater than male's at 22.81, even though either sex had normal weight based on world health organization. The benefits of physical activities/exercise in people living with HIV/AIDS while being treated with ARTs include improvement of their quality of life [14].

Problem Statement

The burden of hypertension and diabetes is higher among HIV- positive people younger than 46 years of age and almost a quarter of people with multiple diagnoses had either hypertension or diabetes or both [8]. A great number of people living with HIV are overweight or obese today. Obesity has negative effects on the immune system and can also cause unwanted health conditions such as heart disease, insulin resistance or diabetes and some cancers.

Objectives

1. To determine the effect of co-morbidity on health status among people living with HIV/AIDS attending Comprehensive Care Clinic in Kangundo hospital
2. To examine the effect of dietary practices on health status among people living with HIV/AIDS attending Comprehensive Care Clinic in Kangundo hospital
3. To establish the effect of socio-economic characteristics on health status among people living with HIV/AIDS attending Comprehensive Care Clinic in Kangundo hospital

Theoretical Framework

We adopt the modelling approach of in which the human biology approach, represented by the health production function, is integrated with an economic model of household allocations. Specifically, the production function f(.) shows how the health outcome (h) is affected by health inputs (x), conditional on observed characteristics of the individual (z_i), the household (z_{fh}), and the community (z_c), and on unobserved characteristics (v):

$$h = f(x; Z_j, Z_{fh}, Z_c, \nu)$$

Methodology

Analytical Framework

Since the dependent variable reflects an order, regression analysis of BMI can be achieved through specifying an ordered probit model [11]. The ordered probit model can be used to model a discrete dependent variable that takes ordered multinomial outcomes like body mass index, with categorical outcomes such as underweight, normal weight, overweight, and obese. Thus, our starting model is formulated through a latent health variable H^* that it is unobserved (an individual's "true" BMI) and which depends on a linear combination of explanatory variables:

$$H^* = \beta' X + \varepsilon, \qquad \varepsilon \mid X \sim \text{Normal } (0, 1)$$

Where X is a set of explanatory variables, β a set of coefficients and ε an error term, uncorrelated with the set of explanatory variables with a normal distribution.

The dependent variable used is categorised BMI based on WHO classification. Thus, the higher value of our latent variable, the higher will be the probability that the calculated BMI is a higher category in the body mass index scale. However, H^* is unobserved and what we do observe is:

$$H_i = \begin{cases} 1 \; if & H_1^* \le \gamma_1 \\ 2 \; if & \gamma_1 < H_1^* \le \gamma_2 \\ 3 \; if & \gamma_2 < H_1^* \le \gamma_3 \\ 4 \; if & H_1^* > \gamma_3 \end{cases}$$

Where $\gamma_1, \gamma_2, \gamma_3$ are unknown cut points (or threshold parameters) to be estimated with β .

Sampling Method and Sample Size

Sampling was done by purposive sampling method to select a specific health facility (Kangundo level 4 hospital), specific department (CCC) and specific patients (PLWHIV). The sample size was determined using Fisher et al., 1998 formula.

$N = Z^2pq/d^2$

Whereby; N= required sample size.
Z= standard normal corresponding to 95% confidence interval (1.96)
P= prevalence (4.6%)
q= (1- p)
d= allowable error (0.1%)
Sample size = 67.

Data Collection and Analysis

Data was collected using a semi-structured questionnaires, food frequency questionnaire and 24 hour recall. Anthropometric data was analyzed by comparing it with set standards and cut offs provided by the WHO. Data was then entered and analyzed using STATA.

Data Analysis and Study Findings

Health Status of the Patients Attending CCC

Health status was addressed by looking at three anthropometric measures namely weight in kilograms (Kgs), height in meter squared (m^2) and body mass index (BMI). The body mass index (BMI) was calculated as weight in Kgs divided by height in meters squared.

Table 4.1: Summary Statistics of Anthropometric Measures

Variable	Frequency	Mean	Minimum	Maximum
Weight	67	63.28	37.00	93.00
Height	67	1.61	1.40	1.80
BMI	67	24.36	15.92	32.69

Using both the weight and height of the patients, the research proceeded to compute the BMI as weight in Kgs divided by the square of height in meters. The BMI of the patients was on average 24.36, however the minimum BMI was 15.92 and a maximum BMI of 32.69 was realized.

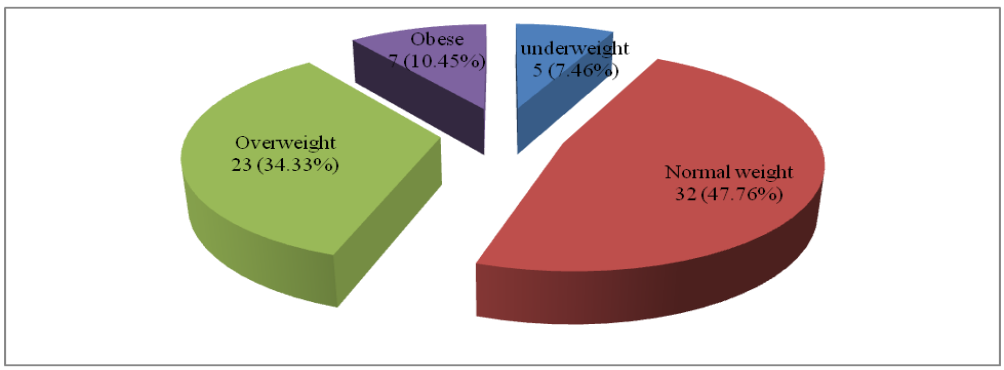

Figure 4.1: BMI Categories based on WHO standards

Further disaggregation of the BMI data based on the world health organization (WHO)[1] shows that the patients attending CCC at Kangundo level 4 hospital 5 (7.45 percent) of them were underweight, 32 (47.69 percent) had normal weight, 23 (34.28 percent) were overweight and 7 (10.43 percent) were obese.

[1] Based on WHO if BMI <18.5 underweight, 18.5 < BMI < 25 Normal weight, 25 < BMI < 30 overweight and BMI >30 Obesity (Muthama, 2018a)

Determinants of Health Status among Patients Attending CCC

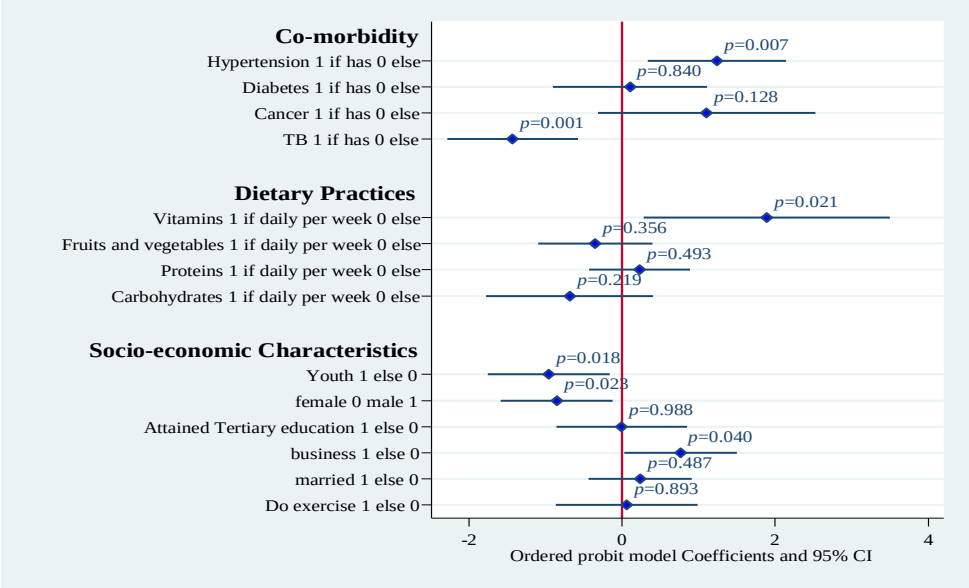

Figure 4.2: Ordered probit model estimation of individuals BMI in Kangundo

Table 4.2: Tests for Joint Significance of the Model Coefficients

Model Chi^2 (14)	51.23*	Prob > chi^2 = 0.0000
Co-morbidity Chi^2 (4)	18.78*	Prob > chi^2 = 0.0009
Dietary Patterns Chi^2 (4)	10.45 *	Prob > chi^2 = 0.0335
Socio-economic characteristics Chi^2 (6)	18.05*	Prob > chi^2 = 0.0061

* denotes statistically significant at the 5 percent level

Based on the estimated model presented in Figure 4.2, the researcher proceeds to conduct a two-sample t-test only for the variables which are statistically significant, in order to establish the mean BMI for each of the groups.

Table 4.3: Two Sample T-Test with Equal Variance

Variable name and T-statistics	Body Mass Index (BMI)
Hypertension (T-statistics)	3.77*
Hypertensive mean	26.10
Else mean	22.33
Has TB (T-statistics)	3.23*
Has TB mean	21.85
Else mean	25.08
Daily consumption of vitamins (T-statistics)	5.17*
Consume vitamins daily mean	29.22
Else mean	24.05
Age (T-statistics)	2.02*
Youth mean	22.82
Adults mean	24.84
Sex (T-statistics)	1.99*
Male mean	23.14
Female mean	25.13
Employment status (T-statistics)	2.70*
Business mean	26.33
Else mean	23.63

Note: * indicates 5 percent level of significance

Effect of Co-morbidity on Health Status

The medical conditions the patients were suffering from and specifically diabetes, hypertension, cancer and tuberculosis (TB). 36 (53.73 percent) of the patients attending CCC at Kangundo level 4 hospital were suffering from hypertension, which is line with the findings by [2, 5] that there is increased risk of hypertension among people living with HIV. In addition, 9 (11.94 percent) were suffering from diabetes, 4 (5.97 percent) from cancer and 15 (22.39 percent) was suffering from TB.

The fact that all the majority of the patients who were living with HIV had hypertension and the presence of other medical conditions like diabetes, cancer and TB; it's a clear indication of the existence of co-morbidity among PLWHIV. This confirms the findings in Ontario by [6]. Figure 4.2 shows that PLWHIV who were hypertensive had significantly greater BMI compared to the rest. In addition, table 4.3 shows that those who were hypertensive had a mean BMI of 26.10 while the mean BMI for non-hypertensive persons was 22.33. The patients who were suffering from tuberculosis (TB) had significantly less BMI compared to the rest as shown in figure 4.2. However further analysis in table 4.3 shows that patients who were suffering from TB had a mean BMI of 21.85, while those who didn't have TB had a mean BMI of 25.08. This indicates that being hypertensive for PLWHIV helps improve their health status, however having tuberculosis among PLWHIV adversely affects their health. The test for joint significance of the ordered probit coefficients presented in table 4.2 for the 4 variables under co-morbidity produced a chi-square statistic of 10.45 which was statistically significant. This implies that co-morbidity in PLWHIV has a joint influence on their health status.

Effect of Dietary Patterns on Health Status

Figure 4.2 shows that PLWHIV who consumed vitamins daily per week had significantly greater BMI compared to the rest. Table 4.3 shows that patients who consumed vitamins daily had a mean BMI of 29.22, while those who did not consume vitamins daily had a mean BMI of 24.05. Daily consumption of proteins by PLWHIV is positively related to their BMI, though not statistically significant. Daily consumption of fruits and vegetables by PLWHIV is negatively related to their BMI; however, it was not statistically significant. Similarly, daily consumption of carbohydrates by PLWHIV is negatively related to their BMI, even though not supported by statistical test of significance. Hence, dietary patterns specifically daily consumption of vitamins among PLWHIV improves their health status. The test for joint significance of the ordered probit coefficients presented in table 4.2 for the 4 variables under dietary patterns of an individual produced a chi-square statistic of 10.45 which was statistically significant. Hence dietary patterns of an individual jointly do influence their health status.

Effect of Socio-economic characteristics on Health Status

Based on the preliminary analysis, the mean age of the patients attending CCC at Kangundo level 4 hospital was 45.12 years. The minimum age of patients was 22 years and the maximum age of the patients was 72 years. Hence the youngest patient who attended the CCC at Kangundo level 4 hospital was 22. Further disaggregation of the data by age category reveals that 16 (23.88 percent) were youths since there age was between 15 to 35 years. Table 4.2 illustrates that youths have significantly less BMI compared to adults. Table 4.3 shows that the mean BMI for youth was 22.82 and for adults it was 24.84. Hence, youths living with HIV/AIDS had worse health compared to the adults living with HIV/AIDS.

The distribution of the patients attending CCC at Kangundo level 4 hospital 26 (38.81 percent) of the respondents were males while 41 (61.19 percent) of the patients were females. Hence a greater number of females compared to males attended the CCC. Figure 4.2 shows that female patients had less BMI compared to male patients. Similar, findings were deduced in a study by [9]. Furthermore, table 4.3 shows that female patients had a mean BMI of 25.13 while males had a mean BMI of 23.14. Hence, females living with HIV/AIDS had significantly better health status compared to male living with HIV/AIDS.

Regarding employment status the patients attending the CCC at Kangundo level 4 hospital who were employed were 34 (50.75 percent). The unemployed patients were 9 (13.43 percent), and business persons were 18 (26.87 percent). This indicates that majority of the people living with HIV/AIDS were employed. Figure 4.2 illustrates that patients who were operating business had better BMI than those who were either employed and unemployed. Table 4.3 further illustrates that the patients who were operating business had a mean BMI of 26.33 while the rest had a mean BMI of 23.63. Hence, a person living with HIV/AIDS who operates business had better health status than their counterparts who were either employed or unemployed. The test for joint significance of the ordered probit coefficients presented in table 4.2 for the 6 variables under socio-economic characteristics of an individual produced a chi-square statistic of 18.05 which was statistically significant. This means that jointly socio-economic characteristics of an individual do indeed influence their health status.

III. Conclusions and Recommendations

Conclusions

Majority of the patients were diagnosed with HIV more than 6 months ago, indicating they have been aware of their HIV status for more than the last 6 months. Commencement of ART was done immediately after diagnosis and as soon as they were confirmed to be HIV positive similar to findings by [13]. There is existence of co-morbidity among PLWHIV patients manifested with hypertension and other medical conditions which is in line with findings by [6]. A greater number of females attended the CCC compared to males and majority of the

patients were married. In addition, majority of the patients had secondary level of education, were employed and were Christians.

Based on WHO less than one-tenth of the patients were underweight and about one-tenth were obese and patients who were on ARVs for more than 6 months had statistically the same co-morbidity with those who had been on ARVs for less than 6 months.

Pertaining to the effect of co-morbidity, PLWHIV being hypertensive helps improve their health status, however having tuberculosis among PLWHIV adversely affects their health status. Dietary patterns specifically daily consumption of vitamins among PLWHIV improves their health status. In regards to socio-economic characteristics youths living with HIV/AIDS had worse health compared to the adults living with HIV/AIDS; females living with HIV/AIDS had significantly better health status compared to male living with HIV/AIDS and business persons living with HIV/AIDS had better health status than their counterparts who are either employed or unemployed.

Co-morbidity in PLWHIV, their dietary patterns, and socio-economic characteristics of an individual do indeed influence their health status. Moreover, the three categories (co-morbidity, dietary patterns and socio-economic characteristics) have a joint effect on health status in PLWHIV.

Recommendations

(i). Disease co-morbidity among persons living with HIV/AIDS especially tuberculosis need to be treated quickly, as it adversely affect their health status.

(ii). The PLWHIV more so the youths should be encouraged to be deployed by opening up businesses rather than seeking employment.

References

[1]. Aishwarya, R. (2015). Assessment of Nutritional Status of people living with HIV/AIDS (PLWHA) in the age group of 18-55 years. *IOSR Journal of Nursing and Health Science (IOSR-JNHS), 4*(2), 17-28.

[2]. Antonello, V. S., Antonello, I. C. F., Grossmann, T. K., Tovo, C. V., Dal Pupo, B. B., & de Quadros Winckler, L. (2015). Hypertension—an emerging cardiovascular risk factor in HIV infection. *Journal of the American Society of Hypertension, 9*(5), 403-407.

[3]. Arjun, B. Y., Unnikrishnan, B., Ramapuram, J. T., Thapar, R., Mithra, P., Kumar, N., . . . Darshan, B. (2017). Factors influencing quality of life among people living with HIV in Coastal South India. *Journal of the International Association of Providers of AIDS Care (JIAPAC), 16*(3), 247-253.

[4]. Haberer, J. E., Kiwanuka, J., Nansera, D., Wilson, I. B., & Bangsberg, D. R. (2010). Challenges in using mobile phones for collection of antiretroviral therapy adherence data in a resource-limited setting. *AIDS and Behavior, 14*(6), 1294-1301.

[5]. Hejazi, N., Huang, M. S. L., Lin, K. G., & Choong, L. C. K. (2014). Hypertension among HIV-infected adults receiving highly active antiretroviral therapy (HAART) in Malaysia. *Global journal of health science, 6*(2), 58.

[6]. Kendall, C. E., Wong, J., Taljaard, M., Glazier, R. H., Hogg, W., Younger, J., & Manuel, D. G. (2014). A cross-sectional, population-based study measuring comorbidity among people living with HIV in Ontario. *BMC Public Health, 14*(1), 1.

[7]. Maciel, R. A., Klück, H. M., Durand, M., & Sprinz, E. (2018). Comorbidity is more common and occurs earlier in persons living with HIV than in HIV-uninfected matched controls, aged 50 years and older: A cross-sectional study. *International Journal of Infectious Diseases, 70*, 30-35.

[8]. Munderi, P. (2016). *Non-communicable disease (NCD) in PLWHA in low and middle income settings: burden of disease and epidemiology*. Paper presented at the 21st International AIDs Conference,, Durban.

[9]. Muthama, T. M. (2018a). Factors Influencing Households Health Status in Machakos County, Kenya. *The International Journal of Humanities & Social Studies, 6*(12), 1-13.

[10]. Muthama, T. M. (2018b). Household Production of Human Health in Kenya: An Econometric Analysis. *International Journal of Science and Research (IJSR), 7*(12), 960-965.

[11]. Muthama, T. M., & Mutiso, S. K. (2019). Analysis of Health Demand Model for Kenya. *International Journal of Science and Research (IJSR), 8*(1), 1075-1083.

[12]. Muthamia, O. G., Mwangi, A. M., & Mbugua, S. K. (2014). The effects of nutritional knowledge on the dietary practices of people living with HIV in Kayole division, Nairobi-Kenya. *International Journal of Nutrition and Food Sciences, 3*(6), 597-601.

[13]. Patel, P., Bennett, B., Sullivan, T., Parker, M. M., Heffelfinger, J. D., Sullivan, P. S., & Group, C. A. S. (2012). Rapid HIV screening: missed opportunities for HIV diagnosis and prevention. *Journal of Clinical Virology, 54*(1), 42-47.

[14]. Steenkamp, L., Truter, I., Williams, M., Goosen, A., Oxley, I., van Tonder, E., . . . Venter, D. (2017). Nutritional status and metabolic risk in HIV-infected university students: challenges in their monitoring and management. *South African Family Practice, 59*(1), 9-13.

[15]. Sullivan, P. S., Carballo-Diéguez, A., Coates, T., Goodreau, S. M., McGowan, I., Sanders, E. J., . . . Sanchez, J. (2012). Successes and challenges of HIV prevention in men who have sex with men. *The Lancet, 380*(9839), 388-399.

[16]. Thapa, R., Amatya, A., Pahari, D. P., Bam, K., & Newman, M. S. (2015). Nutritional status and its association with quality of life among people living with HIV attending public anti-retroviral therapy sites of Kathmandu Valley, Nepal. *AIDS research and therapy, 12*(1), 14.

[17]. Zingmond, D. S., Arfer, K. B., Gildner, J. L., & Leibowitz, A. A. (2017). The cost of comorbidities in treatment for HIV/AIDS in California. *PLoS ONE, 12*(12). doi: e0189392. https://doi.org/10.1371/journal.pone.0189392