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Original Article

Effects of Care Givers Counselling on Depression among People Living With HIV/AIDs

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ABSTRACT

Introduction: People living with HIV/AIDs (PLWHA) are also prone to mental health problem such as depression. However, there is limited evidence on the effects of care giver counselling on the level of depression among people living with HIV/AIDs.
This study aimed to determine factors associated with depression and the effects of care giver counselling and follow up on depression among PLWHA attending Federal Teaching Hospital, Ido-Ekiti, Nigeria.
Methods: This study has two parts. The first part addressed the descriptive aspect of the study while in the second part, an experimental study was performed on 64 depressed HIV patients (32 intervention group and 32 in the control group). These 64 respondents were randomly screened out of 351 consenting PLWHA in the hospital using Zung's self-rating depression scale. A systematic random sampling technique was employed to allocate participants to the groups, with the first client of the 64 participants allocated to the control group and the next client allocated to intervention group. On-phone counselling of a minimum of 30 minutes (once in a week) was done for the patients in the experimental group for a month after which a post intervention assessment was done for both intervention and control groups. Bar chart and descriptive statistics were employed to explain the data. Yate's Chi-squared statistics was employed to find out statistical associations between the groups while the p-values were consequently reported.
Results: The age of the studied subjects ranged between 21-80 years with a mean age of 41.53 (±9.06). One hundred forty-nine (42.5%) of the 351 subjects were found to have one form of depression or the other. Of 351 subjects, 57.5% were not depressed, 17.1% had mild depression, 10.3% had moderate depression and 15.1% had severe depression. One hundred two (29.1%) of 351 respondents came from a severely dysfunctional family, while 193(55.0%) from a moderately dysfunctional family and 56(16%) from highly functional family. The percentage of the intervention group that suffered severe depression reduced from 40.6% to 6.2% after the intervention as opposed to a marginal reduction of 34.4% to 31.2% in the control group without intervention (p-value<0.001). Also, the relationships between the severity of depression and BMI, CD4 and family functions were significantly associated with p-values of <0.001.
Conclusion: Care giver counselling significantly reduced depression among PLWHA. Therefore, PLWHA should be encouraged through policies and otherwise to attend counselling sessions with caregivers.

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Introduction

Depression is a mental state involving alterations in mood and characterized by feelings of sadness, despair, and discouragement.[1] It is the lowering of mood beyond the normal range of ups and downs encountered in normal life which is sustained over time and to such a degree that the person's quality of life is significantly impaired.[2] Depression is a serious medical condition that affects thoughts, feelings and the ability to function in everyday life. It can affect any age range.[3] In addition, it is well documented that chronic diseases such as hypertension, diabetes mellitus, stroke and HIV infection predispose people to depression.[4] Depression is approximately two to three times more common in patients with a chronic physical health problem (prevalence of about 20 %) than in people who have good physical health.[5] Currently, 39% of HIV patients are reported to suffer from depression.[6] Estimates suggest that this co-morbid condition of HIV affects 10-50 % of PLWHA.[1]

In addition, there are vivid pieces of evidence that support the fact that gender affects the development of psychiatric morbidity among HIV positive individuals. In a study, over 15.87 % of HIV positive women and 10 % of HIV negative women have current major depression.[7] These figures, however, approach twice the value for HIV positive men.[8] However, the prevalence of depression worldwide ranges from 20-70 %.[9] In patients with HIV/AIDS in Nigeria, when one member of a family has the disease, the whole family is called “AIDS family” by other villagers.[10] Studies have shown that disclosure of HIV positive status can however result in greater social support, which in turn has positive effect on psychological well-being.[11,12] Improving family support and social relationships may translate to improved outcome of management of depression among people living with HIV/AIDS.

There is extensive research that proves conclusively that family support, education and psycho-education improve both patient outcomes and family functioning in both medical and psychiatric illnesses.[12-16] Hence, this is to be verified in the case of depression among PLWHA. Clinical experience holds that members of a family are influenced by the health of the other members, and family-oriented primary care can lead to improved health for both the individual patient and the family as a whole.[16, 17] In Africa, the rich cultural and family ties could be explored to manage patients with depression in chronic diseases like HIV/AIDS and this may have positive impact on the outcomes.

Depression is one of the most common psychological problems affecting nearly everyone either through personal experience (affective losses, incurable disease and rejection of any sorts) or through depression in a family member.[12] Over 67 % of Nigerian adults above 45years experience a period of clinical depression.[18] It is a common statement in the HIV clinic at Federal Teaching Hospital Ido-Ekiti, that patients have defaulted but nobody has actually considered the fact that patients may suffer from depression or even suicide in extreme cases. These patients often appear moody, have little talk, and most of them do not participate in clinical discussions. Currently, social workers are doing a great job of motivating patients. They meet patients at home to get to know them, encourage them to join support groups, and often encourage them to take their medications. Unfortunately,

this approach is increasingly failing because most patients do not want to be visited at home because of the stigma associated with the disease. In fact, majority of the patients give fake names and addresses in the clinic making them difficult to trace.

This study will contribute to the existing knowledge on effect of family support and care giver support and education on treatment outcomes of depression among PLWHA. This will be achieved by addressing the objectives. These goals include (i) evaluating the pattern of depression among PLWHAs present at the Federal Teaching Hospital. (i) Determining the relationship between family functioning and depression among PLWHA. (iii) Determining the relationship between CD4 count and depression and determines the relationship between BMI and depression in PLWHA and (iv) the effect of caregiver counselling on depression in depressed PLWHA.

Methods

Study Area

The study was conducted at the HIV clinic of the Federal Teaching Hospital (FETH) Ido-Ekiti. The FETH Ido-Ekiti is located in Ekiti State, in the Western zone of Nigeria, and about 30 km to the state capital. The 2006 population census by the National Population Commission put the population of Ekiti State at 2,384,212 people. The HIV prevalence for Ekiti State has risen from 0.2% in 2012 to 2.9% in 2014.[19] FETHI serves as a referral centre for other health institutions in Ekiti state and the environs. The overall prevalence of psychiatric disorders was reported to be as high as 59.1% among people living with HIV in Nigeria.[20]

The total number of patients seen in the HIV clinic at the time of this study was 1,010. There is a side laboratory where basic investigations like packed cell volume estimation, HIV-I & II and Hepatitis B & C screening, CD4 count and some other kit (serology) investigations could be carried out. The clinic holds twice in a week. The family physicians, internal physicians, and the laboratory physicians run the clinics. The care and support unit of the HIV clinic caters for the PLWHA referred from other clinics in and outside the FETHI.

Study Design

The study was a hospital based and intervention study on the effect of care giver counselling on depression among people living with HIV/AIDS attending Federal Teaching Hospital, Ido-Ekiti. The intervention was done for the study group and the result was compared with the control group. On-phone counselling was done for the patients for one month as the intervention.

Inclusion and Exclusion Criteria

All consenting adults that had been diagnosed with HIV infection and had been on treatment for at least 2 months at FETH Ido-Ekiti were considered as the respondents. Excluded from the study were patients with past history of mental illness and patients who had severe debilitating ailments that found it too distressing to express themselves.

Sample Size Estimation

This study has two parts. The descriptive part answered objectives i-iii and the intervention part which addressed objective iv. Therefore,

the sample size was also classified into two parts. The sample size for the descriptive part was estimated to be 271. However, to improve the power (external validity) of the study, 351 respondents were considered. They were over-sampled from 271. One hundred and forty nine respondents out of the 351 screened had depression. For the experiment, the estimated sample size was approximately 30 (for each of the two groups). To cater for attrition assuming an anticipated response of 80%, a sample size of 32 was used for each group. This is in order to increase the power and reliability of the study. Summarily, 351 PLWHV had Zung self-rating depression scale applied to them and 149 depressed patients were identified. Sixty four depressed patients were chosen using systematic random sampling, these were randomized into 32 intervention and 32 control groups.

The Intervention

In the first stage of the study, phone numbers of important collaborators/caregivers were written down (i.e. the persons who were concerned about the present health challenges of the client) for both the intervention and the control groups. This served as a gateway to the family. The investigator put phone calls across to these collaborators. Self-introduction was made by the investigator; he also acquainted them with the fourth objective of the study. The ailment, the grave complication which is depression and the dangerous consequences of depression if it was not well managed was all talked about.

The investigator went ahead to talk about the beliefs of the family members about the health challenges and how close or far their beliefs were from the scientific explanation of the ailment. He then tried to dispel the erroneous beliefs and reinforce the true/right beliefs, though non-judgmentally. The investigator spoke about other recent challenges other than the illness that the patient was passing through lately and he negotiated how a joint effort could be made by the family, friends and the physician to help him or her out of the predicaments. He also dwelt on how a robust family support could help the patient cope with the ailment. These discussions went under minimum of 3 sections for each client while each section lasted minimum of 10 minutes. The sections were once a week and this phase went on for one month. The intervention, was done for the intervention group. The intervention group had this intervention alongside their routine anti-retroviral treatment and this lasted for 4 weeks. The second group called the controlled group had only routine anti-retroviral treatment for the study period.

Results

The findings of the study are presented in the section. The majority (48.1%) of PLWHA in the clinic were of middle age (41-60years) [Table 1]. Over 74% of the participants were female and more than 47% lived below poverty line (living below $35.52/ N13500 per month).

Majority of the respondents had their body mass index (BMI) within the normal range and 53.3% had a CD4 count of between 200 and 350 cells/microliter. Also, fifty-five percent of the respondents had a moderately functioning family.

Figure 1 shows pattern of depression among the study population where 57% of the population

Table 1. Socio – demographic characteristics of the study population (PLWHA).

Variable	Frequency (N = 351)	Percentage (%)
Age (in years)		
20 – 40	142	40.5
41 – 60	169	48.1
61 – 80	40	11.4
Sex		
Male	89	25.4
Female	262	74.6
Marital Status		
Married	196	55.8
Single	44	12.5
Widowed	55	15.7
Separated	56	16.0
Income		
Less than N5,000	166	47.3
N5,001 – N20,000	111	31.6
N20,001 – N50,000	41	11.7
More than 50,001	33	9.4
Highest level of education		
No Formal Education	21	6.0
Primary	62	17.7
Secondary	191	54.4
Tertiary	77	21.9

Table 2. Health Characteristics of PLWHA

Variable	Frequency (N = 351)	Percentage (%)
BMI		
Underweight	48	13.7
Normal	201	57.3
Overweight	76	21.6
Obese	26	7.4
CD4		
Less than 200	59	16.8
200 – 350	187	53.3
351 – 500	94	26.8
Above 500	11	3.1
Family APGAR		
Highly functioning	56	16.0
Moderately functioning	193	55.0
Severely dysfunctional	102	29.0

Table 3. Relationship between family functioning and presence of depression among PLWHA

Variable	Presence of Depression		x^2	p – value
	No (%)	Yes (%)		
Family functioning			37.00	<0.001
Highly (n = 56)	45 (80.4)	11 (19.6)		
Moderately (n= 193)	122 (63.2)	71 (36.8)		
Severe dysfunction (n= 102)	35 (34.3)	67 (65.7)		
Total (n = 351)	202 (57.5)	149 (42.5)		

were not under depression but 15.1% were in severe depression. The prevalence of depression in this study was 42.5% [Fig 2]. There was statistically significant relationship between family functioning and presence of depression (p <0.001) [Table 3].

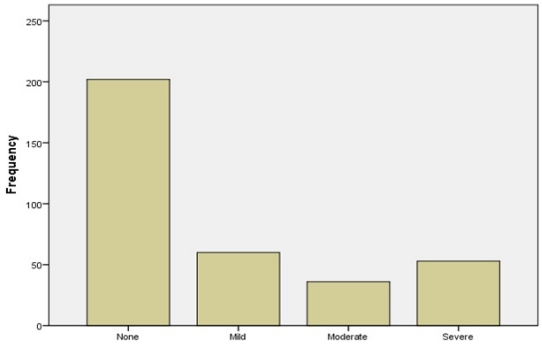

Figure 1. Pattern or depression among PLWHA

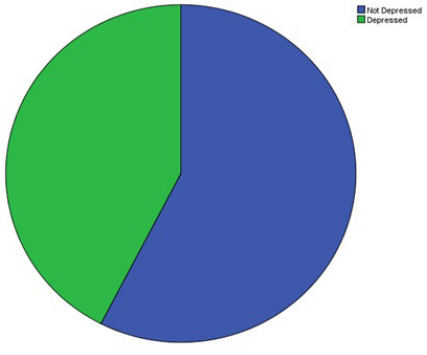

Figure 2. Pie chart of prevalence of depression among PLWHA in FETH Ido-Ekiti

The highest percentage of respondents in severe form of depression had a CD4 count of less than 350cells/ microliter. Those with CD4 counts above 500 were quite few. The CD4 count had a statistically significant effect on the severity of depression (p<0.001).

The relationship here had a U-shaped distribution with people in severe form of depression distributed more in the lowest and highest ranges (underweight and obese) of BMI. There is no significant difference in any of the socio-demographic characteristics between the study and the control groups.

The distribution of the socio-demographic characteristic among the study and control group were not skewed. None of the characteristics considered was statistically significant. The pre-intervention distribution of health variables differences between study and control groups were not statistically significant [Table 9]. The difference between the pre-intervention pattern of depression among intervention and control groups was not statistically significant (p = 0.334).

The difference between the pattern of depression in the post-intervention period among the study and control group was statistically significant with a p value of <0.001.

There was statistically significant difference between pre-intervention pattern of depression and post-intervention pattern of depression (p <0.001) in the study group. However, in

Table 4. Relationship between family functioning and severity of depression among the study population (PLWHA)

Variable	Severity of Depression				x^2	p –value
	None (%)	Mild (%)	Moderate (%)	Severe (%)		
Family Functioning					81.04	<0.001
Highly (n = 56)	45 (80.4)	5 (9.0)	3 (5.3)	3 (5.3)		
Moderately (n= 193)	122 (63.2)	44 (22.8)	16 (8.3)	11 (5.7)		
Severe dysfunction (n = 102)	35 (34.3)	11 (10.8)	17 (16.7)	39 (38.2)		
Total (n = 351)	202 (57.5)	60 (17.1)	36 (10.3)	53 (15.1)		

Table 5. The relationship between CD4 count and severity of depression among PLWHA

Variable	Severity of Depression				x^2	p – value
	None (%)	Mild (%)	Moderate (%)	Severe (%)		
CD4 Count					89.94	<0.001
Less than 200(n = 59)	9 (15.3)	22 (37.3)	16 (27.1)	12 (20.3)		
200 – 350 (n = 187)	106 (56.7)	31 (16.6)	12 (6.4)	38 (20.3)		
351 – 500 (n = 94)	80 (85.1)	6 (6.4)	6 (6.4)	2 (2.1)		
Above 500 (n = 11)	7 (63.6)	1 (9.1)	2 (18.2)	1 (9.1)		
Total (n = 351)	202 (57.5)	60 (17.1)	36 (10.3)	53 (15.1)		

Table 6. The relationship between BMI and severity of depression among PLWHA

Variable	Severity of Depression				x^2	p – value
	None (%)	Mild (%)	Moderate (%)	Severe (%)		
BMI					150.39	<0.001
Underweight (n = 48)	9 (18.8)	5 (10.4)	10 (20.8)	24 (50.0)		
Normal (n = 201)	155 (77.1)	25 (12.4)	8 (4.0)	13 (7.5)		
Overweight (n=76)	35 (46.1)	27 (35.5)	8 (10.5)	6 (7.9)		
Obese (n = 26)	3 (11.5)	3 (11.5)	10 (38.5)	10 (38.5)		
Total (n = 351)	202 (57.5)	60 (17.1)	36 (10.3)	53 (15.1)		

Table 7. Socio – demographic characteristics of study and control groups

Variable	Study (%) N = 32	Control (%) N = 32	X^2	p – value
Age (in years)			0.50**	0.779
20 – 40	15 (46.9)	16 (50.0)		
41 – 60	16 (50.0)	15 (46.9)		
61 – 80	1 (3.1)	1 (3.1)		
Sex			0.72	0.395
Male	10 (31.2)	7 (21.9)		
Female	22 (68.8)	25 (78.1)		
Marital Status			3.33	0.343
Married	15 (46.9)	12 (37.5)		
Single	7 (21.9)	5 (15.6)		
Widowed	4 (12.5)	10 (31.3)		
Separated	6 (18.7)	5 (15.6)		
Religion			0.143**	0.705
Christianity	29 (90.6)	27 (84.4)		
Islam	3 (9.4)	5 (15.6)		
Highest Level of Education			2.031**	0.566
No Formal Education	1 (3.1)	4 (12.5)		
Primary	9 (28.1)	10 (31.2)		
Secondary	13 (40.6)	14 (43.8)		
Tertiary	9 (28.1)	4 (12.5)		

** Yates' Chi Square

Table 8. Socio-demographic characteristics of study and control groups

Variable	Study (%) N = 32	Control (%) N = 32	X^2	p – value
Occupation			1.92	0.383
Unemployed	5 (15.6)	7 (21.9)		
Self Employed	15 (46.9)	18 (56.2)		
Civil Servant	12 (37.5)	7 (21.9)		
Income			0.292**	0.962
Less than N5,000	22 (68.7)	21 (65.6)		
N5,001 – N20,000	3 (9.4)	5(15.6)		
N20,001 – N50,000	4 (12.5)	2 (6.3)		
More than 50,001	3 (9.4)	4 (12.5)		

Table 9. Health characteristics of the study and control groups

Variable	Study (%) N = 32	Control (%) N = 32	X^2	p – value
BMI			3.15	0.369
Underweight	6 (18.8)	9 (28.1)		
Normal	9 (28.1)	13 (40.6)		
Overweight	10 (31.2)	6 (18.8)		
Obese	7 (21.9)	4 (12.5)		
CD4			1.31**	0.726
Less than 200	3 (9.4)	4 (12.5)		
200 – 350	18 (56.2)	20 (62.5)		
351 – 500	8 (25.0)	7 (21.9)		
Family APGAR			0.94	0.623
Highly functioning	8 (25.0)	5 (15.6)		
Moderately functioning	16 (50.0)	17 (53.2)		
Severely dysfunctional	8 (25.0)	10 (31.2)		

** Yates' Chi Square

Table 10. Pre-intervention pattern of depression among intervention and control groups

Variable	Study (%) N = 32	Control (%) N = 32	X^2	p – value
Pattern of Depression			2.19	0.334
Mild	14 (43.8)	11 (34.4)		
Moderate	5 (15.6)	10 (31.2)		
Severe	13 (40.6)	11 (34.4)		

Table 11. Post-intervention pattern of depression among the study and control groups

Variable	Study (%) N = 32	Control (%) N = 32	X^2	p – value
Pattern of Depression			25.38	<0.001
None	19 (59.4)	1 (3.2)		
Mild	5 (15.6)	13 (40.6)		
Moderate	6 (18.8)	8 (25.0)		
Severe	2 (6.2)	10 (31.2)		

Table 12. Comparing the pattern of depression between the pre-intervention period and post-intervention period for both study and control groups

Variable	Study		Control	
	Pre Intervention	Post Intervention	Pre Intervention	Post Intervention
Pattern of Depression	N = 32	N = 32	N = 32	N = 32
None	0 (0.0)	19 (59.4)	0 (0.0)	1 (3.2)
Mild	14 (43.8)	5 (15.6)	11 (34.4)	13 (40.6)
Moderate	5 (15.6)	6 (18.8)	10 (31.2)	8 (25.0)
Severe	13 (40.6)	2 (6.2)	11 (34.4)	10 (31.2)
Statistics	$X^2 = 31.42$ $p < 0.001$		$X^2 = 1.44$ $p = 0.696$	

the control group, there was no significant difference in the patterns of depression for both pre-intervention and post-intervention since the p-value is 0.696.

Discussion

In this study, family functionality had a direct relationship with the presence of depression. After the intervention (caregiver counselling), 59.4% of the depressed patients in the intervention group recovered from depression as opposed to 3.2% in the control group. Therefore, there is a statistically significant effect of caregiver counselling on depression among PLWHA. It was also revealed by the study that the prevalence rate of depression among PLWHA is quite high and that the CD4 had a statistically significant association with the severity of depression.

The prevalence of depressive disorders among HIV/AIDS patients attending the adult retroviral clinic in Federal Teaching Hospital Ido-Ekiti was 42.5%. Sixty (17.1%) had mild depression while 53(15.1%) had severe form of depression. This result is less than the 57% reported in.[20] The lower prevalence could be attributed to the fact that a different tool (The patient health questionnaire PHQ-9) was used in.[20] However, this is similar to previous findings among PLWHA patients and the prevalence falls within the rates seen internationally.[21-25]

In this study, family functionality had a linear relationship, those who had poor family support being more prone to depression. This supported the finding of[26] where it was reported that perceived family support was inversely associated with depression.

This also shows that CD4 count has an inverse relationship with the chance of developing depression, that is the higher the CD4 count of a patient the less likelihood he/she will develop depression. This was at variance with a South African research which showed that there was no correlation between depression and CD4 counts with p-value < 0.05.[27] These differences in observation in the two studies could be explained by the fact that the number of respondents of the South African study was smaller than the one used in this study, 41 as against 351. Also, only 15% of the respondents in the South African study were married as opposed to 55.8% who are married in this study. Furthermore, marital status could have an effect on nutrition because married people are more stable and they could have regular planned meals as opposed to unmarried people. This could have a positive effect on their nutrition and by extension have an effect

on the CD4 count. Moreover, different tools were used to screen for depression in the two studies; Zung's self-rating Depression scale in this study and Beck's Depression Inventory (BDI) in the South African study.

In the intervention phase of this study, 32 respondents were recruited for the intervention with the same number of controls. The socio-demographic characteristics, health variables and family functioning of each group were equally compared. In the pre-intervention stage, 40.6% of the study group were in severe depression, 15.6% and 43.8% were in moderate and mild respectively. The control groups had 34.4% in both severe and mild depression respectively and 31.2% in moderate depression. The difference in the pattern of depression for the two groups was not statistically significant (p= 0.334). After one month of caregiver counselling, the 40.6% of the intervention group that were in severe depression had reduced to 6.2% and 59.4% of the intervention had no depression. The difference between post-intervention stage and pre-intervention stage was statistically significant ($p<0.001$). However, this was not so for the control group because there was no statistically significant difference in the pattern of depression between the two stages. The p-value was 0.696.

This study shows that the prevalence rate of depression among PLWHA was 42.5% which is similar to the (40.0%) reported in.[28] The findings of this study were also similar to the findings of [29] that concluded that the prevalence of depression among patients attending the general medical out-patient clinics is high and highly under-recognised.

Conclusion

Since there is a statistically significant relationship between family functioning and the presence of depression, family functioning should be critically examined. The pre-intervention distribution of health variables differences between study and control groups were not statistically significant but CD4 count had a statistically significant effect on the severity of depression. Care giver counselling program among depressed HIV patient in this study had a positive impact on the outcome of management of depression in the intervention group as there is reduction in the level of depression.

Limitations of the study

This study was carried out in a tertiary health care setting with the findings not likely to be applicable to the general population. The HIV patients used in this study were in specialized HIV clinics not in general outpatient clinics, this leads to a tendency for over estimation of depressive disorders in them because of the stigma associated with such clinics. Lastly, the intervention was short due to time constraints, further research should be of a longer duration to determine if the effect of care giver counselling on depression among PLWHA is sustainable.

Recommendations

According to the findings of this study, the following is recommended

1) Attending physicians in HIV/AIDS clinics should routinely screen patients for depression because there is a high prevalence of this co-morbidity among

HIV/AIDS patients.

2) Caregivers should be encouraged to come out of obscurity to have an active appearance in the clinics for proper education and counselling because it has been revealed that they could be a useful resource in the management of these patients.

3) Further research needs to be done using randomized controlled trials on the effect of caregiver counselling or education on the outcomes of their care recipients. This is because the majority of the studies seen in the literature looked at the effect of caregiver counselling on the caregiver outcomes not the effect of caregiver counselling on the care recipient outcomes.

Conflict of interest

There is no conflict of interest.

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References

1. Gadamaya M, Shehu S. Prevalence and factors associated with depression in HIV/AIDS patients at Aminu Kano Teaching Hospital Nigeria. AIDS 2006;XVI International AIDS conference. AIDS 2006 South Africa: NSPISA;2012.

2. Oriol G, Jennifer M, Kate F, Trent S, Ben R (Eds.) Depression and HIV. Proceedings of the XIX International aids conference. AIDS 2012. CDM Publishing. Washington DC.

3. Becker D. (2021) Depression symptoms by age group https://www.sutterhealth.org/health/mental/depression-by-age

4. Abdullah A.M, Lara A.M Abdullah B, Moon F.C., Badar S.R.A., Nasser A.S, and Samir A.A.(2020). Prevalence and correlates of depressive symptoms among people living with HIV attending tertiary care hospitals in Oman. Pan Afr Med J. 2020; 37: 90.

5. Chapman DP, Perry GS, Strine TW. The vital link between chronic disease and depressive disorders. Prev Chronic Dis[serial online] 2005.

6. Bach XT, Roger CMH, Cyrus SHH, Carl AL, Hai TP, Giang HH, Giang TV, Jiangbo Y, Melvyn WBZ. Depression among Patients with HIV/AIDS: Research Development and Effective Interventions (2019) Int J Environ Res Public Health.16(10): 1772-1781.

7. Evans DL, Have TDT, Douglas SD, Gettes DR, Morrison M, Chiappini MS, Brinker-Spence P, Job C, Mercer DE, Wang YL, Cruess D, Dube B, Dalen EA, Brown T, Bauer R, Petitto JM.(2002). Association of depression with viral load, CD8 T lymphocytes, and natural killer cells in women with HIV infection. Am J Psychiatry, 159(10):1752-1759.

8. Mark CRN. Dealing with HIV and depression when sadness takes over. www.about.com. Health, Disease and Condition 2009.

9. Ndu AC, Arinze-Onyia SU, Aguwa EN, Obi IE. Prevalence of depression and role of support groups in its management: A study of adult HIV/AIDS patients attending HIV/AIDS clinic in a tertiary health facility in South-eastern Nigeria. J Pub Health Epidem 2011; 3(4):182-186.

10. Revah-Levy A, Speranza M, Barry C, Hassler C, Gasquet I, Moro M, et al. Association between Body Mass Index and depression; the "fat and jolly" hypothesis for adolescent girls. BMC Pub Health 2011; 11:649.

11. Li L, Wu Z, Sun S, Cui H, Jia M. Understanding family support for people living with HIV/AIDS. AIDS Behav 2006; 10(5):509-517.

12. Berman E, Heru A, Grunebaum H, Josephson A, Miller G, Rolland J, et al. Family oriented care in adult psychiatric residency training. University of Pennsylvania Department of Psychiatry 2013. pp3-11.

13. Rank J. Definition of family − Theoretical definition. http://family.jrank.org.

14. Alison M. H. Family Psychiatry: From Research to Practice. Am J Psychiatry 2006; 163:962-968.

15. Effect of a psycho-educational intervention for family members on caregiver burdens and psychiatric symptoms in patient with schizophrenia in Shiraz, Iran. Available from http//www.biomedcentral.com.

16. Ronald M. E and Richard L. S, Jr. The Value of Patient-Centered Care. Ann Fam Med 2011; 9:100-103; doi: 10.1370/afm.1239.

17. McDaniel SH, Thomas LC, Jeru H, Alan L. Family-oriented primary care 2nd Edition 2005. Springer Science + Business Media Inc. USA.

18. Afolabi MO. Pattern of depression among patients attending general medical practice clinic, Wesley Guild Hospital Ilesa. Dissertation thesis 2008, Wesley Guild Hospital Ilesa, Nigeria.

19. Nigeria 2006 census figures (Population)-Nigeria masterweb. http://www.nigeriamasterweb.com/nigeria06censusfig.html.

20. Shittu RO, Issa BA, Olanrewaju GT, Odeigah LO, Sanni MA, Aderibigbe. Correlates and Consequences of International Stigma of Mental Illness Among People Living with HIV/AIDS in Nigeria. West Afr J AIDS and HIV Res 2014; 6(2):44-52.

21. Gupta R, Dandu M, Packel L, Rutherford G, Leiter K, Phaladze N. Depression and HIV in Botswana, a population based study on gender-specific, socio-economic and behavioural correlates. Plos One 2010; 5:e14252.

22. Kaharuza FM, Brunell R, Moss S, Purcell DW, Bikaako-Kajura W, Wamai N,

et al. Depression and CD4 Cell Count among Persons Living with HIV and Infection in Uganda. AIDS Behav 2006; 10(4): S105-S111.

23. Myer L, Smit J, Roux LL, Parker S, Stein O, Seedat S. Common Mental Disorders and Validation of Brief Psychiatric Rating Scales. AIDS Patient Care STD 2008;22; 147-158.

24. Nakimidi Mpungu E, Musisi S, Katabiha E, Niechega J, Bass J. Prevalence and Factors Associated with Depressive Disorders in an HIV + Rural Patient Population in Southern Uganda. J Affect Disord 2011; 135: 160-167.

25. Marwick KF, Kaaya SF. Prevalence of Depression and Anxiety Disorders in HIV-positive Outpatients in Rural Tanzania. AIDS Care 2010; 22: 415-419.

26. Stephanie W, David C, Johyn Aaker. Caregiver support Interventions. Family caregivers in California 2004. pp 49-74.

27. Richard.S, Alison O'Brien, Sara C, Marcia O, Rachel N, Lynn M.M, et al. Dementia Caregiver Intervention Research: In search of clinical significance. Gerontologist. Oct 2002; 42(5):589-602.

28. Igie I, Udoh M (2011) Prevalence of depression in HIV/AIDS patients,Lagos state university hospital (LUTH), Lagos, Nigeria. International AIDS society, 6th IAS conference on HIV Pathogenesis, Treatment and Prevention. Rome, Italy.

29. Obadeji A, Oluwole LO, Dada MU, Ajiboye AS, Kumolalo BF, Solomon OA. Assessment of depression in a primary care setting in Nigeria using the PHQ-9. Journal of Family Medicine and Primary of Care 2015(4):30-4.