

Influence of Stigma Consciousness and Coping Strategies on CD4 Counts of Persons with HIV/AIDS

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Abstract: *Influence of stigma consciousness (belief or feeling that one will be negatively stereotyped by others) and coping strategies (social support, information and problem) on the CD4 counts (measure of immune system) of People Living With HIV/AIDS (PLWHA) were examined. 430 PLWHA (men=148 & women=282), aged 17 to 70 (M=35.73; SD=8.4) years were studied. Anti Retroviral Therapy (ART) sites were randomly selected from the study area. All PLWHA in the three ART sites' enrolments were used. Measures of CD4 counts of PLWHA were obtained from ART records. Stigma consciousness was measured using stigma consciousness questionnaire Pinel (1999) while social support scale Turner, Frankel, and Levin (1983), information coping scale (Kalichman et al, 2006), and ways of coping inventory (Folkman & Lazarus, 1980) measured coping strategies. 4-way analysis of variance statistic revealed that stigma consciousness had significant influence on CD4 counts of PLWHA, $P = .001$. Social support had significant main effect on CD4 counts of PLWHA, $P = .001$. Information coping had significant main effect on CD4 counts of PLWHA, $P = .001$. And, problem coping produced significant real effect on CD4 counts of PLWHA, $P = .05$. Psychosocial variables affected immune system of PLWHA. Stigma consciousness and CD4 counts of PLWHA were extended to psychoneuroimmunology literature. Outcome of this study will be utilized by PLWHA, psychologists/counsellors, healthcare workers, and policy makers. Discussions were based on immunocompetence model of Jemmott and Lock (1984) which holds that psychosocial stressors lower immune system efficiency.*

Keywords: *stigma consciousness, coping strategies, psychosocial variables, CD4counts, immune system, HIV/AIDS.*

I. Introduction

Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) management calls for consideration of salient psychosocial variables experienced by People Living With HIV/AIDS (PLWHA). Understanding and taking into account psychosocial variables, example stigma consciousness and coping strategies (social support, information and problem copings) can guarantee effective service delivery in caring and healthy condition for PLWHA despite negative attitude of the society towards PLWHA.

Unfortunately, the society devalues, rejects and discriminates against people infected with HIV/AIDS, thereby inducing psychological condition of stigma consciousness on such people. Stigma consciousness is an expectation that one will be negatively stereotyped (Pinel, 1999). Stigma consciousness spawns psychological devastation that poses problems on management of HIV/AIDS, especially if the immune system of PLWHA as indicated in their CD4 counts (index of immune system among PLWHA) are affected by such psychological devastation (Anyaegbunam, 2010).

Undoubtedly, the individuals who are stigmatized, conditions degenerated into stigma consciousness and who frantically attempt to affiliate with their kin, may share the same experience of the painted bird (Jerzy Kosinski, as cited in Pryor & others, 2004).

The painted bird circled from one end of the flock to the other, vainly trying to convince its kin that it was one of them. But, dazzled by its brilliant colours, they flew around it unconvinced. The painted bird would be forced farther and farther away as it zealously tried to enter the ranks of the flock.

What could occupy the psychological conditions of the painted bird? Likely, the painted bird feels rejected, negative self-image, devalued, discredited, and internal sense of shame, thus becomes stigma conscious by internalising those psychological conditions and become worried about them. Applied to PLWHA, that are stigmatized, stigma consciousness will arise. Thus, stigma consciousness is conceptualized in this study as

psychological internal state, which disposes those PLWHA to believe or feel that others will negatively stereotype them because of their HIV/AIDS seropositive status.

Perceiving enacted stigma (stigma consciousness), people shape their behaviours to avoid or reduce enacted stigma which may eventually slim their opportunities for seeking support and treatment (Scambler, 1998; Swendeman, Rotheram-Borus, Comulada, Weiss & Ramos, 2006). Stigma consciousness can bring about negative psychological conditions leading to poor health condition among PLWHA by affecting their immune system functioning as indicated in CD4 counts. Study never provided plausible explanation on the roles of stigma consciousness of the stigmatized individuals on their immune systems. Hence, the need for this study to be conducted using PLWHA.

Experiencing life-threatening illness such as HIV/AIDS, people tend to engage in self-reevaluation and negative social identities can occur, necessitating application of coping strategies to shock-absorb the psychological devastations that occur. Coping involves cognitive processes that begin with perception of a stimulus. When individual living with HIV/AIDS perceives a condition as threatening, he or she engages in appraisal and evaluation of the extent to which any action he or she takes will be useful in saving the situation. The individual consciously or unconsciously propagates coping mechanism immediately he discovers that as route to relief. Social psychological researches have shown that humans are active agents who have an amazing ability to recover from negative life events (Major, 1994; Taylor & Brown, 1988), but through application of appropriate coping strategies.

Scholars have defined coping in many ways (for review see, Davison & Neal, 2001; Weber & Manning, 2001 & Folkman & Lazarus, 1988). Coping is said to have occurred when people engage in generating their assumed positive behaviours as responses to forces that affect them, while coping strategies imply application of any coping mechanism to checkmate negative psychological and physical feelings. Coping prevents damaging emotions which can render immune system inactive (Scheck & Kinicki, 2000). Coping strategies, for instance, social supports available to the individuals living with HIV/AIDS can influence their immune systems. Social support is the physical and emotional comfort given to people by their family, friends, co-workers and others.

Two types of social support have been identified (Davison & Neal, 2001). These include *structural social support* - a person's basic network of social relationships, for example marital status and a number of friends; and *functional social support* - the quality of a person's relationships, for example, whether the person believes he/she has friends to call on in time of need (Cohen & Wills, 1985).

Few studies (e.g. Mulder, de Vroome, Van Griensven, Antoni & Standfort, 1999) have examined the association between social support and immune system using CD4 count as measure among PLWHA while others did but not with CD4 counts (Kessler & Mcleod, 1985; Kiecolt-Glasser, 1985; 2002). Studies have considered some coping styles, for example social support, to predict health (Berkman, 1995; Ryff & Singer, 2000). And health risks are greater among lonely people, who often experience more stress, sleep less well, and commit suicide more often (Cacioppo, Hawkley & Bernston, 2003). However, these studies were not designed to examine the influence of different levels of social support on immune system among PLWHA using CD4 count as measure.

People adopt other dimensions of coping while in different experiences of life. To Lazarus and Folkman (1984, 1980) and Kalichman et al (2006) two broad dimensions of coping exist e.g. problem-focused and avoidant coping. This involves taking direct action to solve the problem or making efforts to reduce the negative emotional reactions to stress, for example, by distracting oneself from the problem, or relaxing; again information seeking and avoidant coping which refers to seeking information that will be relevant for the solution of the problem or avoid information that will cause harm or emotional problem or distress.

Earlier studies have shown that problem-focused coping and information avoidant coping are related (Carver, Scheier, & Weintraub, 1989; Folkman & Lazarus, 1980; Miller & Mangan, 1983) and problem focused and avoidant coping styles are found to be related (Kalichman, Benotsch, Weinhardt, Austin, Luke, & Cherry, 2003; Kalichman & Others 2006) among PLWHA.

Psychosocial problems arise when PLWHA are bogged with stigma consciousness. Some suffer from social illnesses that may result from inappropriate application of coping strategies e.g. social withdrawal, lack of social affiliation, dissociation, anxiety, depression, hopelessness, emotional instability and cognitive imbalance, which affect health negatively by reducing immune system functioning. Use of coping strategies may be important for health improvement.

Such social problems have presumably caused a young woman of 25 years old and HIV/AIDS seropositive from a community in Anambra State to commit suicide. Circumstances surrounding the death of the young woman formed source of inspiration for this study to be conducted in Anambra State of South East Nigeria. The young woman's husband died about three years after their marriage of a protracted illness believed to be HIV/AIDS. About one year after the death of her husband, the young woman became sick. When the young woman was diagnosed HIV/AIDS seropositive, she was believed to have been engulfed by stigma

consciousness. Rather than seeking intervention, she decided to end up her life by committing suicide through drinking concoction. The idea to commit suicide became known through her mother, whom she disclosed to shortly before giving up. Her reason was to save face since many people must have known about her HIV/AIDS seropositive status, evidenced from her late husband's case. This proves that PLWHA are bogged with internal states in form of emotions that make them experience stigma consciousness that impairs ability to apply appropriate coping strategies thereby affecting their health. Application of appropriate coping strategies would have saved her suicidal tendency resulting from stigma consciousness.

CD4 count is an index or measure of body's immune system among PLWHA. Primarily, immune system helps the body resist disease (Rice, 1998). Low level of stigma consciousness favours immune system functioning and not the reverse (Anyaeunam, 2010). CD4 count as an index for measuring immune system efficiency forms routine test for determination of health condition among PLWHA. A healthy person has between 500 and 1600 CD4 counts (Mark, 2007). Mostly, PLWHA have CD4 counts below 350. This varies according to severity of the disease.

An individual infected with HIV/AIDS who accesses social support, seeks correct information, and actually focuses on problems associated with managing HIV/AIDS is likely to develop positive emotion that will favour his/her CD4 counts. Central to the relevance of the present study lies on understanding some psychosocial variables necessary for taking adequate care of PLWHA. Most social scientists, psychologists/counsellors or healthcare workers may feel aversive caring for PLWHA. This results from lack of understanding some internal states of PLWHA such as stigma consciousness and application of appropriate coping strategies. Often times, healthcare experts try to design intervention without considering psychosocial variables. Of course, understanding stigma consciousness, and coping strategies implications on PLWHA will surely inform interventions designed to rehabilitate and improve the social well-being and overall health of PLWHA. Therefore, as a result of dearth in scientific knowledge in those areas, this study investigated the influence of stigma consciousness and coping strategies on immune system among PLWHA as indicated in their CD4 counts.

This study is based on immunocompetence model -the ability of immune system to protect the body at any given time (Rice, 1998). Immunocompetence model was developed to concern with casual connections between psychosocial variables such as grief following loss of a loved one and biological variables such as immune efficiency (Jemmott & Locke, 1984). The model was based on the hypothesis that psychosocial stressors lower immune system efficiency, which leads to an increase in medical symptoms (either morbidity or mortality), and the risk for disease, the course of illness, and remission of symptoms may all be related to the interaction of psychosocial factors with the potency of biological threat, for example CD4 counts.

Studies support immunocompetence model (e.g. Totman & Kiff, 1979; Kasl, Evans & Niederman, 1979), even in animal studies (e.g. Sklar & Anisman, 1980; Ader, 1983; Bovbjerg, Cohen & Ader, 1987). Therefore, enough evidences have been established on the link between psychosocial variables and immune system. Thus, there is need for the present study among seropositive individuals.

Psychoneuroimmunology studies have linked immune system with psychosocial variables such as grief caused by death of loved one, however, the present study has scientific relevance in that it will be an extension of literature in that direction, by demonstrating a connection between stigma consciousness and CD4 count.

Hypotheses

1. People living with HIV/AIDS that scored low in stigma consciousness scale will tend to have higher immune system than those who scored high in stigma consciousness scale.
2. People living with HIV/AIDS who scored high in social support will tend to have higher immune system than those who scored low in social support measure.
3. People living with HIV/AIDS who seek information will be expected to have higher immune system than those who avoid information.
4. People living with HIV/AIDS who focus on problem will be expected to have higher immune system than those who avoid problem.

II. Method

Participants

Four hundred and thirty (148 = men; 282 = women) PLWHA recruited from population of PLWHA in Anambra State were participants; aged between 17 and 70 ($M = 35.73$; $SD = 8.4$) years. The participants were recruited from PLWHA that enrolled for Antiretroviral Therapy (ART) in Anambra state and whose HIV/AIDS seropositive status and CD4 counts were known, at least six months, through regular monitoring of CD4 counts, as at the time of this study. CD4 count is tested every six months to monitor immune system functioning.

Three major ART sites (hospitals) were selected, one from each of the senatorial zone adopted as stratum in Anambra State. Three senatorial zones of Anambra state included, Anambra Central, Anambra North and

Anambra South each with seven local government areas. The senatorial zones were adopted as strata for this study. From each stratum, one ART site was selected. Samples were selected from the three ART sites as follows; General Hospital Awka = 101 central; St. Charles Borromeo Hospital Onitsha=156 north; and Nnamdi Azikiwe University Teaching Hospital Nnewi = 173 south. The three hospitals were the best-equipped and oldest ART sites with the largest enrolments from their strata. Actual selection of participants was based on the population that visited the sampled ART sites in the months of August and September 2009 for ART, since they were always on two months routine appointment.

Pregnant women living with HIV/AIDS were eliminated since they were casually considered to, either suffer from some pregnancy conditions that are capable of affecting their immune system or receive medical attention capable of boosting up their immunocompetence levels. In addition, children under 15 years and have HIV/AIDS were excluded since they have not had enough exposure to account for experiences of stigma consciousness or engage in information coping. Moreover, PLWHA who also suffer from diabetes, tuberculosis or asthma were excluded from the study since they were considered to have comorbidity that could cause preexisting immune system damage.

Instrument

Stigma consciousness questionnaire (SCQ) Pinel (1999) with 10 items ($\alpha = .74$), 15-item Provision of social relations scale Turner, Frankel and Levin (1983), Ways of Coping Inventory Folkman and Lazarus (1980), Information Coping scale (Kalichman & others, 2006), and patients' folders were instruments used. Pilot studies were conducted to validate and establish the reliability of the instruments.

However, to the researcher's awareness, SCQ has not been used on people living with HIV/AIDS in Nigerian culture. The 10-item questionnaire was modified for use with people living with HIV/AIDS. (Sample items are: *Discrimination about HIV/AIDS has not affected me. And, most healthy people have a lot more HIV/AIDS thoughts than they actually express.*) Then, in a pilot study, the researcher found the validity and reliability of modified instrument by administering it to 46 PLWHA. Principal component factor analysis with Varimax rotation revealed eigenvalue of .30 loadings and above for all the 10 items and internal consistency ($\alpha = .77$).

15-item Provision of Social Relations (PSR) developed to measure social support (Turner, Frankel & Levin, 1983) and has two dimensions, family support and friend support collected information on social support. (Samples: *whatever happens, I know my family will always be there for me should I need them. And, when I am with my friends, I feel completely able to relax and be myself.*) The authors reported concurrent validity correlating significantly with the Kaplan scale of social support and internal consistency, with alpha that range from .75 to .87.

In another pilot study, the researcher also standardized the instrument by administering it to 36 students resulting to internal consistency ($\alpha = .71$). 8-item Ways of Coping Inventory (Folkman & Lazarus, 1980) was used to measure problem coping on dimensions of problem focus and problem avoidance, with four items on each dimension. Problem focus measures include items, such as *I knew what had to be done and worked hard at it*; and problem avoidance, *I avoided the situation*. The instrument was found reliable $r(32) = .62$ alpha.

Finally, (Kalichman et al, 2006) information coping scale was used to measure information seeking and avoidance. Information seeking has three items and information avoidance has two items. The items on information seeking were modified to reduce ambiguity e.g. *"I feel like knowing what my medical treatment plan is; I can run as many medical tests as required: And, I can look up information for medications.* Information avoidance items include, *I would do as my doctor said without questions. And, I would do all that I could to block the negative news from my mind.* Kalichman et al (2006) reported information – coping scales to be internally consistent ($\alpha > .75$). However, following its scant use in this culture (Nigeria), the researcher re-standardized the instrument in another pilot study by administering it to 40 PLWHA. Internal consistency was $\alpha = .65$.

Procedure

The instruments on stigma consciousness, social support, information coping, and problem coping were used as part of routine evaluations during adherence counseling. Since people living with HIV/AIDS are familiar with adherence counseling as they attend routine antiretroviral therapy, after assurances of confidentiality of responses, there was no objection to respond to the administration of the instruments during data collection. Before administering the questionnaire items, their current CD4 counts, age, and gender were extracted from their respective hospital folders.

So, the instruments on stigma consciousness, social support, information coping, problem coping, and provision for information on bio-data (e.g. age and gender) were administered to the participants individually. (Besides, information was collected on method of treatment and covariate with psychosocial variables.) At the end, the questionnaires were collected back from them on the spot. Data collection lasted for two months

simultaneously in all the selected ART sites with the assistance of adherence counselors attached to the ART sites.

Design/method of data analysis

This is a survey study with complex design and has immune system measured using CD4 count as dependent variable (DV). Archival method, in which measures of the participants' CD4 counts were collected from ART records, was used in collecting data for the dependent variable. Independent variables (IVs) are stigma consciousness, social support, information coping, and problem coping. The independent variables were manipulated at two levels each (high and low) using independent groups design. Thus, 2 groups of stigma consciousness (low and high) X 2 groups of social support (low and high) X 2 groups of information coping (information seeking and avoidance) X 2 groups of problem coping (problem focus and avoidance) factorial design resulting to 16 treatment conditions or cells was adopted.

Use of drugs for treatment by PLWHA, that is administration of Anti-Retroviral Therapy (ART), can influence immune functioning among PLWHA. Thus, treatment was used as a covariate to control for influence of Anti Retroviral drug (ARV) and was measured on two levels thus, using drugs and not using drugs. This reduced doubt on the plausible and interesting outcome of this study.

The four instruments, stigma consciousness, social support, information coping, and problem coping were scored on 5-point options of strongly agreed (SA), agree (A), undecided (UD), disagree (D), and strongly disagree (SD). The responses were converted to numerical values so that SA = 5, A = 4, UD = 3, D = 2 and SD = 1. Mean and standard deviation scores were computed to determine high and low levels of stigma consciousness and social support, those who seek information and those who avoid information, and those who focus on problem and those who avoid problem. For stigma consciousness measure, the lowest possible score was 10 while the highest possible score should be 50 since the instrument has 10 items scored on 5-point options. Thus, the median score was used to determine high and low levels of stigma consciousness. Those who scored below the median were adjudged low stigma conscious while those who scored above the median were labeled high stigma conscious. So, scores between 10 and 29 were regarded as low stigma consciousness while scores between 30 and 50 were labeled high stigma consciousness.

The same method was applied to low and high levels of social support. The lowest possible score was 15 while the highest possible score was 75 since there were 15 items rated on 1 - 5 continuums. Thus, those who scored between 15 and 45 were adjudged low social support while those who scored between 46 and 75 were labeled high social support.

Also, the same method was further applied to information coping and problem coping. For information coping, the least possible score was 5 and the highest possible score was 25 since the instrument has 5 items scored on 5 – point option. Thus, the median score was used to determine information seeking and avoidance. Scores between 5 and 14 were adjudged as information avoidance while scores between 15 and 25 were labeled information seeking.

The same method was applied to problem coping. Those who scored between 8 and 23 were adjudged problem avoidance while those that scored between 24 and 40 were regarded as being problem focus.

Then, to test the predictions of the hypotheses, the data generated were subjected to four-way analysis of variance (4-way ANOVA). This took care of the four independent variables of stigma consciousness, social support, information coping, and problem coping at a stretch. Four-way analysis of variance is appropriate statistic for a complex design study that adopts 2 X 2 X 2 X 2 - factorial design.

III. Results

To determine the level to which stigma consciousness, social support, information and problem copings influenced immune system functioning measured using CD4 counts among PLWHA, a 4–way analysis of variance statistic was performed using statistical package for social sciences (SPSS). Different levels of stigma consciousness (low and high), social support (low and high) and types of information coping (seeking and avoidance) and problem coping (focus and avoidance) were treated as independent variables while CD4 counts of PLWHA were measured as dependent variable. The results of data analysis that tested the propositions earlier stated for this study and their interpretations were presented in the sections that follow.

Table 1
Mean and standard deviation of stigma consciousness, social support, information, and problem copings on CD4 counts.

Source	N	M	SD
Stigma consciousness			
Low	227	452.79	206.77
High	203	286.19	156.58
Social support			
Low	152	258.29	156.12
High	278	437.49	197.03
Information coping			
Information seeking	333	409.74	202.18
Information avoidance	97	251.93	149.53
Problem coping			
Problem focus	282	387.64	200.42
Problem avoidance	148	348.41	204.58

Note: n = Number of participants; M = Mean; SD = Standard deviation

The results of 4-way analysis of variance that tested the four hypotheses produced significant main effects in each case (See Table 2). Stigma consciousness produced significant main effect on the CD4 counts PLWHA used in this study. Those who were of low stigma consciousness scored ($M= 452.79$; $SD = 206.77$) whereas those of high stigma consciousness had score ($M=286.19$; $SD = 156.58$), $F(1,414)= 35.52$, $P = .001$. Therefore, the hypothesis which stated that those PLWHA who scored low in stigma consciousness scale would have higher immune system, as measured using CD4 counts, than those who scored high in stigma consciousness measure was confirmed.

Also, similar statistic that tested the second proposition produced significant main effect. Those PLWHA who were high in social support scored ($M = 437.49$; $SD = 197.03$) as against their counterparts who scored low in social support and had CD4 counts score ($M = 258.29$, $SD = 156.12$), $F(1,414) = 28.42$, $P = .001$. Therefore, the prediction that those who scored high in social support measures would also score high in CD4 counts among PLWHA used in this study was upheld.

Similarly, a significant difference was found between those who avoid information and those who seek information on their immune system as measured in CD4 counts. Those who avoid information scored ($M = 251.93$; $SD = 149.53$) less than those that seek information who scored ($M = 409.74$; $SD = 202.18$), $F(1,414) = 37.76$; $P = .001$. Thus, the hypothesis which proposed that those who seek information would score more than those who avoid information in CD4 counts was also confirmed.

Finally, problem coping produced significant main effect on CD4 counts of PLWHA used in this study. Those who focus on problem scored ($M = 387.65$; $SD = 200.42$) more than those who avoid problem that scored ($M = 348.41$; $SD = 204.58$), $F(1,414) = 3.81$, $P = .05$. Therefore, the fourth hypothesis which stated that those who focus on problem would score more than those who avoid problem in CD4 counts among PLWHA was also confirmed. Interaction effects were not found.

Table 2
Summary of 4-way Analysis of Variance of stigma consciousness, social support, information, and problem copings on CD4 counts.

Source	SS	df	Ms	F	P	Sig.
Lstigmac (A)	972904.93	1	972904.93	35.52	.001	*S
Levsocsu (B)	778382.52	1	77832.52	28.42	.001	* S
Typeoinf (C)	1034150.11	1	1034150.11	37.76	.001	*S
Typofpc (D)	104372.46	1	437102.64	3.8	.05	*S
A X B	25.50	1	25.50	.001	.98	**n.s
A X C	43.72	1	43.72	.002	.96	**n.s
A X D	2570.30	1	2570.30	.09	.76	**n.s
B X C	66672.79	1	66672.79	2.43	.12	**n.s
C X D	10826.10	1	10826.10	.39	.53	**n.s
B X D	2174.14	1	2174.14	.08	.79	**n.s
A X B X C	21033.65	1	21033.65	.74	.39	**n.s
A X B X D	46096.25	1	46096.25	1.68	.16	**n.s
A X C X D	11182.25	1	11182.25	.41	.52	**n.s
B X C X D	37107.63	1	37107.63	1.36	.25	**n.s
A X B X C X D	9554.41	1	9554.41	.35	.56	**n.s
Error	111339833.8	414	27390.9			
Total	1758900.3	429				

Notes: *S= significance for main effects; P = Probability (.05); Lstigmac = levels of stigma consciousness; Levsocsu = Levels of social support; Typeoinf = Type of information coping Typeofpc = Type of problem coping; **n.s = non significant interaction effects

Interestingly, after entering treatment as covariate, treatment produced significant main effect on CD4 counts of PLWHA, $F(1,413) = 5.79, P = .02$, stigma consciousness was significant in influencing CD4 counts of PLWHA, $F(1,413) = 36.83, P = .001$. Also, social support produced significant real effect on CD4 counts of PLWHA, $F(1,413) = 28.35, P = .001$. Information coping was also significant, $F(1,143) = 31, P = .001$, but not problem coping $F(1,413) = 2.89, P = .09$.

III. Discussions

This study found that stigma consciousness, social support, information and problem copings were implicated in contributing to changes in immune system as measured in CD4 counts among PLWHA used in this study. After entering for statistical control using ANCOVA stigma consciousness, social support, information coping were still significant but not problem coping. Treatment was also significant. This actually dismissed any doubt as to whether psychosocial variables were responsible for changes in immune system functioning of the groups used in this study.

Consistent with the first prediction of this study, those who scored low in stigma consciousness measure tended towards higher immune system measure than those who scored high in stigma consciousness measure. This shows that those PLWHA and who are also of high stigma consciousness are disposed to believe that others will stereotype them. It is possible that those who are of high stigma consciousness may have been affected by discrimination that affected their mood. They are more concerned on how they appear before other people than those who are of low stigma conscious. The implication being that living with HIV/AIDS will bring about feeling of worry for discrimination and feelings that their behaviours will be interpreted in terms of the fact that they are HIV/AIDS seropositive, thus being more concerned with how they appear before others. This finding is in accordance with Pinel (1999) in which gay men and lesbians who scored high in stigma consciousness scale were found to be more concerned with how they appear before others. Those living with HIV/AIDS view themselves as less equal to others. This situation as found among HIV/AIDS population brings about negative mood which invariably affects their immunocompetence levels. In other words, their immune systems are rendered inactive or inefficient. It could be that high stigma consciousness can be implicated in hormonal changes during immune system functioning among PLWHA. This idea may interest other scientists.

Also, in accordance with the second prediction, PLWHA who scored high in social support scale were disposed towards having more immune system than their counterparts who scored low in social support measure. This implies that high social support exerts beneficial effects on immunity among the population of people living with HIV/AIDS. Earlier Kessler, and Mcleod (1985) demonstrated that social support or lack of it could have direct effect on biological processes. The finding of this study substantiates Kessler and Mcleod finding since CD4 count is a biological process that determines the level of immunity among those living with HIV/AIDS. According to Kessler and Mcleod, low levels of social support is responsible for increase in negative emotion which according to Kiecolt-Glasser et al (1985;2002) can affect hormone and immune system.

The plausible outcome can be attributed to the fact that PLWHA who have family members whom they can rely on and call on, in times of need, will develop positive emotions that will exert beneficial effects on their immune systems functioning. Also, if HIV/AIDS seropositive individuals realize that their family members regard them as worthy fellows and help them in finding solutions to their problems, they are likely to develop favourable emotions and improved immune system. Pryor and his colleagues (2004) found high proportion of people who have friends and relatives to have higher immune system. Of course, conveying empathy and compassion to people living with HIV/AIDS by their relatives and friends for realistic negative situations will be beneficial in boosting up their immunity.

Also, having friends and feeling relaxed when staying with them, talking over problems with them can serve as attachment, and are sources of social support necessary for improved immune system among PLWHA. This is mostly true since positive emotion can result from attachment to friends. This can further be explained on the ground that those who are high on social support eat diets which help in improving their immune systems. For people living with HIV/AIDS, having at least one friend they can tell anything to, and feeling close to others can exert beneficial effect on their immune system functioning. Thus, this result shows that lower social support is risky in lowering immune system functioning among PLWHA. At least, if others who are assumed to be normal refuse to relate well with seropositive individuals; the seropositive individuals can find solace in support group meetings with their seropositive colleagues.

This study found strong evidence in connection between information coping and CD4 counts of persons with HIV/AIDS. In other words, there is significant difference between those who seek information and those who avoid information in their immune system measures. PLWHA who seek information tended towards better immune system functioning than those who avoid information. According to Kalichman et al (2006) and Devins and Binik (1996) information coping is associated with health benefits and increased access to information as coping strategy may empower people to become more engaged in their health care. The result of this study makes different by comparing two domains of information coping, that is seeking information and avoiding information, on immune system using CD4 counts as measure. This finding is consistent with one of the predictions of this study which stated that PLWHA who seek information would score higher in immune system measure than their counterparts who avoid information. This outcome could be explained on the ground that the individuals living with HIV/AIDS used in this study were more disposed to seek information on medication and the need for running medical tests; seek to know their medical treatment plan by asking doctors questions. With doctors or healthcare workers providing positive information, PLWHA will likely develop positive mood or emotion that will be beneficial to their immune system functioning.

Furthermore, this study found that there was strong evidence to support that problem coping exerts influence on immunity of people living with HIV/AIDS. Those people living with HIV/AIDS that focus on problem tended towards having more immunity when their CD4 counts were compared with those who avoid problem. The implication is that focusing on problem is beneficial to people living with HIV/AIDS. People living with HIV/AIDS should focus on problem by following plans of actions as provided by healthcare workers and work hard at them in order to have control over psychological devastation caused by experience of living with HIV/AIDS.

Those who avoid problem by just hoping that the situation would one day go away are at risk of rendering their immune systems inactive since their thoughts of living with HIV/AIDS are not anchored on realistic coping. Also, people living with HIV/AIDS should not go on as if nothing happened without actually focusing on the problem by seeking social support and information on medication.

Recently, O'Clearigh and his colleagues (2007) demonstrated that slower disease progression could be realistic through favourable coping profiles such as more active and less avoidant coping. The findings of this study are in agreement with O'Clearigh et al but makes difference by rather a comparison between PLWHA who focus on problem and those who avoid problem.

Generally, the findings of this study are in agreement with immunocompetence model (Jemmott& Lock, 1984); biological responses of CD4 counts are actually connected with psychosocial conditions of stigma consciousness, social support, information, and problem copings, and so, if changed negatively can lower immune system responses of PLWHA. Thus, high stigma consciousness, low social support, information

avoidance, and problem avoidance copings are implicated in lowering immune system function as measured in CD4 counts among the people living with HIV/AIDS used in this study.

Even after entering for statistical control using treatment as fifth independent variables, stigma consciousness, social support and information coping were still significant but not problem coping. This outcome can be explained on the ground that focusing on problem or seeking information could lead to discovering possible treatment to apply in managing HIV/AIDS. And once this is achieved more attention is paid to treatment than problem coping. Therefore, treatment can be interchanged with problem coping in a study of this nature.

With the findings of this study discussed thus, there are enough evidences to support immunocompetence model (Jemmott & Locke, 1984). Although, immunocompetence model was demonstrated using psychosocial variables example, stress caused by death of loved one, this study made difference by demonstrating other psychosocial variables such as stigma consciousness, social support, information coping, and problem coping which could produce the same effect on psychological condition as stress among people living with HIV/AIDS. This study has far-reaching implications for the population of people living with HIV/AIDS, healthcare workers, psychologists/counsellors, scholars in general and policy makers in healthcare programme.

Recommendations and Conclusion

There are increasing needs to improve the psychological conditions of PLWHA by psychologists/counselors. This can be realised by psychologists if PLWHA are helped to modify their self views, easing health concerns, and improving relationship issues, develop better views of the future, and finding positive meanings into present situations through cognitive therapy. The outcome of this study could be considered, to be incorporated in primary medical healthcare for PLWHA.

Finally, it can safely be concluded that lowering stigma consciousness and increasing high social support improve CD4 counts, a measure of immune system functioning. Also, seeking information and focusing on problems are necessary in improving immune system functioning among PLWHA in Anambra state. To this effect, psychologists should concentrate on how to reduce stigma consciousness, increase provision of social support, and step up information seeking and problem focus behaviour on PLWHA through application of cognitive therapy.

No study could claim to be free of limitations. Therefore, the main limitation of this study was that the study focused on the 10-item stigma consciousness, 15-item social support, 5-item information coping, and 8-item problem coping domains.

Second, the study was delimited to Anambra state due to financial cost of covering the whole Nigeria, and so had problem of external generalization. Third, although few residents of rural communities in Anambra state visit urban communities for anti retroviral therapy, this study could not include enough of the population of PLWHA that reside in rural areas.

It is suggested that further studies in this direction should consider developing a wider scale primarily for use in studying stigma consciousness among PLWHA. Such scale would encompass more domains of stigma consciousness. This idea also, applies to social support, information and problem copings.

Also, future studies can be designed to cover more areas or parts of Nigeria. This will improve external generalization. Other researchers may design studies to explore the lots of problems of PLWHA in the rural areas, more of whom this study did not capture. Finally, study should be conducted to establish the appropriate cognitive therapy to take care of those psychosocial variables.

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