EFFECT OF HIV POSITIVE TEST AND GENDER ON STRESS IN CLIENTS SCREENED IN KANO

[*]Aminu Saidu & Chuka Mike Ifeagwazi

Department of Psychology, University of Nigeria, Nsukka
[*]Correspondence: amnsidu@hotmail.co.uk, +2348064860102

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Abstract

This is an exploratory psychophysiological study. The study investigated the stress level of newly tested HIV^{+ve} males and females. The indicator of stress in this study is blood pressure (BP) which has two readings; systolic blood pressure (SBP) and diastolic blood pressure (DBP). High SBP and/or DBP were indicative of stress. Two null hypotheses were postulated and tested. Cross sectional design and convenience sampling were used in this study. A sample of 40 participants comprising of 12 males HIV^{+ve}; 28 females HIV^{+ve} screened in Aminu Kano Teaching Hospital (AKTH), Kano participated in the study. The BP of each participant was measured with mercurial sphygmomanometer after post-test counselling and disclosure of participants' serostatus. Data analysis was conducted with Multivariate Analysis of Variance (MANOVA). The results indicated that there was significant difference between the SBP readings of males HIV^{+ve} and females HIV^{+ve}. There was no significant difference between the DBP readings of males HIV^{+ve} and females HIV^{+ve}. The post hoc findings indicated two widows recorded highest SBP and one widow highest DBP reading(s). Clinical psychologist should be employed to give psychotherapy to clients that tested HIV^{+ve} with high SBP and/or DBP, with attention to the widows.

Keywords: Blood pressure, Diastolic blood pressure, Gender, HIV positive status, Stress,

Systolic blood pressure

INTRODUCTION

HIV means human immunodeficiency virus (Barlett & Finkbeiner, 2001; Centers for Disease Control and Prevention [CDC], 2022). It is a virus that attacks the body's immune system

(CDC, 2022). "HIV is the virus that causes acquired immune deficiency syndrome (AIDS). AIDS is the most advanced stage of HIV infection" (NIH.gov, 2021, Key points section, para.1). A positive HIV test result indicates that the client has HIV (NIH.gov, 2021). The diagnosis of HIV infection may trigger adverse reactions among individuals depending on their perception of the disease and these psychological reactions may lead to difficulty in accessing care and services if not immediately and adequately solved (Ninnoni et al., 2023).

HIV testing services are an important first stage to HIV prevention, treatment, care and support services (Sidibe, 2018; WHO/UNAIDS (2017). The World Health Organization (WHO) and the Joint United Nations Programme on HIV/AIDS (UNAIDS) support and promote worldwide access to knowledge of HIV status (WHO/ UNAIDS, 2017).

Many women-living with HIV suffer from stigma and discrimination that is worsened by their lack of rights (UNWOMEN, 2024). Women widowed by AIDS or living with HIV may face property inheritance crises with their in-laws with difficulty getting access to justice (UNWOMEN, 2024). They also care for the sick and orphans and all these can decrease their pursuits of education and employment (UNWOMEN, 2024). These may generate stress responses in the females (including widows) participants of this study resulting to high blood pressure.

The pioneering researchers of stress were Claude Bernard, Walter B. Cannon and Hans Selye (Goldstein & Kopin, 2007; Lu, Wei & Li, 2021). Earlier, the term homeostasis introduced by Cannon was a purely physiological concept but later, the concept was extended to the field of psychology (Lu, Wei & Li, 2021). Also, cumulating evidence suggested that the activation of the hypothalamic-pituitary-adrenocortical (HPA) axis described by Selye was more sensitive to emotional activities than physiological ones (Lu, Wei, & Li, 2021). As a result, stress was categorized into physiological stress and psychological stress (Mason, 1975 as cited in Lu, Wei, & Li, 2021, p.5). Cannon defined stress as threats to homeostasis (Cannon,

1935 as cited in Lu, Wei, & Li, 2021, p.4). By and large the concept of stress was developed from Selye's general adaptation syndrome (Lu, Wei, & Li, 2021). Selye defined stress as the nonspecific response of the body to any demand upon it (Selye 1974 as cited in Goldstein & Kopin, 2007; Selye 1936, 1956 as cited in Lu, Wei, & Li, 2021). Furthermore, Selye's notion that prolonged stress can produce physical diseases, and mental disorders are now widely accepted (Goldstein & Kopin, 2007).

Cacha, Poznanski, Latif and Ariff (2019) defined stress as "how the brain and body respond to any pressure, demand, or upsetting change that can lead to psychosomatic dysfunction". Cordon (1997) stated that the term stress has been used to describe a variety of negative feelings and reactions that accompany threatening or challenging situations. Lazarus and Folkman (1984) defined psychological stress as a particular relationship between the person and the environment that is considered by the person as difficult or exceeding his or her wellbeing. Sturt (2004) defined stress as the condition that results when the person/environment contact lead the individual to perceive inconsistency whether real or not between the demands of a situation and the resources of the person's biopsychosocial systems. Stress occurs when the individual feel like having to deal with more than he/she can handle (emotionally or physically) for an extended period (Trisdale, 2002). Stress as a wide term for a multifarious process such as the exposure to psychological or physical threats, perception of the stimuli as being stressful and the resultant activation of a psychophysiological cascade in the individual to re-establish homeostasis (Universiteit Leidan, 2024)

The stress response is frequently triggered because of the initial evaluation by the individual thus psychological factor is likely the trigger of the stress response (Palmer, 2013). The brain is the central organ in the stress response (McEwen, 2007 as cited by Cacha et al., 2019). When a person perceives being in a threatening situation that cannot be cope with, messages are send to along neurones from the cerebral cortex (the place of thought processes)

and the limbic system to the hypothalamus (Palmer, 2013). Then, the anterior hypothalamus produces sympathetic arousal of the autonomic nervous system (ANS). The ANS consists of sympathetic and parasympathetic nervous system. However, it is the SNS that prepares the body for action and when in a stressful situation, the SNS immediately increases strength of skeletal muscles, increases heart rate and so on (Palmer, 2013).

The psychophysiological cascade also includes the activities of the adrenal and pituitary gland (Cacha et al., 2019; Palmer, 2013; Universiteit Leiden, 2024). Stress triggers the sympathetic adrenal medullary axis (SAM), the Hypothalamus-pituitary-adrenal (HPA) axis, and the neuroendocrine system (Freberg, 2015; Bale & Vale, 2004 as cited in Cacha et al., 2019; Palmer, 2013; Universiteit Leidan, 2024). Once in action the SNS stimulates the adrenal medulla to produce adrenaline and noradrenaline (catecholamines) into the blood stream and both increase the heart rate and the pressure at which the blood leaves the heart (Palmer, 2013).

Also, in a stressful situation, the anterior hypothalamus activates the pituitary gland which releases adrenocorticotropic hormone (ACTH) into the blood stream, the ACTH activates the adrenal cortex to synthesise cortisol (stress hormone), and the cortisol increases arterial blood pressure and so on. (Palmer, 2013). The adrenal cortex also releases aldosterone which increases blood volume and subsequently increases blood pressure (Palmer, 2013)

High blood pressure is one of the physical symptoms of stress (Cleveland Clinic, 2024; O'Neil, 2023). Chronic stress adversely affects blood pressures while acute stress may transiently increase the blood pressure (Onwubere, 2005). It should be noted that "high blood pressure is a descriptive term indicating that the blood pressure is above acceptable normal range. Hypertension, on the other hand leaves an impression of a disease entity that must of a necessity be accorded relevant attention". (Onwubere, 2005, pp. 4-5). In this study we defined high SBP as equal to or greater than ($\geq$) 140mmHg and high DBP as equal to or greater than

(≥) 90mmHg based on Nigerian measurements and guidelines (Kadiri et al., 2020; Onwubere, 2005; Wahab et al., 2021).

Most research on the newly diagnosed HIV infected and people living with HIV (PLWH) are on anxiety, depression, disclosure problems and generalized stress (particularly negative life events aspects of stress). Also, many of the studies in the literature are on hypertension or prevalence of hypertension in the HIV infected or PLWH that are at advanced stage of the HIV infection and were already on antiretroviral therapy and in some cases even on antihypertensive medications. However, blood pressure is one of the physical symptoms of stress that need to be researched on but is scarcely studied by HIV researchers. This study seeks to identify those newly HIV positive (HIV^{+ve}) clients with high systolic blood pressure (SBP) and/or diastolic blood pressure (DBP) at the time of HIV testing to help them by psychotherapy. This study will contribute to the existing literature on HIV research. The research questions were, would there be significant difference between the SBP readings of HIV^{+ve} males and HIV^{+ve} females? Would there be significant difference between the DBP readings of HIV^{+ve} males and HIV^{+ve} females?

Purpose of the Study

The purposes of the study are:

1. To determine the difference between the SBP readings of males HIV^{+ve} and females HIV^{+ve} participants.
2. To ascertain the difference between the DBP readings of males HIV^{+ve} and females HIV^{+ve} participants.

LITERATURE REVIEW

The Walter B. Cannon Fight-or-Flight Response Theory of Stress and Lazarus and Folkman Cognitive Theory of Stress were the guiding theoretical framework of this study because the

two theories explained stress responses (psychophysiological). Cannon explains the body's stress response in terms of the fight-or-flight response (Cannon 1929 as cited in Goldstein & Kopin, 2007; Lu, Wei & Li, 2021). When a person experience some set of stimuli (perceived danger or threats to homeostasis) from the world around him/her, this automatically generates complex physiological changes that prepare the body to fight or flee if necessary. The beginning of the stress response is associated with specific physiological actions in the sympathetic nervous system leading to the release of adrenaline and noradrenaline from the adrenal gland (medulla) which causes immediate physiological responses such as increases in heart rate, constricting blood vessels and so on.

Lazarus and Folkman (1984) proposed the cognitive theory of stress. The theory places emphasis on the meaning that an event has for the individual and not on the physiological responses (Lazarus & Folkman, 1984 as cited in Sturt, 2004). They believe that one's view of a situation determines whether an event is experienced as stressful or not, making stress the consequence of appraisal and not the antecedent of stress (Lazarus & Folkman 1984 as cited in Cordon, 1997). According to the cognitive theory, the way an individual appraises an event plays a fundamental role in determining not only the magnitude of the stress responses but also the kind of coping strategies that the individual may employ in efforts to deal with the stress (Lazarus & Folkman, 1984 as cited in Cordon, 1997).

Huang et al. (2020) conducted a study on HIV related stress experienced by newly diagnosed people living with HIV (PLWH) in China which was a 1year longitudinal study. The participants that completed the baseline survey and the 1year follow up survey were 410 newly diagnosed PLWH with 53.2 % of the participants commencing antiretroviral therapy (ART) midway into the research. The instrument of the study was HIV/AIDS Stress Scale (SS-HIV). Generalized estimating equation (GEE) method was used to determine the factors associated with stress levels among newly diagnosed PLWH. The results showed that the most

frequent stressors experienced by PLWH at diagnosis were confidentiality (93.2%), risk of infecting others (86.9%), distressing emotions (86.3%), physical functions (83.9%), and disclosure concerns (83.7%). The events that were rated as most frequent 1 year after diagnosis were confidentiality (77.6%), disclosures concerns (73.2%), risk of infecting others (71.5%), physical functions (71.2%), and distressing emotions (67.3%) (Huang et al). They concluded that future stress management should consider the identified stressors.

Jayanthi and Reddy (2014) carried out a study on the influence of gender on sources of stress in HIV/AIDS patients. The sample of participants consisted of 374 male and 346 female attending two hospitals anti retro viral therapy (ART) centers. Stress inventory developed by the researchers was used to assess the stress experienced by the participants. The statistics used for data analysis of the continuous variables were Mean, Standard Deviation and 't' test. Results revealed that Gender is significantly influencing the stress faced by HIV/AIDS patients due to emotional problems, occupational problems and financial problems. Whereas the influence of Gender on stress faced by HIV/AIDS patients due to family problems, health problems and social problems is not significant.

Okello et al. (2017) conducted a study on the association between HIV and BP in adults and the role of body weight as a mediator in a cross-sectional study at Uganda. The participants were 577 HIV-infected and 538 matched HIV-uninfected participants. Almost all the HIV infected participants were on ART. The instrument used to measure BP was digital upper arm sphygmomanometer (Omron BP710N 3 series, Omron Healthcare Inc.0). Mixed-effects models were fit to determine the association between HIV and BP and the amount of effect of HIV on BP mediated through body mass index (BMI). The result shows that HIV infection was associated with 3.3 mm Hg lower systolic BP (1.2-5.3 mm Hg), 1.5 mm Hg lower diastolic BP (0.2-2.9 mm Hg), 0.3 m/s lower pulse wave velocity (0.1-0.4 mm Hg), and 30% lower odds of hypertension (10%-50%). BMI mediated 25% of the

association between HIV and systolic BP. HIV infection was inversely associated with systolic BP, diastolic BP, and pulse wave velocity.

Hypotheses

The following hypotheses were formulated for this study.

1. Males HIV^{+ve} participants will have higher SBP readings than females HIV^{+ve}.
2. Males HIV^{+ve} participants will have higher DBP readings than females HIV^{+ve}.

METHOD

Participants

A total of forty HIV^{+ve} participants were selected by convenience sampling during the six weeks of the study from Aminu Kano Teaching Hospital Voluntary Counselling and Testing-Center (AKTH-VCT-Center) also known as heart-to-heart center; AKTH blood donor room and AKTH antiretroviral clinic (ARV clinic). The participants were divided into males HIV^{+ve} and females HIV^{+ve}. Demographic variables such as gender, age, marital status and occupation were recorded. The participants comprised of twelve (12) males HIV^{+ve} and twenty eight (28) females HIV^{+ve}, this was because more females (as widows, divorcees, married, unmarried) than males tested HIV^{+ve} in the AKTH-VCT-Center during the period of the study, thus thirty nine (39) HIV^{+ve} were from AKTH-VCT-Center, one (1) HIV^{+ve} participant was from ARV clinic and no HIV^{+ve} participant from AKTH blood donor room. HIV test counsellors were stationed in each of the above places to give voluntary pre- and post- HIV test counselling to the clients. The inclusion criteria were clients that were referred or that voluntary came for HIV test. The exclusion criteria were clients with cardiovascular diseases (CVD) such as those diagnosed with hypertensives, congestive cardiac failure (CCF), very sick, AIDS clients, clients with prior knowledge of their HIV status, client(s) not informed about the HIV test, those who did not get pre- and post- test HIV counselling, and pregnant women. The researcher

was assisted in excluding clients that did not participate in the research by the medical doctors and HIV test counsellors working in the AKTH, Kano HIV/AIDS centers.

Instrument

The instrument used for the study was sphygmomanometer (Mercurial Model, CE0219, made in USA) and the auscultatory (indirect) method of measuring blood pressure (SBP and DBP) was used in the study. The auscultatory method makes use of the clinic type mercury sphygmomanometer (Onwubere, 2005; Stern *et al.*, 1980). The sphygmomanometer is made up of the following parts: cuff bladder; inflating bulb; valve; rubber tube; mercury manometer (Onwubere, 2005). The auscultatory method of measuring arterial blood pressure with sphygmomanometer was convincingly discovered by Nicholai Korotkoff in 1905 (Acierno, 1994). This put into the hands of clinicians throughout the world an extremely simple diagnostic approach capable at the same time of being very accurate (Acierno, 1994).

Procedure

Approval for the study was obtained from AKTH, Kano ethical committee. The ethical rules provided by the ethical committee were adhered to in the study which includes full explanation and information about the research, informed consent, confidentiality, right to conservation of time. In this study, the auscultatory (indirect) method of measuring arterial blood pressure with sphygmomanometer (mercurial type) was done. The following were the step-by-step procedure used by the researcher in the conduct of the research and in measuring the blood pressure of each participant after post-test counselling and the informing of the HIV test result by HIV test counsellors and after resting for five (5) minutes.

- The participant sat comfortably on a chair.
- The participant was adequately informed about the research and assured of confidentiality.

- The participant that agreed to participate in the research was given a copy of the informed consent form for his/her signature or thumb print.
- After the participant signed the informed consent form or thumb printed. The blood pressure measurement was done as follows.
- The appropriate cuff size was applied around the upper arm of each of the participants and the diaphragm of the stethoscope placed over the brachial artery just below the cuff.
- The cuff is rapidly inflated to a point 20mmHg above the pulse obliteration pressure,
- quickly deflated, then re-inflated to the same top point and slowly deflated with the use of the regulator or valve to measure the BP.
- As the cuff pressure decreases, tapping sounds (Korotkoff sounds) are heard through the air pieces of the stethoscope. As soon as these first sounds (phase I) are heard the pressure level indicated by the mercury manometer connected to the cuff indicates the SBP.
- When the cuff pressure decreases further, the Korotkoff sounds changed in quality having less of the tapping quality but more of murmuring quality (phase II) and then become clearer and louder (phase III) which then suddenly change to muffled quality sounds (phase IV) that ends after 5 to 6mm Hg drop in cuff pressure, until the sounds disappear completely (phase V). The mercury manometer was noted at this point and this equal to the DBP.
- A total of three (3) readings were taken separated by an interval of two (2) minutes. An average of the second and third readings was recorded and used in the analyses.

Design and Statistics

The design of the study was cross-sectional because the SBP and DBP readings of the participants were required to be measured at a point in time (only once) at the center of the HIV testing after a HIV positive test. The independent variables were HIV positive test and

Gender which has two (2) levels (Males and Females). The dependent variable was Stress indicated by blood pressure which has two readings: SBP and DBP readings with high SBP and/or DBP indicating Stress. The statistics used for the study was Multivariate Analysis of Variance (MANOVA), because the study compared two groups on more than one dependent variable simultaneously. The data was entered into SPSS version 20 and analyzed.

RESULTS

Table 1: Group Mean of Systolic and Diastolic Blood Pressure Readings for HIV Positive and Gender

Dependent Variables	Independent Variables		N (Number)	Mean	Standard Deviation
	HIV Positive	Gender			
1. Systolic Blood Pressure	HIV Positive	Male	12	1.6667	.49237
		Female	28	1.9286	.26227
		Total	40	1.8500	.36162
2. Diastolic Blood Pressure	HIV Positive	Male	12	1.6667	.49237
		Female	28	1.7143	.46004
		Total	40	1.7000	.46410

The table 1 above shows overall group means of systolic and diastolic blood pressure readings for 12 males HIV^{+ve} and 28 females HIV^{+ve} participants.

Table 2: MANOVA Table for the Effect of HIV Positive and Gender on SBP and DBP

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Systolic Blood Pressure	.576	1	.576	4.840	.034
	Diastolic Blood Pressure	.019	1	.019	.086	.770
Intercept	Systolic Blood Pressure	108.576	1	108.576	912.040	.000

	Diastolic Blood Pressure	96.019	1	96.019	435.359	.000
HIV Positive (Males HIV Positiv	Systolic Blood Pressure	.576	1	.576	4.840	.034
and Females HIV Positive	Diastolic Blood Pressure	.019	1	.019	.086	.770
	Systolic Blood Pressure	4.524	38	.119		
Error	Diastolic Blood Pressure	8.381	38	.221		
	Systolic Blood Pressure	142.000	40			
Total	Diastolic Blood Pressure	124.000	40			

The results in MANOVA table 2 indicated the findings below.

1. There was statistically significant difference between the SBP readings of males HIV^{+ve} and females HIV^{+ve} participants, F=4.840, p < .05.
2. There was statistically no significant difference between the DBP readings of males HIV^{+ve} and females HIV^{+ve} participants, F=.086, p >.05.

Table 3: SBP and DBP Means ($\bar{X}$) for HIV Positive (Males and Females HIV Positive)

Dependent Variables	HIV Positive	Mean	Standard Error
1. Systolic Blood Pressure	Males HIV Positive	1.667	.100
	Females HIV Positive	1.929	.065
2. Diastolic Blood Pressure	Males HIV Positive	1.667	.136
	Females HIV Positive	1.714	.089

The table 3 above shows the SBP and DBP Means ($\bar{X}$) for HIV Positive (Males and Females HIV Positive) as follows:

1. The males HIV^{+ve} scored ($\bar{X}$= 1.667) and the females scored ($\bar{X}$= 1.929). This indicated that the females HIV^{+ve} have a higher SBP mean score than the males HIV^{+ve} participants.
2. The males HIV^{+ve} scored ($\bar{X}$= 1.667) while the females HIV^{+ve} scored ($\bar{X}$= 1.714). This showed that both the males HIV^{+ve} and females HIV^{+ve} participants have almost the same mean score.

Post hoc Findings

1. Two widows' participants of the study measured the highest SBP readings.

2. A widow participant of the study measured the highest DBP reading.

DISCUSSION

Two hypotheses were postulated and tested in this study. The first finding of the study showed that there was significant difference between the SBP readings of HIV^{+ve} males and HIV^{+ve} females' participants. This is not in agreement with the hypothesis that males HIV^{+ve} participants will have higher SBP readings than females. Therefore, the first hypothesis (null) was rejected. This might be because of the stigma and discrimination being suffered by several women living with HIV (UNWOMEN, 2024). Also, women that are widows of husbands that died of AIDS or that are living with HIV might face property inheritance crises with their in-laws with difficulty getting access to justice (UNWOMEN, 2024). The understanding of these by the HIV^{+ve} females (including the widows) from their community and the thoughts might have psychophysiologically increased their heart beats and the SBP readings to that higher than the males HIV^{+ve} participants.

The second finding indicated that there was no significant difference between the DBP readings of HIV^{+ve} males and HIV^{+ve} female participants, thus the second hypothesis was rejected. This does not tally with the hypothesis that males HIV^{+ve} participants will have higher DBP readings than females HIV^{+ve}. The psychophysiological activities might have decreased immediately during the diastolic (relaxation phase of the heart) in both the males HIV^{+ve} and females HIV^{+ve} participants thus reducing the heartbeat and lowering the DBP.

The studies that were reviewed could not be aligned to this study because all the three were not psychophysiological (Huang et al., 2020; Jayanthi & Reddy, 2014; Okello et al., 2017). Many participants of the reviewed studies have even commenced with ART.

Furthermore, the participants of one of the reviewed studies consisted of those with both HIV/AIDS (Jayanthi & Reddy, 2014). Also, one of the reviewed studies was completely medical research (Okello et al., 2017).

Implications of the Findings

The practical implication of the study was that there is the need for the employment of clinical psychologists AKTH, Kano and their involvement in the management of HIV/AIDS clients to give psychotherapy to the clients that tested HIV^{+ve} with attention to clients with high SBP and/or DBP and the widows. Also, to teach stress management skills and lifestyle modifications to them. These would minimize or stopped the effect of testing HIV positive, slow down the development of AIDS, lower blood pressure and prevent psychophysiological disorder (e.g. hypertension) at later stage (s) of HIV infection.

Conclusion

HIV^{+ve} test result is still stressful. However, the understanding by the client that he/she is HIV^{+ve} would make him/her to start antiretroviral medications early, and benefit from psychotherapy and stress management. These would enable him/her to live a well fulfilled life. There is so far no vaccine against HIV. Therefore, behavioural interventions or behavioural changes will continue to be of importance in HIV prevention.

Recommendations

1. Empathetic and compassionate care should be given to the HIV^{+ve} clients always and all the times
2. More women than men were observed to test HIV^{+ve} during the study. Therefore, health education on the prevention of HIV transmission and spread should be increasingly focused on women and then extended to men.
3. Widows were observed by the researcher to be among those that tested HIV^{+ve} in the AKTH-

VCT-Center. Thus, more medical and psychological attention should be given to widows that

tested HIV positive.

4. The researcher has noted that disclosure of HIV^{+ve} status is a stressor for most clients. Therefore, confidentiality should be maintained by all HIV test counsellors and healthcare professionals working in the AKTH-HIV centers.
5. The researcher has observed the reluctance of some HIV^{+ve} females' husbands to partake or come for VCT. The husbands should be encouraged to come for VCT.
6. Poverty or financial difficulties are among the stressors of HIV infected males and females. Psychosocial modifiers of stress in the form of altruistic financial or monetary assistance should be given to the HIV infected.
7. Women should be educationally and economically empowered to protect themselves against sexual abuse and sexual exploitations and to also resist succumbing to sex by coercion.
8. Clinical psychologists should be employed by the management of AKTH, Kano and be made members of the team of healthcare professionals treating HIV/AIDS clients. The clinical psychologist because of his/her specialization should be made to oversee all HIV counselling centers in AKTH, Kano.

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