

Physiological and Psychological Correlates of HIV Related Fatigue

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Abstract: *Fatigue is a frequent symptom reported by persons living with HIV disease and one that affects all aspects of quality of life. To improve quality of care of persons with HIV disease, it is important to address all factors that contribute to fatigue. This study intended to determine the relationship between fatigue and selected physiological & psychological variables among HIV positive patients at NGO HIV care centre, Madurai. A survey approach was used for this study. The design adopted for the study was descriptive correlational research design. Purposive sampling technique was adopted for this study. The sample consisted of 100 HIV positive patients. The techniques used for data collection were interview and record analysis. Fatigue severity was measured using the Piper Fatigue Scale. With Piper's Integrated Fatigue Model guiding selection, factors examined in this study were haemoglobin count, CD4 count, sleep quality, daytime sleepiness, anxiety and depression, both descriptive and inferential statistics were used for the analysis of data. Physiological measures included hemoglobin count, CD4 count, daytime sleepiness and sleep quality. Psychological measures included anxiety and depression. Using Pearson's r , significant relationships were observed between fatigue and sleep quality, daytime sleepiness, anxiety and depression. Sleep quality ($r = 0.314$, $p = 0.0197$), daytime sleepiness ($r = 0.443$, $p = 0.0016$), anxiety ($r = 0.300$, $p = 0.034$) and depression ($r = 0.380$, $p = 0.0142$) retained significance in a 3-step, backward stepwise elimination model and accounted for 80% of the variance in fatigue. There were no correlations between fatigue severity and CD4 count ($r = -0.08$) or fatigue severity and hemoglobin count ($r = 0.032$). There is a stronger association between fatigue and psychological parameters than between physiological parameters.*

Keywords: HIV-related fatigue, psychological factors, sleep quality, anxiety and depression, physiological variables

1. Introduction

HIV is a virus that damages a person's immune system, the body's defense against disease. The virus infects and gradually destroys the cells in the body that usually combat infections leaving the body susceptible to diseases it would normally be able to fight. Without treatment, the immune system will become too weak to fight off illness and a person with HIV may develop rare infections or cancers. When these are particularly serious, the person is said to have AIDS (Acquired Immune Deficiency Syndrome). (Carter, 2010)

The UNAIDS strategy aims to advance global progress in achieving country set targets for universal access to HIV prevention, treatment, care and support and to halt and reverse the spread of HIV and contribute to the achievement of the Millennium Development goals by 2015. The AIDS response is a long term investment and the intent of the strategy is to revolutionize HIV prevention, catalyze the next phase of treatment, care and support, and advance human rights and gender equality. (UNAIDS, 2011)

UNAIDS (2010) estimated that there are 5.6 million people living with HIV in India, which indicated that there were more people with HIV in India than in any other country in the world. In 2007, following the first survey of HIV among the general population, UNAIDS and NACO agreed on a new estimate – between 2 million and 3.1 million people living with HIV. In 2008 the figure was estimated to be 2.31 million. In 2009 it was estimated that 2.4 million people were living with HIV in India, which equates to a prevalence of 0.3%. While this may seem low, because India's population is so large, it is third in the world in terms of greatest number of people living with HIV. With a population of around a billion, a mere 0.1% increase in HIV

prevalence would increase the estimated number of people living with HIV by over half a million.

People living with HIV /AIDS undergo/has many physical and psychological problems. Fatigue has been defined as "a lessened capacity for work and reduced efficiency of accomplishment, usually accompanied by a feeling of tiredness that is not reduced by a good night's sleep". Fatigue, one of the most prevalent and distressful symptoms of HIV infection, affects all aspects of an individual life. To improve quality of care of persons with HIV disease, it is important to address all factors that contribute to fatigue. Fortunately, there are several measures that people experiencing fatigue can take to improve their energy levels and overall quality of life. (Jong et al., 2010)

According to Capaldini (1998) fatigue can be divided into physical, psychological, and emotional components. Physical fatigue is associated with activity. People with this type of fatigue may experience muscle weakness, limb heaviness, or soreness. They may be unable to perform daily physical tasks such as shopping or preparing meals; those with severe fatigue may even find it difficult to get out of bed or carry on a conversation. Physical fatigue is often related to a specific physical malfunction such as heart, lung, endocrine (hormone), or nervous system problems. People with psychological fatigue may find it difficult to concentrate, calculate, or remember things; such symptoms are easily confused with the early stages of HIV-associated dementia. Emotional fatigue involves a decrease in motivation and lack of interest or pleasure in normal activities. Emotional fatigue may also be associated with feelings of frustration and irritability.

Fatigue is strongly related to quality of life. Fatigue can disrupt normal activities of daily living reduce physical

functioning and reduce self-care activities. Fatigue affects HIV infected individuals' ability to work and to take care of themselves and their families, their physical and emotional well-being, their enjoyment of life, and their ability to be intimate with their partners. Fatigue may be the most important symptom in an HIV-infected individual's decision to discontinue employment, and with that decision comes loss of income and loss of health insurance. (Adinolfi, 2001)

Fatigue is a frequent symptom reported by persons living with HIV disease and one that affects all aspects of quality of life. A multitude of factors may contribute to the fatigue experienced by an HIV-infected individual. Understanding correlates of fatigue allows nurses to plan and provide the holistic care that is most appropriate for an HIV-infected individual who is experiencing fatigue.

Statement of the Problem

A descriptive correlational study to determine the relationship between fatigue and selected physiological & psychological variables among HIV positive patients at NGO HIV care centre, Madurai.

Objectives

- 1) To assess the level of fatigue among HIV positive patients
- 2) To assess the selected physiological variables (haemoglobin count, CD4 count, sleep quality and daytime sleepiness) of HIV positive patients.
- 3) To assess the selected psychological variables (depression and anxiety) of HIV positive patients.
- 4) To correlate the selected physiological and psychological variables with fatigue among HIV positive patients.
- 5) To explore the predictors of HIV related fatigue
- 6) To find out the association of fatigue with demographic variables among HIV positive patients.
- 7) To find out the association of selected physiological variables with demographic variables among HIV positive patients.
- 8) To find out the association of selected psychological variables with demographic variables among HIV positive patients.
- 9) To compare the level of fatigue between male Vs female HIV positive patients.

Hypotheses

All the hypotheses will be tested at 0.05 level of significance.

H₁: There will be a significant relationship between the selected physiological variables and fatigue.

H₂: There will be a significant relationship between the selected psychological variables and fatigue.

H₃: There will be a significant association between the selected demographic variables and physiological variables.

H₄: There will be a significant association between the selected demographic variables and psychological variables.

H₅: There will be a significant association between the selected demographic variables and fatigue.

H₆: There will be significant difference between fatigue and male Vs female HIV positive patients.

2. Methodology

A survey approach was used for this study. It is a non-experimental research that obtains information about people's activities, beliefs, preferences, and attitudes via direct questioning. (Polit, 2011).

A descriptive correlational research design was adopted for the study. Research design is the overall plan for addressing a research question including specifications for enhancing the studies integrity. (Polit, 2011).

Section- 1:

This consisted of demographic variables and clinical variables.

- a) Demographic variables included were age, gender, education, occupation, income, marital status and place of residence.
- b) Clinical variables included were stage of illness, antiretroviral therapy and comorbidity.

Section-2:

Piper Fatigue Scale (Piper 1998) is a universal tool. It was used to measure subjective fatigue of HIV positive patients. It consisted of 22 items that are numerically scaled from 0 to 10. The total score was calculated for 220 and was converted to 10. A higher score indicates greater subjective fatigue.

Interpretation

0 = None

1 to 3 = Mild Fatigue

4 to 6 = Moderate Fatigue

7 to 10 = Severe Fatigue

Section 3:

Physiological variables assessed were hemoglobin count, CD4 count, daytime sleepiness and sleep quality.

- a) Hemoglobin and CD4 count:

It was obtained from the patients case file which was maintained by the ART medical officer where the hemoglobin count is monitored once in every month and the CD4 count is monitored once in every six months at Government Rajaji Hospital, Madurai.

- b) Daytime Sleepiness:

Daytime sleepiness was measured by Epworth Daytime sleepiness scale (ESS), which was developed by Murray Johns (1992). This scale asks individuals to rate on a scale of 0 to 3 how likely they are to doze off or fall asleep in 8 specific situations. Possible score ranges from 0 to 24. A higher score indicates greater daytime sleepiness.

- c) Sleep Quality

This consisted of Pittsburgh Sleep Quality Index (PSQI) developed by Buysse (1989) that measures subjective sleep quality. This instrument contains 9 self-report items and seven components each scored from 0 (no difficulty) to 3 (severe difficulty). The component scores are summed to produce a global score (range 0 to 21). Higher scores indicate worse sleep quality.

Section – 4:

This consisted of Spielberger's State-Trait Anxiety Inventory (Spielberger, 1971). The STAI is a 40 item likert – type instrument used to measure state anxiety and trait anxiety. There are 20 items for the state anxiety scale and 20 items for the trait anxiety scale. The participants were asked to respond to each of the items on a 4- point scale ranging from 1 (not at all) to 4 (very much so). A higher score indicates greater anxiety.

Tool– 7:

This consisted of Center for Epidemiological Studies Depression Scale which was developed by Locke. It is a 4-point, 20 item scale that measures depressive symptoms. Possible scores for the total scale ranges from 0 to 60.

3. Findings

This chapter deals with the description of sample, analysis and interpretation of data collected and the achievements of the objectives of the study.

The data were collected from 100 HIV positive samples attending HIV Care Centre Madurai in order to determine the physiological and psychological correlates of HIV related fatigue. This is described in following sections.

Section I:

This section deals with the demographic characteristics (Table 1) and clinical characteristics (Table 2).

Table 1: Distribution of samples according to demographic characteristics, N=100

S. No	Characteristics	F	%
1	Age		
	a) 21-30	11	11
	b) 31-40	34	34
	c) 41-50	37	37
	d) 51-60	18	18
2	Sex		
	a) Male	51	51
	b) Female	49	49
3	Education		
	a) Literate	38	38
	b) Illiterate	62	62
4	Occupation		
	a) Sedentary	5	5
	b) Moderate	48	48
	c) Heavy worker	18	18
	d) Unemployed	29	29
5	Income		
	<1000	28	28
	1001-3000	33	33
	3001-5000	39	39
	>5000	0	0
6	Marital status		
	a) Single	3	3
	b) Married	87	87
	c) Widowed/Separated	10	10
7	Place of residence		
	a) Rural	84	84
	b) Urban	16	16

The table 1 depicts that among 100 HIV positive patients 37% were between 41-50 years and 34% were between 31-

40 years. There were equal numbers of samples in both sexes. 3/5th (62%) of the samples were illiterate and the remaining 2/5th (38%) were literate. Nearly half of the samples 48% were moderate workers and 29% were unemployed. Among 100 HIV positive patients 28% had income below Rs 1000, 33% had it between 1001–3000 and 39% had it between 3001-5000. Nearly 3/4th (87%) of the samples were married and 1/4th (10%) were widowed. Majority (84%) of the samples were hailed from urban areas.

Table 2: Distribution of samples according to their clinical characteristics, N=100

S. No	Characteristics	F	%
1	1. Stage of illness		
	a) Asymptomatic	12	12
	b) Symptomatic	88	88
2	2. Art	37	37
	a) Yes	73	73
	b) No	27	27
3	3. Co-morbidity	Nil	Nil

The table 2 depicts that more than 4/5th (88%) of the samples were symptomatic. Nearly 73% of the HIV positive patients were under ART treatment. None of the participants had co morbidity illness.

Section II:

This gives the description regarding the level of fatigue. (Table 3)

Table 3: Description of the level of fatigue of the HIV positive patients, N=100

S. No	Level of fatigue	N	%
1	None (o)	0	0
2	Mild Fatigue (1to3)	1	1
3	Moderate Fatigue (4to6)	59	59
4	Severe Fatigue (7to10)	40	40

From table- 3 it can be inferred that 40% of the HIV positive patients had severe fatigue and 59% had moderate level of fatigue. Only one sample reported mild fatigue.

Section III:

This gives the description regarding the level of daytime sleepiness [(Table 4a)] and sleep quality. [(Table 4b)]

Table 4 (a): Description of the level of daytime sleepiness of the HIV Positive Patients

S. No	Level of sleepiness	N	%
1	Normal range (0-10)	1	1
2	Borderline daytime sleepiness (10-12)	7	7
3	Abnorml daytime sleepiness (10-12)	92	92

Table 4 (a) predicts the level of daytime sleepiness, where 92% of the HIV positive patients had abnormal daytime sleepiness and 7% had borderline daytime sleepiness.

Table 4 (b): Description of the level of Sleep Quality of the HIV Positive Patients

S. No	Level of sleep Quality	N	%
1	>5= Poor quality of sleep	93	93
2	<5= Good quality of sleep	7	7

Section IV:

This gives the description regarding the level of depression [(Table 5a)] and anxiety. [(Table 5b)]

Table 5 (a): Description of the level of depression of the HIV Positive Patients.

S. No	Level of depression	N	%
1	Mild depression (0 to 20)	0	0
2	Moderate depression (21 to 40)	73	73
3	Severe depression (41 to 60)	27	27

From the above table- 5 (a) it can be inferred that 27% of the HIV positive patients had severe depression and 73% had moderate level of depression.

Table 5 (b): Description of the level of anxiety of the HIV Positive Patients

S.No	Level of anxiety	N	%
1	Mild anxiety (1 – 53)	0	0
2	Moderate anxiety (54 – 107)	12	12
3	Severe anxiety (108 – 160)	88	88

Table-5 (b) predicts the level of anxiety where 88% of the HIV positive patients had severe anxiety and only 12% had moderate level of anxiety.

Section V:

This gives the description regarding the correlation between fatigue and selected physiological & psychological variables.

Bivariate correlation between fatigue and selected physiological & psychological variables. [(Table 6a)]

S. No	Variable	1	2	3	4	5	6
1	Fatigue						
2	Hemoglobin Count	0.032					
3	CD4 Count	-0.08	0.315*				
4	Daytime Sleepiness	0.443*	-0.099	0.027	0.122		
5	Sleep Quality	0.314*	-0.013	0.039	0.191		
6	Anxiety	0.300*	0.059	0.104	0.191	0.034	
7	Depression	0.380*	0.024	0.056	0.120	0.084	0.286*

To find out the correlation between fatigue and selected physiological & psychological variables of the HIV positive patients, the null hypotheses was stated as follows:

Backward stepwise regression analysis. [(Table 6b)]

S. no	Model	R	R square	Adjusted R square	Std. Error of the Estimate
1	1.	0.443	0.812	0.163	14.13416

ANOVA

S. no	Model	Sum of Squares	Df	Mean Square	F	Significance
1	Regression	5012.753	4	846.460	4.227	0.001
2	Residual	18622.627	95	200.234		
3	Total	23635.38	99			

- a. Predictors: (Constant), daytime sleepiness, sleep quality, anxiety, depression.
b. Dependent Variable: Fatigue.

Section VI:

This provides the association between fatigue and selected demographic variables [(Table 7)].

Demographic Variables	Source of Variation	Sum of Square	Degree of Freedom	Mean Square	Variance Ratio of F
1. Age	Between samples	903.679	3	301.226	1.27
	Within samples	22767.711	96	237.164	
	Total	23671.39	99		
2. Occupation	Between samples	286.855	3	1592.277	7.067*
	Within samples	23384.505	96	225.297	
	Total	23671.39	99		
3. Income	Between samples	892.453	3	297.484	1.254
	Within samples	22778.937	96	237.281	
	Total	23671.39	99		
4. Marital status	Between samples	1592.277	2	95.628	0.393
	Within samples	22079.113	97	243.589	
	Total	23671.39	99		

The finding shows that there was a statistically significant association between fatigue and occupation, the obtained F ratio was 7.067 at ($P < 0.01$) was significant. This supports the research hypotheses. Other demographic variables had no association with fatigue. So, the researcher rejects the

null hypotheses and accepts the research hypotheses for this variable alone.

Section VII:

This provides the association between fatigue and selected physiological variables [(Table 8)].

Demographic Variables	Source of Variation	Sum of Square	Degree of Freedom	Mean Square	Variance Ratio of F
1. Age	Between samples	96.804	3	32.268	5.146*
	Within samples	601.946	96	6.270	
	Total	698.750	99		
2. Occupation	Between samples	9.734	3	3.245	0.452
	Within samples	689.016	96	7.177	
	Total	698.750	99		
3. Income	Between samples	21.518	3	7.173	1.017
	Within samples	677.232	96	7.055	
	Total	698.750	99		
4. Marital status	Between samples	56.743	2	243.589	1.662
	Within samples	642.007	97	6.551	
	Total	698.750	99		

Table 8 (b): Description of the association between sleep quality and selected demographic variables of the HIV positive patients

Demographic Variables	Source of Variation	Sum of Square	Degree of Freedom	Mean Square	Variance Ratio of F
1. Age	Between samples	15.004	3	5.001	0.380#
	Within samples	1262.706	96	13.153	
	Total	1277.710	99		
2. Occupation	Between samples	19.838	3	6.613	0.505#
	Within samples	1257.872	96	13.103	
	Total	1277.710	99		
3. Income	Between samples	4.450	3	1.483	0.112#
	Within samples	1273.260	96	13.263	
	Total	1277.710	99		
4. Marital status	Between samples	23.731	2	23.731	1.855#
	Within samples	1253.979	97	12.796	
	Total	1277.710	99		

In order to find out the association between sleep quality and selected demographic variables such as age, occupation, income and marital status, F ratio was computed.

Table 8 (c): Description of the association between hemoglobin count and selected demographic variables of the HIV positive patients

Demographic Variables	Source of Variation	Sum of Square	Degree of Freedom	Mean Square	Variance Ratio of F
1. Age	Between samples	4.366	3	1.455	0.839#
	Within samples	166.557	96	1.735	
	Total	170.922	99		
2. Occupation	Between samples	1.866	3	0.622	0.353#
	Within samples	169.057	96	1.761	
	Total	170.922	99		
3. Income	Between samples	7.889	3	2.630	1.548#
	Within samples	163.034	96	1.698	
	Total	170.922	99		
4. Marital status	Between samples	0.647	2	0.647	0.372#
	Within samples	170.276	97	1.738	
	Total	170.922	99		

Table 8 (d): Description of the association between CD₄ count and selected demographic variables of the HIV positive patients

Demographic Variables	Source of Variation	Sum of Square	Degree of Freedom	Mean Square	Variance Ratio of F
1. Age	Between samples	82211.405	3	27403.802	0.576#
	Within samples	4564536.705	96	47547.257	
	Total	4646748.110	99		
2. Occupation	Between samples	123692.248	3	41230.749	0.875#
	Within samples	4523055.862	96	47115.165	
	Total	4646748.110	99		
3. Income	Between samples	20642.542	3	6880.847	0.143#
	Within samples	4626105.568	96	48188.600	
	Total	4646748.110	99		
4. Marital status	Between samples	88329.505	2	88329.505	1.899#
	Within samples	4558418.605	97	46514.476	
	Total	4646748.110	99		

Section VIII:

This provides the association between fatigue and selected psychological variables [(Table 9)].

Table 9 (a): Description of the association between anxiety and selected demographic variables of the HIV positive patients

Demographic Variables	Source of Variation	Sum of Square	Degree of Freedom	Mean Square	Variance Ratio of F
1. Age	Between samples	1442.474	3	480.825	2.019#
	Within samples	15337.966	96	159.770	
	Total	16780.440	99		
2. Occupation	Between samples	1379.373	3	459.791	2.006#
	Within samples	15401.067	96	160.428	
	Total	16780.440	99		
3. Income	Between samples	1455.087	3	485.029	2.38#
	Within samples	15325.353	96	159.636	
	Total	16780.440	99		
4. Marital status	Between samples	696.495	2	696.495	4.244#
	Within samples	16083.945	97	164.122	
	Total	16780.440	99		

The finding shows that there was no significant association between anxiety and age, occupation, income and marital status. Hence the researcher accepts the null hypotheses and rejects the research hypotheses.

Table 9 (b): Description of the association between depression and selected demographic variables of the HIV positive patients

Demographic Variables	Source of Variation	Sum of Square	Degree of Freedom	Mean Square	Variance Ratio of F
1. Age	Between samples	139.504	3	46.501	1.957#
	Within samples	2280.606	96	23.756	
	Total	2420.110	99		
2. Occupation	Between samples	82.428	3	27.476	1.128#
	Within samples	2337.682	96	24.351	
	Total	2420.110	99		
3. Income	Between samples	25.437	3	8.479	0.340#
	Within samples	2394.673	96	24.945	
	Total	2420.110	99		
4. Marital status	Between samples	12.330	2	12.330	0.502#
	Within samples	2407.780	97	24.569	
	Total	2420.110	99		

Section IX:

This gives the description regarding comparison of fatigue score between male Vs female [(Table 10)].

Variables	Mean	Mean Diff-	SD	't' value	'p' value
1. Men	7528	187	74.64	0.12#	1.661
2. Women	7341		75.61		

No statistically significant differences in total fatigue were observed between men and women ($t = 0.12$, $p < 0.05$). So, the researcher accepts the null hypothesis and rejects the research hypothesis.

4. Major Findings of the Study

Among 100 HIV positive patients 37% were between 41-50 years and 34% were between 31-40 years. 3/5th (62%) of the samples were illiterate. Nearly half of the samples 48% were moderate workers. Nearly 3/4th (87%) of the samples were married. Majority (84%) of the samples were hailed from urban areas. More than 4/5th (88%) of the samples were symptomatic. Nearly 73% of the HIV positive patients were under ART treatment.

- Nearly half of the samples 59% had moderate fatigue and 40% had severe level of fatigue.
- Almost two- third (92%) of the HIV positive patients had abnormal daytime sleepiness.

- More than 4/5th (93%) of the HIV positive patients had poor quality of sleep.
- Majority (73%) of the HIV positive patients had moderate depression.
- Among 100 HIV positive patients, 88% had severe anxiety.
- Sleep quality ($r = 0.314$, $p = 0.0197$), daytime sleepiness ($r = 0.443$, $p = 0.0016$), anxiety ($r = 0.300$, $p = 0.034$) and depression ($r = 0.380$, $p = 0.0142$) retained significance in a 3-step, backward stepwise elimination model and accounted for 80% of the variance in fatigue.
- Using regression analysis keeping in mind the predictors found in the present study, the following formula was derived to quantify fatigue for the HIV population.
- No statistically significant differences in total fatigue were observed between men and women.

5. Limitations

The limitations of the study were as follows:

- The study was conducted among HIV positive patient's from selected Non Governmental Organization at Madurai, so generalization must be done with caution.
- The responses were based on self – report of the study samples that could not be counter checked.
- Laboratory findings were obtained from the patient's medical record.

- 4) HIV positive patients who visited NGO HIV Care Centre with their medical record alone were only included.
- 5) HIV positive patients who visited the NGO HIV Care Centre those referred by the ART medical officer in Government Rajaji Hospital were only included.

6. Recommendations

On the basis of the present study the following recommendations have been made for further studies.

- 1) An experimental study can be undertaken to determine the effectiveness of selected intervention in reducing fatigue and improving quality of life of HIV positive patients.
- 2) A longitudinal study can be conducted to identify the fatigue aspect of HIV positive patients and also the follow-up specific to HIV related fatigue.
- 3) A correlational study along with physiological and psychological variables, sociological and health related quality of HIV positive patients can be undertaken.
- 4) A qualitative approach can be used to explore HIV related fatigue.

7. Conclusion

The present study examined selected physiological and psychological correlates of fatigue. The results indicated that the physiological characteristics of sleep quality and daytime sleepiness correlated with fatigue. The psychological characteristics that correlated with fatigue were anxiety and depression. A backward stepwise regression model indicated that almost 80% of the variability in fatigue could be explained in a model containing daytime sleepiness, sleep quality, anxiety and depression. These data indicate that the high prevalence of fatigue in the HIV-infected population is a multifactorial syndrome that includes both physiological and psychological correlates.

Treatment of HIV-related fatigue is important because of its physiological and psychological consequences and requires a multidisciplinary approach. There is a need for an appropriate evidence-based practice guideline for the management of HIV-related fatigue.

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