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NIGHTMARE AS NEUROPSYCHIATRIC REACTION OF EFAVIRENZ: A BASIS FOR EXERCISE PHYSIOLOGICAL INTERVENTION PROGRAM TO HIV PATIENTS

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ABSTRACT

HIV patients who are taking Efavirenz experienced high-level of nightmare distress as a neuropsychiatric side effect of the drug. They underwent a 4-week Exercise Physiological Intervention Program, which comprised of basic yoga and physical fitness exercise. This kind of intervention program was proven to regulate the central nervous system, particularly the hypothalamic -pituitary -adrenal (HPA) axis activity. The HPA Axis is responsible for relaxing the brain activity for stressors and various kinds of anxiety, and it can further minimize the nightmare activity of the brain. The Respondents had the Nightmare Distress Questionnaire for pre-test and post-test analysis to the Exercise Physiological Intervention Program. The pre-test showed a high level (3.89) of nightmare distress, and the post-test showed a moderate level (3.14) of nightmare distress. The paired sample t-test result showed that there is a significant difference between the pre-test and post-test and asserts that the proposed intervention program is effective.

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Introduction and Background

HIV/AIDS cases in the Philippines are rapidly increasing these past few years. According to the statistical report of the Department of Health (DOH) (2019) in the Philippines, there are a total of 71,778 HIV diagnosed patients from January 1984 to September 2019. Three thousand six hundred seventeen of which died because of the said disease[1]. Alarmed and determined to resolve the rising number of HIV cases, the Philippine government doubled its effort to cascade and mobilized different strategies to spread awareness about this condition.

Part of the Philippine government's determination to help the confirmed HIV/ AIDS positive patients, they are providing free Antiretroviral Therapy (ART) or a systematic medication to support reducing and controlling the HIV in the body. ART is being monitored and funded by Philhealth, national health insurance for Filipino people. The free ART provided to their designated institutions, and the most common are Research Institute for Tropical Medicine (RITM) in Alabang, Muntinlupa and San Lazaro Hospital in Santa Cruz, Manila. According to DOH (2019), 41,468 people are living with HIV were presently on ART[1].

Most of the ART pill that distributed in the country imported from India to which all are generic. One of those generic pills is Efavirenz, which is commonly known for its brand name as Sustiva. It is highly an active antiretroviral combination therapy that can suppress plasma viral load, but there is a reported neuropsychiatric side effect such as nightmares experience (Arendt, Nocker, Giesen, &Nolting, 2007)[2]. Taking Efavirenz can have interaction within the Central Nervous System (CNS), including the penetration and concentration of the drug in the brain. It is the very reason why Efavirenz was known for a nightmare as its neuropsychiatric reaction or side effect (Apostolova, Funes, Blas-Garcia, Galindo, & Alvarez, 2015)[3]. New patients who are new to Efavirenz are experiencing this side effect that only lasts for a couple of months; however, some patients experience long-lasting side effects for several years.

Nightmare is a kind of dream which typically contains unpleasant, and terror situation within the dream and the person is experiencing extreme fear, distress, and apprehension while sleeping. It also occurs during Rapid Eye Movement (REM) phase when sleeping. Sigmund Freud, the father of psychoanalysis, strongly believed that dreams, including nightmare, is the gateway to discover the unconscious state of a person. Nightmare also attributed to the hypothalamic -pituitary -adrenal (HPA) axis activity (Nagy, Salavecz, Simor, Purebl, Bodizs, Dockray, & Steptoe, 2015)[4]. The HPA is also responsible for stress and anxiety brain activity by releasing of corticotropin-releasing factor (CRF). According to Ross and Thomas (2010), yoga and exercise can regulate and calm the HPA[5]. This research will adopt this concept to ease HPA activity and reduce the respondents' nightmare distress.

Methodology

Five respondents willingly participated in the research process. The qualification for this research to be a subject are (1) HIV patient for more than 1 year; (2) Consistently taking Efavirenz for more than 1 year; (3) With undetectable status; (4) No therapeutic intervention for nightmare experiences; and (5) Frequent experience of nightmare. For the patient to qualify for the nightmare experience, they need to fall to the following criteria of International Classification of Sleep Disorders (ICSD)- Third Edition (2014)[6]:

A. Repeated occurrences of extended, extremely dysphoric, and well-remembered dreams usually involve threats to survival, security, or physical integrity.
B. The episodes generally occur during the second half of the major sleep episode.
C. On awakening from the dysphoric dreams, the person rapidly becomes oriented and alert.
D. The dream experience, or the sleep disturbance produced by awakening from it, causes clinically significant distress or impairment in social, occupational, or other important areas of functioning as indicated by the report of at least one of the following:
    1.Mood disturbance (i.e., persistence of nightmare effect, anxiety, dysphoria)
    2.Sleep resistance (i.e., bedtime anxiety, fear of sleep or subsequent nightmares)
    3.Cognitive impairments (i.e., intrusive nightmare imagery, concentration, impaired memory)
    4.Negative impact on caregiver or family functioning (i.e., nighttime disruption)
    5.Behavioral problems (i.e., bedtime avoidance, fear of the dark)
    6.Daytime sleepiness
    7.Fatigue or low energy
    8.Impaired occupational or educational function
    9.Impaired interpersonal or social function

These qualified respondents answered the Nightmare Distress Questionnaire (NDQ) of Belicki (1992), which identified that they have a high level of nightmare distress[7]. The internal consistency coefficients of NDQ vary between 0.83 and 0.88 (Belicki, 1992)[7]. Respondents underwent a 4-week exercise physiological intervention program, which involved a combination of yoga and basic exercise. They took basic 1-hour basic yoga classes and 1-hour physical fitness exercises alternately. The yoga classes are every Monday, Wednesday, and Friday from 6 pm to 7 pm, and the physical fitness exercises are every Tuesday, Thursday, and Friday from 6 pm to 7 pm. The basic yoga classes have routine have various poses such as natural, bridge, cat, chair, child, cobra, corps, fish, garland, extended puppy, gate, half lord of the fishes, high lunge, intense side stretch, extended side angle, and bharadvaja's twist. Physical fitness exercise includes cardiovascular, aerobics, endurance, and basic strengths or resistance training. After the 4-week intervention program, the respondent's nightmare distress assessed using the same tool, which is NDQ.

The data collection for the pre-test was January 7, 2020. After consulting their physician to undergo basic yoga and physical fitness exercise, the respondents started their Exercise Physiological Intervention Program on January 20, 2020, and finished it on February 15, 2020. The data collection for the post-test gathered on February 17, 2020.

This research utilized Paired Sample T-Test as a statistical tool to assess the difference between the pre-test and the post-test of the respondent's NDQ.

Hypothesis

There is no significant difference between the respondent's nightmare distress before and after the exercise physiological intervention program.

Result

Table 1. Respondents Data with NDQ Result and Interpretation Before the Exercise Physiological Intervention Program

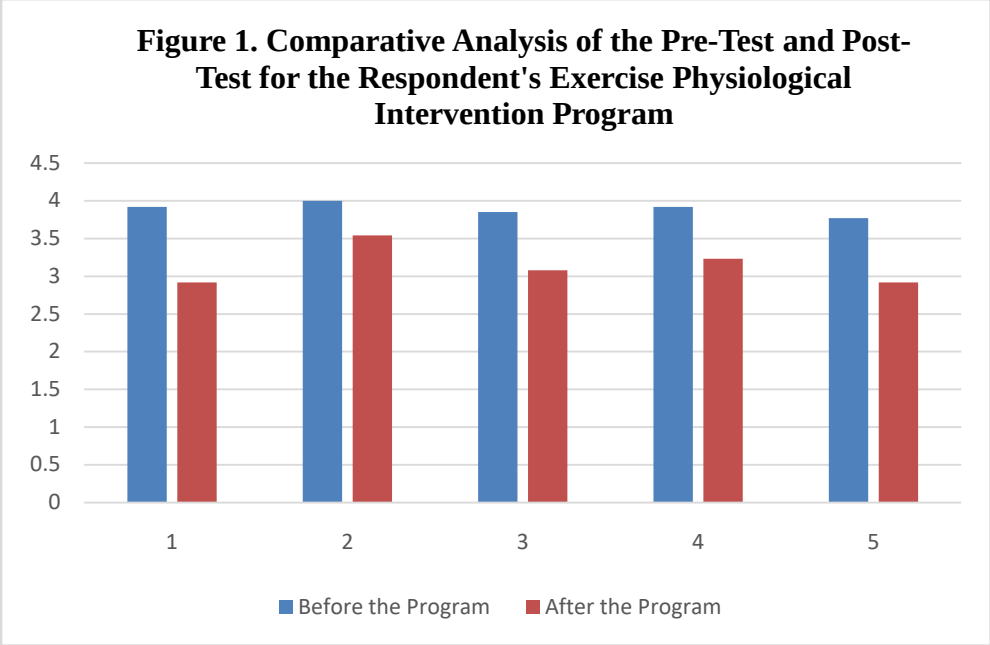
Respondent	Gender	Years Taking Efavirenz	NDQ Result	Interpretation
1	Male	2.3 years	3.92	High
2	Male	1.8 years	4.00	High
3	Male	2.1 years	3.85	High
4	Male	1.4 years	3.92	High
5	Male	3.2 years	3.77	High
Average	**Male**	**2.2 years**	**3.89**	**High**

The data result showed that the five respondents are all male. Respondent 1 is taking the Efavirenz for 2.3 years with 3.92 mean for his pre-test NDQ and interpreted as high level. Respondent 2 is taking the Efavirenz for 1.8 years with 4.00 mean for his pre-test NDQ and interpreted as high level. Respondent 3 is taking the Efavirenz for 2.1 years with 3.85 mean for his pre-test NDQ and interpreted as high level. Respondent 4 is taking the Efavirenz for 1.4 years with 3.92 mean for his pre-test NDQ and interpreted as high level. Respondent 5 takes the Efavirenz for 3.2 years with 3.77 mean for his pre-test NDQ and interpreted as a high level. The average mean of all respondents for their pre-test NDQ is 3.89, which indicates that they all have a high level of nightmare distress.

Table 2. Respondents Data with NDQ Result and Interpretation After the Exercise Physiological Intervention Program

Respondent	Gender	Years Taking Efavirenz	NDQ Result	Interpretation
1	Male	2.3 years	2.92	Moderate
2	Male	1.8 years	3.54	High
3	Male	2.1 years	3.08	Moderate
4	Male	1.4 years	3.23	Moderate
5	Male	3.2 years	2.92	Moderate
Average	**Male**	**2.2 years**	**3.14**	**Moderate**

The data result showed that the five respondents are all male. Respondent 1 takes the Efavirenz for 2.3 years with 2.92 mean for his post-test NDQ and interpreted as a moderate level. Respondent 2 is taking the Efavirenz for 1.8 years with 3.54 mean for his post-test NDQ and interpreted as high level. Respondent 3 is taking the Efavirenz for 2.1 years with 3.08 mean for his post-test NDQ and interpreted as a moderate level. Respondent 4 is taking the Efavirenz for 1.4 years with 3.23 mean for his post-test NDQ and interpreted as a moderate level. Respondent 5 is taking the Efavirenz for 3.2 years with 2.92 mean for his post-test NDQ and interpreted as a moderate level. The average mean of all respondents for their post-test NDQ is 2.92, which indicates that they all have a moderate level of nightmare distress.



The data result showed that all respondents decreased their nightmare distress level after the Exercise Physiological Intervention Program. The pre-test and post-test mean difference for respondent 1 is 1.00, respondent 2 is 0.46, respondent 3 is 0.77, respondent 4 is 0.69, and respondent 5 is 0.85. The mean average difference is 0.75.

Table 3. T-Test: Paired Two Sample for Means in Pre-Test and Post-Test

	Before the Program	***After the Program***
Mean	3.89	3.14
Variance	0.00747	0.06712
Observations	5	5
Pearson Correlation	0.769482952	
Hypothesized Mean Difference	0	
df	4	
t Stat	8.416310864	
P(T<=t) one-tail	0.00054554	
t Critical one-tail	2.131846786	
P(T<=t) two-tail	0.00109108	
t Critical two-tail	2.776445105	

The paired sample t-test result showed that the computed t value or stat is 8.4163, the p-value for one tail is 0.0005, and the p-value for two tail is 0.0010. For the critical value approach of interpretation, there is a significant difference for the pre-test, and the post-test since the t value (8.4163) is greater than the one tail critical value (2.1318). The p-value approach also states that there is a significant difference between the pre-test and the post-test since the one-tail p-value (0.0005) is less than the significant value level (0.05).

Discussion

The NDQ pre-test showed that the respondents are having a high level of nightmare distress as they do not address it through therapy or medication. After the respondents finished the 4-week Exercise Physiological Intervention Program, the NDQ post-test showed that they attained a moderate level of nightmare distress. The NDQ mean difference average for the pre-test and post-test is 0.75, which means that there is a nightmare level reduction. There is a significant difference in nightmare distress of the respondents before and after undertaking the Exercise Physiological Intervention Program. The said program is primarily composed of basic yoga and physical fitness. These exercises are done alternately for six days with a 1-hour time limit and with one day intended for rest. For the research purposes, it accomplished for four weeks after measuring the nightmare distress.

This study made a stand that some HIV patients are experiencing nightmare distress as a side effect of Efavirenz. Efavirenz increases the HPA axis activity (O'Mahony, Myinth, Steinbusch, Leonard, 2005)[8], and HPA axis abnormal activity can cause sleep problems such as nightmares. To treat nightmares, it needs to regulate the central nervous system's amygdale, hippocampal activity, and HPA axis (Cranston, Davis, Rhudy, Favorite, 2011)[9]. It also proved that there is a relationship between the HPA axis activity and sleep problems such as nightmare occurrence (Shunmugapriya, 2015)[10]. The HPA Axis is also known for its stress-responsive physiological system (Hennessy, 2013)[11].

There are medications that address nightmare as caused by high HPA Axis activity, and there is some treatment which does not involve ingested drugs such as exercise. Exercise is one of the physiological conditioning to regulate the HPA axis activity (Luger, Deuster, Kyle, Gallucci, Montgomery, Gold, Loriaux, Chrousos, 1987)[12]. Yoga and exercise can also regulate the HPA axis activity (Ross & Thomas, 2010)[13]. This study adopted these claims and formulated the Exercise Physiological Intervention Program by using yoga and exercise as the main treatment for nightmares. The formulate intervention program is successful in achieving its purpose in addressing the respondent's nightmare distress.

Conclusion

HIV patients who are taking Efavirenz can experience a long-term neuropsychiatric side effect, such as nightmares. Respondents in the study who are taking Efavirenz for more than 1-year experienced a high level of nightmare distress. When the respondents introduced to the proposed Exercise Physiological Intervention Program, their nightmare distress got better and turned into a moderate level. The nightmare experience of HIV patients can somehow reduce its occurrence and the distress caused by the neuropsychiatric side effect of Efavirenz using the proposed Exercise Physiological Intervention Program. It only means that the Exercise Physiological Intervention Program is effective for HIV patients who are experiencing nightmares as a neuropsychiatric side effect of Efavirenz.

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