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CLINICAL EVALUATION OF DIATHESIS STRESS ON POST BATTLEFIELD SOLDIERS

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ABSTRACT

Several literatures have attempted to analyse the causes and effects of diathesis stress. Some methods of medical evaluation and research design have established a dynamic and causal relationship between genetic<sup>1</sup> factors and environmental exposure; others have linked it with post traumatic experiences.<sup>2</sup> The paper explores these developments and identified the gaps in the field and new directions in recent research focusing on soldiers that have served in war and peace keeping missions. The data is a compilation of the cost of medical diagnosis and treatment of diathesis stress patients from 1993-2013. The data is drawn from 10 British Soldiers that have served in Afghanistan and Iraq wars and 20 African soldiers that fought in the civil wars of Liberia and Sierra Leone. We hypothesize that exposure to war does not cause and/or worsen the symptoms of diathesis stress in the patients with a pre-existing vulnerability. We adopted the Granger causality tests of the hypothesis and explored the implications for present and future treatment.

*Keywords:* Medical Evaluation, Diathesis Stress, Granger Causation, War.

1. INTRODUCTION

There is a medical consensus that, diathesis stress patients have, to different degrees, predispositions and susceptibility for developing depression<sup>3</sup>. The physical examination of patients is usually conducted to exclude the physical factors routinely linked to the nervous and

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<sup>1</sup> Andreasen, N. C. (1987). The measurement of genetic aspects of depression. (In A. J. Marsella, R. M. A. Hirschfeld, and M. M. Katz (Eds.), *The measurement of depression* (pp. 87—108). New York: Guilford Press.)

<sup>2</sup> Dickerson S S, Kemeny ME. Acute stressors and cortisol responses: a theoretical integration and synthesis of laboratory research. *Psychol Bull.* 2004;150:355–391.

<sup>3</sup> Nemade, Rashmi; Reiss, Natalie Staats; and Dombeck, Mark (2012) *Current Understandings of Major Depression - Diathesis-Stress Model*. Online at:

[http://www.pvmhmr.org/poc/view\\_doc.php?type=doc&id=12998&cn=5](http://www.pvmhmr.org/poc/view_doc.php?type=doc&id=12998&cn=5). Accessed 1/2/2014

hormonal systems.<sup>4</sup> Also, it assists in the identification of any fundamental health issues that may be contributing to the symptoms of clinical depression.<sup>5</sup> The symptoms of diathesis stress may be confused with hypothyroidism triggered by the disorder of the thyroid gland. Brain and spinal damage could cause diathesis stress.<sup>6</sup> Jones and Fernyhough, (2007:1) explains that:

The neural diathesis stress model of schizophrenia<sup>7</sup> proposes that stress, through its effects on cortisol production<sup>8</sup>, acts upon a pre-existing vulnerability to trigger and/or worsen the symptoms of schizophrenia. In line with its focus on the neurobiology of stress response in schizophrenia, this model treats stressors as a homogeneous category. Recent research has shown that, in healthy individuals, cortisol is most strongly produced in response to stressors that result from perceived uncontrollable threats to important goals and/or social-evaluative threats.

Previous studies have found that attribution lifestyle with an external locus of control in teenagers bestows the likelihood of diathesis stress in later life.<sup>9</sup> The defect in human developmental progress has also been linked to the development of diathesis stress.<sup>10</sup> Despite genetics and developmental factors, early childhood traumatic experience, has been found to increase the risk of the disease.<sup>11</sup> It is against the foregoing argument that the hypothesis of this study was constructed.

*Hypothesis: War causes Diathesis Stress*

## 2. MATERIALS AND METHOD

### 2.1 DATA

The data is a compilation of the cost of medical diagnosis and treatment of diathesis stress patients from 1993-2013. The data is drawn from 20 British Soldiers that have served in Afghanistan and Iraq wars and 20 African soldiers that fought in the civil wars of Liberia and Sierra Leone. The data were mainly based on medical reports of the subjects compiled between 1992 and 2013, which were voluntarily supplied by the subjects. Ethical consideration and confidentiality was taken into account.<sup>12</sup>

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<sup>4</sup> Gureje O, Adewunmi A. 1988; Life events and schizophrenia in Nigerians: a controlled investigation. *Br J Psychiatry*. 153:367–375.

<sup>5</sup> Frenkel E, Kugelmass S, Nathan M, Ingraham LJ. 1995; Locus of control and mental health in adolescence and adulthood. *Schizophr Bull*. 21:219–226.

<sup>6</sup> Ryan MCM, Sharifi N, Condren R, Thakore JH. Evidence of basal pituitary-adrenal over activity in first episode, drug naive patients with schizophrenia. *Psychoneuroendocrinology*. 2004;29:1065–1070

<sup>7</sup> Brown, G. W. & Birley, J. L. T. (1968). Crises and life changes and the onset of schizophrenia. *Journal of Health and Social Behavior*, 9, 203-214.

<sup>8</sup> Dickerson S S, Kemeny ME. Acute stressors and cortisol responses: a theoretical integration and synthesis of laboratory research. *Psychol Bull*. 2004;150:355–391.

<sup>9</sup> Frenkel E. Locus of control and mental health in adolescence and adulthood. *Schizophr Bull*. 1995;21:219–226.

<sup>10</sup> Ventura J. A prospective study of stressful life events and schizophrenic relapse. *J Abnorm Psychol*. 1989;98:407–411.

<sup>11</sup> Read J. Sexual and physical abuse during childhood and adulthood as predictors of hallucinations, delusions and thought disorder. *Psychol Psychother*. 2003;76:1–22.

<sup>12</sup> Meehl, P. E. (1977). Specific etiology and other forms of strong influence: Some quantitative meanings. *The Journal of Medicine and Philosophy*, 2, 33-53.

## 2.2 EMPIRICAL ANALYSES

### 2.2.1 ADF AND KPSS UNIT ROOTS STATIONARITY TESTS

The unit root tests comprised of two tests were conducted using the models of Dickey (1979) and Kwiatkowski et. al.,(1992). These were to ascertain that the medical data of the subjects were stationary. The null hypothesis that the data have unit root is accepted. The unit test results show that the data have the required time series properties. A specified model was therefore estimated by differencing the variables in line with the levels of stationary. This was necessary to avoid the estimation of a spurious regression. The result thus shows the existence of a positive, but the statistical relationship between diathesis stress and the medical cost of treatment and diagnosis. The summary of the unit root test results is presented in Table 1.

Table 1: Results of ADF and KPSS Unit Root Tests

Series	Lag=20		
	ADF	KPSS $\mu$	KPSS $\tau$
	Level	Level	
British Soldiers	0.010022***	0.06374***	0.00864***
African Soldiers	0.014309***	0.04412***	0.001096***
First Difference; Lag=20			
British Soldiers	0.011875***	0.00532***	0.0019***
African Soldiers	0.00415***	0.00134***	0.001207***

*Note:* Subscripts  $\mu$  and  $\tau$  represents the models permitting for drift in the trend of determination. Asterisks \*\*\* indicates acceptance of the existence of unit root at 1% and 5% of the critical values. The numbers in parentheses are the lag length. The ADF is with intercept and trend and, the 20 years lag is selected in compliance with *Akaike Information Criteria* (AIC) and the longitudinal analysis. The ADF critical value is 0.01, 0.05 and 0.010 respectively. The KPSS critical value is 0.216, 0.176, 0.146 and 0.119, also known as the upper tail critical values (Kwiatkowski et. al., 1992). Under the KPSS, the null hypothesis of the existence of stationarity is acceptable where the test-statistic is less than the critical value and the asterisks \*\*\* indicates the acceptance of the existence of stationarity.

### 2.2.2 COINTEGRATION TEST

Given the existence of the unit roots of the variables, we proceeded to execute the Engle-Granger co-integration procedure by estimating the linear combination of all the explanatory variables at their level forms with their intercept and then tested their residual. The result is presented in the Table 2.

Table 2: Summary of Cointegration Results

	t-ADF	Lag	Critical value
Residual 1	-2.3122	20	0.00011
Residual 2	-1.0701	20	“
Residual 3	-1.3083	20	“

The evidence from table 2 shows that all the residual t-ADF is lower than the critical value at the 1% and 5% level of significance. This means that there is no long run equilibrium relationship between military service in war and the cost of medical diagnosis /treatment of diathesis stress and military service in war. The need for formulating an error correction model is eliminated. We progressed the analysis to verify the results on the ordinary least squares

(OLS), presented in Table 3. The OLS results show that the *p-value* is less than .05 so the null hypothesis of the existence of an equilibrium relationship between the cost of medical diagnosis /treatment of diathesis stress and military service in war is rejected at the 5% level. The  $R^2=0.048301$  which implies that there is less than 1% of the likelihood of the variables being associated. In essence, not up to one per cent of the patients suffering from diathesis stress can be attributed to their services in the military at the war fronts.

Table 3: OLS Results

SUMMARY OUTPUT						
<i>Regression Statistics</i>						
Multiple R	0.0065044					
R Square	0.048301					
Adjusted R Square	0.064401					
Standard Error	0.00231					
Observations	20					
ANOVA						
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	1	70.9788	80.93889	2.918976	0.058295	
Residual	3	23.86111	6.953704			
Total	4	94.8				
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-7.91667	7.050578	-1.12284	0.343259	-30.3548	14.52144
Medical treatment	1.569444	0.525519	2.986465	0.058295	-0.10299	3.241882
RESIDUAL OUTPUT						
<i>Observation</i>	<i>Predicted Y</i>	<i>Residuals</i>				
1	10.91667	1.083333				

Table 4: Granger causality analysis of Military Service in war and diathesis stress

Category	X	y	Crit.
H <sub>0</sub>	9.000026	11.87001	7.98
H <sub>1</sub>	0.001023	0.000221	0.00002

*Note:* The Null Hypothesis is "military service in war causes diathesis stress". *Crit.* represents the critical value at 5%. *x* = the cost of diagnosis and treatment prior to war posting of the soldiers. *y* = the cost of diagnosis and treatment during and after war.

The *null hypothesis* [H<sub>1</sub>]: War does not cause and/or worsen the symptoms of diathesis stress in the patients with a pre-existing vulnerability. *Alternative Hypothesis* [H<sub>0</sub>]: War does cause and/or worsen the symptoms of diathesis stress in the patients with a pre-existing vulnerability.<sup>13</sup> The results indicate the absence of long run links between the variables, however, it does not indicate causality direction of when the variables are cointegrated.

### 3. CONCLUSION

The finding shows substantial flaws in the medical understanding of chronic stress, depression and anxiety disorder consistent with Akiskal, et. al., (1977); Alloy and Abramson

<sup>13</sup> Jones, Simon R. and Fernyhough, Charles (2007) A New Look at the Neural Diathesis Stress Model of Schizophrenia: The Primacy of Social-Evaluative and Uncontrollable Situations. *Schizophrenia Bulletin* vol. 33 no. 5 pp. 1171–1177

(1988) and Falconer (1965). Also, there are no significant gender differences in exposure and reactivity to stressors (Brown, 1968). By adopting the longitudinal tests of diathesis stress models; and by evaluating the biological stress progression linked with naturally occurring and depressive stress outcomes, the study suggests that there is a strong genetic connection with diathesis stress in schizophrenia patients.<sup>14</sup>

We found that diathesis stress is rather triggered by traumatic experiences than caused by it. The medical causes could be attributed to several factors, including genetics and social development of the patients.<sup>15</sup> This study affirms available medical evidence which suggests that the neural diathesis stress model of schizophrenia can be expanded to account for the heterogeneity of effects of psychological stressors.<sup>16</sup> We, thus, emphasise that it is the events professed as social evaluative involving uncontrollable threats to important goals that raise patients' cortisol levels (Entralgo, 1955). For example, we found that the soldiers with no genetic history of diathesis stress had a very marginal level of the disease irrespective of the exposure to the same stressor (wars).<sup>17</sup>

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