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An Investigation on Effectiveness of Bender Visual Motor Gestalt Test in Diagnosis of Visual-Spatial Disorganizations among Selected Psychotic Patients

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Abstract

Screening patients for psychotic features can pose a problem when using verbal based tests. Establishment of validity of non-verbal psychotic screening scale can enhance diagnostic specificity and address challenges associated with verbal based tests. The goal of this study is to check whether Bender Visual Motor Gestalt Test-II will serve as a diagnostic specific tool for distinguishing between psychotic patients and healthy population. A total of 40 participants 22 males and 18 females were employed in the study. They were made of 10 patients diagnosed with schizophrenia, another 10 with depressions associated with psychotic features, 10 with substance/medication induced disorders and 10 healthy adults as the control. Their ages ranged from 20 - 65 with a mean age of 35.70 and standard deviation of 6.04. The healthy control group was staff of the hospital that was comparable to the patients in terms of age, gender and studies. All participants available who met the inclusive criteria who were willing to participate were selected. The instruments were (BVMGT-II) and (WHODAS 2.0). The design of the study was between group designs and One Way ANOVA was employed for data analysis. The findings of the study showed that BVMGT-II discriminated between patients with psychotic disorder and healthy population. It is recommended that BVMGT-II should be employed as screening instrument by the clinical/neuropsychologists in clinical psychological assessment for distinguishing psychotic patients from healthy population.

Keywords

Bender, Visual Motor Gestalt, Visual-Spatial, Disorganizations, Psychotic Patients

1. Introduction

1.1. Background to the Study

The diagnosis of psychopathology and assessment of psychological well-being are some of the main responsibilities of clinical psychologists/neuro-psychologist trained on the use of test battery. To carry out these responsibilities, clinical psychologists require correct tools (valid and reliable) and proper skills. Amongst the battery of test clinical psychologists use for this purpose is Bender Visual Motor Gestalt Test II. BVMGT-II evaluates visual-spatial organization or disorganization, perceptual function domain of visual-spatial and motor function domain of visual-spatial organization or disorganization of the cognitive functions.

In this study, Bender Visual Motor Gestalt Test-Second Edition (BVMGT-II) is used to evaluate or assess the visual-spatial condition of selected psychotic patients (patient diagnosed with schizophrenia, patient diagnosed with depression associated with psychotic features, patient diagnosed with substance/medication induced disorders and selected healthy adults). It is always a great challenge screening psychotic features; this can pose a problem when using verbal based tests. This is because, the interplay between cognitive deficits and psychotic features like delusion, hallucination and disorganized thinking and behaviour has been considered as an important factor responsible for the manifestations of psychosis, among patients diagnosed with schizophrenia, patients diagnosed with depression associated with psychotic features and patients diagnosed with substance/drug psychotic disorders [1]. Thus, to effectively diagnose with specificity patients with psychotic features is often a big challenge when using verbal based tests which may result in poor diagnostic impression. Hence, establishment of validity of non-verbal psychotic screening scale can enhance diagnostic specificity and address challenges associated with verbal based tests including culture bias. Besides, it is generally believed that poor diagnostic impression contributes to poor treatment outcome. This challenge may likely be more in making specific diagnoses among psychotic patients as they share similar psychotic features [2]. Psychotic disorder is a condition which affects the mind in which there have been distortions in a person's sense of reality and amongst the psychotic disorders this work intends to consider the following:

Schizophrenia is a mental disorder that affects individuals' pattern of thinking, feeling and behaviour. It is associated with dysfunctions in relatively basic aspects of visual processing as reflected in performance on tasks, like visual-spatial organizations. A well-documented visual impairment in schizophrenia

is in a perceptual organization [3], which is the process by which individual elements of sensory information are collectively structured into larger units of perceived objects and their interrelations [4].

Depression associated with psychotic symptoms and bipolar disorder has been shown to have symptoms of psychotic features. According to DMS-5, it is seen as differentials of schizophrenia; and the distinction between schizophrenia and depression associated with psychotic symptoms or bipolar disorder with psychotic features or with catatonia depends on the temporal relationship between the mood disturbance and the psychosis, and on the severity of the depressive or manic symptoms [5].

Substance/drug-induced psychotic disorder, according to DSM-5, individuals with substance/drug-induced psychotic disorder may present symptoms characteristic of DSM-5 Criterion A for schizophrenia, but the substance/drug-induced psychotic disorder can usually be distinguished by the chronological relationship of substance use at the onset and remission of the psychosis in the absence of substance use. Substance-Induced Psychotic Disorder is a disorder that is directly caused by the effects of drugs of abuse including alcohol, medications, and toxins.

Visuospatial or visual-spatial organization (as part of the executive functions) is the ability to meaningfully and accurately interpret, organize, analyze, synthesize, explore and dominate one's environment, space or localization. When there are defects in a visual-spatial organization, one experiences remarkable deficits in a visual-motor domain. This process is called Visuo-Perceptual-Construction Behaviour (VPMB), which represents the complex behavioural pattern assessed to determine the neural stability and general behaviour organization of an individual. In this perspective, a complex behavioural pattern is an integration of two concepts: visual perception ability and motor ability (BVMGT-II) [6].

The choice of Bender Visual Motor Gestalt Test-Second Edition (BVMGT-II) for this study emanated from investigation on literature that shows BVMGT-II to be most highly favoured and frequently used psychological tests in the United State for visual-motor perception [7]. Besides, BVMGT-II is quick and easy to administer. The prominent tasks in Bender Gestalt test are performances that involve drawing and construction. People with psychotic symptoms have decreased cognitive capacities when compared with the normal population.

In Nigeria, it is suspected that psychiatric diagnosis of psychotic disorders is often based on verbal bases tests (symptom manifestations that centred on observation, the report from patients and/or information gathered from patients' relatives). Furthermore, some of the objective tests used by clinical psychologists to assess patients are in some way very complicated, and for that reason are difficult to be understood by patients owing to the standardized education levels required by some of these tests. Following these limitations and obstacles, the choice of Bender Visual Motor Gestalt Test-II (BVMGT-II) as an independent variable of this study can be viewed from two major perspectives, namely: 1) culture-sensitivity and 2) its limited demands for higher educational qualifica-

tions.

1.2. Statement of the Problem

Screening patients for psychotic features can pose a problem when using verbal based tests. Establishment of validity of non-verbal psychotic screening scale can enhance diagnostic specificity and address challenges associated with verbal based tests including culture bias. This research work centres on the use of (BVMGT-II) to assess the visual-spatial disorganization, motor coordination and perceptual organization among selected psychotic patients and healthy population as control.

It is suspected that the use of (BVMGT-II) instrument is not common in clinical diagnosis in Nigeria, and from observation made from literature by the researcher; to the best of the author no known study in Nigeria has attempted to use (BVMGT-II) as an instrument for the diagnosis of psychiatric disorder, hence, the need for this study.

1.3. Research Questions

To address the component issues of this study, the following research questions form the basis of the investigation:

1) Will copy domain of BVMGT assess between the healthy population, schizophrenia, depression with psychotic features and substance/drug-induced psychotic disorder population group in the visual spatial disorganizations.

2) Will recall domain of BVMGT assess between the healthy population, schizophrenia, depression with psychotic features and substance/drug-induced psychotic disorder population group in the visual spatial disorganizations.

3) Will motor domain of BVMGT assess between the healthy population, schizophrenia, depression with psychotic features and substance/drug-induced psychotic disorder population group in the visual spatial disorganizations.

4) Will perceptual domain of BVMGT assess between the healthy population, schizophrenia, depression with psychotic features and substance/drug-induced psychotic disorder population group in the visual spatial disorganizations.

1.4. Purpose of the Study

The general purpose of the study is to assess psychometrically the effectiveness of BVMGT for assessment of visual spatial disorganization among selected psychotic patients and healthy participants.

1.5. Relevance of the Study

It is expected that this study will contribute to making specific diagnosis among patients with psychotic disorder. More so, it is expected that BVMGT-II will discriminate between patients with psychotic disorder and healthy population and as such will add to the available non-verbal test battery for diagnosis of these disorders.

1.6. Operational Definition of Key Study Variables

The key study variables defined here as they apply to this study:

Bender Visual Motor Gestalt Test II: This is an educational, psychological and neuropsychological assessment tool for assessing visual spatial conditions.

Healthy Population: They are the participants with no known or diagnosed mental health disturbances as determined by WHO disability assessment scale.

Depression associated with Psychotic Features: The definition offered by DSM-5 on this was adopted for this study. Accordingly, this refers to a mood disturbance that is sufficiently severe to cause marked impairment in social or occupational functioning as measured by the DSM-5 criteria.

Psychotic Disorder: It is a condition which distorts a person's sense of reality with characteristic symptoms as delusion, hallucination, disorganised thinking and behaviour, negative symptoms and cognitive impairment as determined by the DSM-5 criteria.

Schizophrenia: It is a mental disorder known for its severe abnormalities including delusion, hallucination, disorganised thinking and behaviour, as well as cognitive and social functioning impairments, as determined by the DSM-5 criteria.

Substance/drug-Induced Psychotic Disorder: This is a psychotic disorder that occurs during or soon after exposure to a drug or after substance intoxication or withdrawal as specified by the DSM-5 diagnostic criteria.

Visual-spatial Disorganization: This refers to the inability to interpret, organize, analyze or synthesize facts related to the cognitive domain, as measured by BVMGT-II.

2. Method

2.1. Participants

Forty (40) participants were selected for the study. They were made up of 10 patients diagnosed with schizophrenia, 10 patients diagnosed with depression associated with psychotic features, 10 patients diagnosed with Substance/medication-induced disorder and 10 healthy adults as the control group. The selection of participants was through cumulative sampling technique, the researcher being a staff of Enugu state University Teaching Hospital Parklane (ESUTH) considering convenience and easy accessibility of the participants, selected the participant from Neuro-Psychiatric Clinic of Enugu State University of Science and Technology Teaching Hospital Parklane, Enugu State. The ages of the subjects were between 20 - 65 years with a mean age of 35.70 and standard deviation of 6.03.

The first group was patients diagnosed of schizophrenia with schizophrenia that is within first-third episode, but currently in partial remission based on DSM-5 criteria for schizophrenia and are admitted to a psychiatric hospital and also confirmed with WHO disability assessment scale to ensure that their remission level is significant to guarantee dependable cognitive output. The WHO

disability scale was also used to screen the patients to ensure that they have recovered significantly or meaningfully to respond to the study instrument.

The second group comprised 10 patients diagnosed with depressions associated with psychotic features that are within first-third episode, but currently in partial remission based on DSM-5 criteria for depression; that did not meet all the criteria for schizophrenia but have depression with psychotic features based on DSM-5 criteria and also confirmed with WHO disability assessment scale.

The third group comprised of 10 patients diagnosed with Substance/Medication-Induced Psychotic Disorder who met DSM-5 criteria for the substance-induced disorder that is within first-third episode, but currently in partial remission based on DSM-5 criteria for Substance/Medication-Induced Psychotic Disorder and also confirmed by WHO disability assessment scale.

The fourth group was the healthy participants who were staff of ESUT Teaching Hospital Enugu State for at least a period of at least 12 months.

2.2. Instruments

The present study employed the following instruments:

World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0) WHO disability assessment scale was employed in this study to screen the participants both patients and control. This is to ensure that the participants have recovered significantly to meaningfully respond to the study instrument as well as to ensure that the healthy populations are healthy and stable.

The Bender Visual Motor Gestalt Test-Second Edition (BVMGT-II).

It was developed by Bender in 1938. The Bender-Gestalt II utilizes the original nine designs from the Bender Gestalt Test. To enhance its utility in educational, psychological and neuropsychological assessment, seven new designs have been added to increase the ability range assessed by the Bender-Gestalt II and to amplify the test's clinical value, a recall domain and two supplementary tests (the motor test and the perception test were also added) (Brannigan and Decker, 2003).

2.3. Procedure

The selection of participant was through availability sampling technique. The researchers considered convenience and easy accessibility of patients from the two psychiatric hospitals in Enugu and being a staff of ESUT Teaching Hospital the researcher selected it. The participants baseline mental health were confirmed by WHO assessment disability scale to ascertain their level of disability or to ensure that they have received significant recovery to meaningfully respond to the study instrument as well as the level of their health and stability. The researchers sort for permission at the ESUT Teaching Hospital Parklane Enugu for their consent to use patients in the hospital and to conduct the study in their facility and to obtain ethical clearance. When the basic approvals were received, the researcher introduced himself to the psychiatric unit of the hospital and with

the permission from the hospital management the researchers went to the record department of the hospital, sorted out folders of legible participants through record identification processes. The researchers identified patients who met the criteria for the study those that have been duly diagnosed with schizophrenia who have had the First-third episode, currently in partial remission and those diagnosed with depression associated with psychotic features and those diagnosed with Substance/medication-induced psychotic disorders. This implies that the researcher selected the available patients diagnosed with schizophrenia, depression associated with psychotic features and substance/medication-induced psychotic disorders as the study sample.

Thereafter, with the help of the staff, the selected participants were gathered in a hall where the researcher introduced himself and explained to them the reason for the study. After obtaining their consent, the researcher administered a consent form to the willing participants. Then with the help of the assistants, he administered a test instrument to them. The participants were assigned to four groups, group one were persons who met DSM-V criteria for schizophrenia and also confirmed with WHODAS disability assessment scale. The administration of WHODAS served the purpose of confirming the disability or health state of the individual participant and to record the level of the disability of participant with the disability to ensure that they have recovered significantly to meaningfully to respond to the study instrument. The second group are patients diagnosed with depression associated with psychotic features based on either DSM-5 criteria for depression associated with psychotic features also confirmed with WHO disability assessment scale to ensure that they have recovered significantly to meaningfully to respond to the study instrument.

The third group are those with Substance/Medication-Induced Psychotic Disorder, also diagnosed by a clinician based on DSM-5 criteria for the substance-induced disorder and also confirmed by WHO disability assessment scale to ensure that they have recovered significantly to meaningfully to respond to the study instrument.

The Fourth were the participants with no known or diagnosed mental health disturbances as control group and meeting the inclusion criteria. They were selected through availability sampling technique and on voluntary basis following inclusion criteria fulfilled. They were staff ESUT Neuro-Psychiatric Hospital Emene drawn from different units of the hospital. The participant's baseline mental health was confirmed by WHO assessment disability scale to ascertain their level of their health and stability.

2.4. Design and Statistics

The design of this study was between group designs. It employed One Way Anova for data analysis to find in between-group mean differences.

2.5. Results

Hi: States that copy domain of BVMGT will discriminate between the

healthy population, schizophrenia, depression with psychotic features and substance/drug-induced psychotic disorder population group in the visual spatial disorganization.

Based on norm value, the healthy population norm is 37.80. From the table one above, the mean value for the healthy population (M = 42.80) is great then the value. The healthy population scored higher on copy domain of BVGT-II. The norm value for the schizophrenia patient's population group is 9.70. From Table 1, the mean value for the schizophrenia patient's population group (M = 14.30) is greater than the norm value. The schizophrenia patient population group scored higher on copy domain of BVMGT-II. The norm value for the depression associated with psychotic features patient's population group is 9.60. From Table 1, the mean value for the depression associated with psychotic patient's population group (M = 14.60) is greater than the norm value. The depression associated with psychotic features patient population group scored higher on copy domain of BVMGT-II. The norm value for the substance/drug-induced psychotic disorder patient's population group is 8.70. From Table 1, the mean value for the substance/drug-induced psychotic disorder patient's population group (M = 13.00) is greater than the norm value. The substance/drug-induced psychotic disorder patient population group scored higher on copy domain of BVMGT-II.

Therefore, copy domain of BVGMT-II discriminated between the healthy population (M = 42.80; SD = 2.49) and schizophrenia patient's population (M = 14.30; SD = 2.21), depression associated with psychotic features patient's population (M = 14.60; SD = 1.26), substance/drug-induced psychotic disorder patient's population (M = 13.00; SD = 3.62). From Table 2, significantly, at f (3, 40) = 323.12, $p < 0.001$. Based on the finding of this study, copy domain of BVMGT-II statistically discriminated between healthy and psychotic disorder patients. Therefore the hypothesis 1 was accepted.

Hi: States that copy domain of BVMGT will discriminate between the healthy population, schizophrenia, depression with psychotic features and substance/drug-induced psychotic disorder population group in the visual spatial

Table 1. The summary table of descriptive statistics on the difference between psychotic patients and healthy population on copy domain of BVGMT.

	N	Mean	Std. Deviation
Schizophrenia	10	14.30	2.21
Depression	10	14.60	1.26
Substance	10	13.00	3.62
Healthy population	10	42.80	2.49
Total	40		

disorganization. Table 1 shows that the healthy population obtained the highest mean (M = 42.80; SD = 2.49), the psychotic groups obtains the following scores, Schizophrenias (M = 14.30; SD = 2.21); Depression (M = 14.60; SD = 1.26), Substance (M = 13.00, SD = 3.62). **Hi:** State that copy domain of BVMGT will discriminate between the healthy population and psychotic disorder patients in the visual spatial disorganization. The above result revealed mean differences between the patient with psychotic disorder and the healthy population. Therefore, hypothesis is accepted.

H2: States that recall domain of BVMGT will discriminate between the healthy population, schizophrenia, depression with psychotic features and substance/drug-induced psychotic disorder population group in the visual spatial disorganization.

Based on norm value, the healthy population norm is 16.50. From the table above, the mean value for the healthy population (M = 21.30) is great then the value. The healthy population scored higher on recall domain of BVGT-II. The norm value for the schizophrenia patient's population group is 0.60. From Table 3 the mean value for the schizophrenia patient's population group (M = 5.90) is greater than the norm value. The schizophrenia patient population group scored higher on recall domain of BVMGT-II. The norm value for the depression associated with psychotic features patient's population group is 1.10. From Table 3 the mean value for the depression associated with psychotic features patient's population group (M = 4.10) is greater than the norm value. The depression associated with psychotic features patient population group scored higher on copy domain of BVMGT-II. The norm value for the substance/drug-induced

Table 2. The summary table of ANOVA statistics on the difference between psychotic patients and healthy population on copy domain of BVGMT.

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	6249.675	3	2083.23	323.12	0.01
Within Groups	232.100	36	6.45		
Total	6481.775	40			

Table 3. The summary table of descriptive statistics on the difference between psychotic patients and healthy population on recall domain of BVGMT.

	N	Mean	Std. Deviation
Schizophrenia	10	5.90	1.73
Depression	10	4.10	3.90
Substance	10	3.10	3.28
healthy population	10	21.30	2.16
Total	40	8.60	7.99

psychotic disorder patient's population group is 2.20. From Table 3, the mean value for the schizophrenia patient's population group (M = 3.10) is greater than the norm value. The substance/drug-induced psychotic disorder patient's population group scored higher on copy domain of BVMGT-II. Therefore, recall domain of BVGMT-II discriminated between the healthy population (M = 21.30; SD = 2.16) and schizophrenia patient's population (M = 5.90; SD = 1.73), depression associated with psychotic features patient's population (M = 4.10; SD = 3.90), substance/drug-induced psychotic disorder patient's population (M = 3.10; SD = 3.28). From Table 4, significantly, at f (3, 40) = 167.10, $p < 0.01$. Based on the finding of this study, recall domain of BVMGT-II statistically discriminated between healthy population and psychotic patients: schizophrenia, depression with psychotic features and substance/drug-induced psychotic disorder. Therefore the hypothesis 2 was accepted. Table 2 shows that the healthy population obtained the highest mean (M = 21.30; SD = 2.16), the psychotic groups obtained the following scores, Schizophrenias (M = 5.90; SD = 1.73), Depression (M = 4.10; SD = 3.90), Substance (M = 3.10, SD = 3.28).

H2: States that recall domain of BVMGT will discriminate between the healthy population, schizophrenia, depression with psychotic features and substance/drug-induced psychotic disorder population group in the visual spatial disorganization. The above result revealed mean differences between the psychotic patients and the healthy population, therefore, hypothesis is accepted.

Based on norm value, the healthy population norm is 8.00. From Table 5, the mean value for the healthy population (M = 12.00) is great then the value. The healthy population scored higher on motor domain of BVGT-II. The

Table 4. The summary table of ANOVA statistics on the difference between psychotic patients and healthy population on recall domain of BVGMT.

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	2190.800	3	730.28	86.82	0.01
Within Groups	302.800	36	8.41		
Total	2493.600	40			

Table 5. The summary table of descriptive statistics on the difference between psychotic patients and healthy population on recall domain of BVGMT.

	N	Mean	Std. Deviation
Schizophrenia	10	3.80	0.79
Depression	10	3.90	0.88
Substance	10	3.90	0.74
healthy population	10	10.00	0.01
Total	40		

norm value for the schizophrenia patient's population group is 0.60. From Table 6, the mean value for the schizophrenia patient's population group (M = 3.80) is greater than the norm value. The schizophrenia patient population group scored higher on motor domain of BVMGT-II. The norm value for the depression associated with psychotic features patient's population group is 1.10. From Table 5, the mean value for the schizophrenia patient's population group (M = 5.20) is greater than the norm value. The depression associated with psychotic features patient population group scored higher on motor domain of BVMGT-II. The norm value for the substance/drug-induced psychotic disorder patient's population group is 2.20. From Table 7, the mean value for the schizophrenia patient's population group (M = 3.90) is greater than the norm value. The substance/drug-induced psychotic disorder patient population group scored higher on motor domain of BVMGT-II.

Therefore, recall domain of BVGMT of BVGMT-II discriminated between the healthy population (M = 12.00; SD = 0.00) and schizophrenia patient's population (M = 3.80; SD = 0.79), depression associated with psychotic features patient's population (M = 3.90; SD = 0.88), substance/drug-induced psychotic disorder patient's population (M = 3.90; SD = 0.74). From Table 6, significantly, at $f(3,40) = 194.62$, $p < 0.01$. Based on the finding recall domain of BVMGT-II statistically discriminated between healthy population and psychotic disorder patients: Therefore the hypothesis 2 was accepted.

H3: States that motor domain of BVMGT will discriminate between the healthy populations, psychotic disorder patient's population group in the visual spatial disorganization.

Table 6. The summary table of ANOVA statistics on the difference between psychotic patients and healthy population on recall domain of BVGMT.

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	282.20	3	94.07	194.62	0.01
Within Groups	17.40	36	0.48		
Total	299.60	39			

Table 7. The summary table of descriptive statistics on the difference between psychotic patients and healthy population on motor domain of BVGMT.

	N	Mean	Std. Deviation
Schizophrenia	10	5.10	0.74
Depression	10	5.20	0.63
Substance	10	4.10	0.74
healthy population	10	12.00	0.01
Total	40		

Based on norm value, the healthy population norm is 8.00. From Table 7, the mean value for the healthy population (M = 12.00) is great then the value. The healthy population scored higher on motor domain of BVGT-II. The norm value for the schizophrenia patient's population group is 0.60. From the table above the mean value for the schizophrenia patient's population group (M = 5.10) is greater than the norm value. The schizophrenia patient population group scored higher on motor domain of BVMGT-II. The norm value for the depression associated with psychotic features patient's population group is 1.10. From Table 7, the mean value for the schizophrenia patient's population group (M = 5.20) is greater than the norm value. The depression associated with psychotic features patient population group scored higher on motor domain of BVMGT-II. The norm value for the substance/drug-induced psychotic disorder patient's population group is 2.20. From Table 7, the mean value for the schizophrenia patient's population group (M = 4.10) is greater than the norm value. The substance/drug-induced psychotic disorder patient population group scored higher on motor domain of BVMGT-II.

Therefore, motor domain of BVGMT-II discriminated between the healthy population (M = 12.00; SD = 0.00) and schizophrenia patient's population (M = 5.10; SD = 0.74), depression associated with psychotic features patient's population (M = 5.200; SD = 0.63), substance/drug-induced psychotic disorder patient's population (M = 4.10; SD = 0.74). From Table 8, significantly, at $f(3,40) = 354.81$, $p < 0.01$. Based on the finding motor domain of BVMGT-II statistically discriminated between healthy population and psychotic disorder patients: Therefore the hypothesis 2 was accepted.

H4: States that perceptual domain of BVMGT will discriminate between the healthy population and psychotic patients in the visual spatial disorganization.

Based on norm value, the healthy population norm is 5.00. From Table 9,

Table 8. The summary Table of descriptive statistics on the difference between psychotic patients and healthy on motor domain of BVGMT.

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	396.200	3	132.07	354.81	0.01
Within Groups	13.400	36	0.37		
Total	409.600	39			

Table 9. The summary table of descriptive statistics on the difference between psychotic patients and healthy population on perceptual domain of BVGMT.

	N	Mean	Std. Deviation
Schizophrenia	10	3.80	0.79
Depression	10	3.90	0.88
Substance	10	3.90	0.74
healthy population	10	10.00	0.01
Total	40	5.40	2.78

the mean value for the healthy population (M = 10.00) is great than the value. The healthy population scored higher on perception domain of BVGT-II. The norm value for the schizophrenia patient's population group is 3.30. From the table above the mean value for the schizophrenia patient's population group (M = 3.80) is greater than the norm value. The schizophrenia patient population group scored higher on perception domain of BVMGT-II. The norm value for the depression associated with psychotic features patient's population group is 3.10. From the table above the mean value for the depression associated with psychotic patient's population group (M = 3.90) is greater than the norm value. The depression associated with psychotic features patient population group scored higher on perception domain of BVMGT-II. The norm value for the substance/drug-induced psychotic disorder patient's population group is 3.20. From the table above the mean value for the schizophrenia patient's population group (M = 3.90) is greater than the norm value. The substance/drug-induced psychotic disorder patient population group scored higher on motor domain of BVMGT-II.

Therefore, perception domain of BVGMT-II discriminated between the healthy population (M = 10.00; SD = 0.00) and schizophrenia patient's population (M = 3.80; SD = 0.79), depression associated with psychotic features patient's population (M = 3.90; SD = 0.88), substance/drug-induced psychotic disorder patient's population (M = 3.90; SD = 0.74). From Table 10, significantly, at f (3, 40) = 86.82, $p < 0.001$. Based on the finding of this study, motor domain of BVMGT-II statistically discriminated between healthy population and psychotic disorder patients. Therefore the hypothesis 4 was accepted.

3. Discussion

The findings of this study showed that BVMGT-II was effective as it discriminated in copy domain discriminated between the healthy populations, psychotic disorder patient's population group in the visual spatial disorganization participants of this study. The results of this study agree with the previous findings in this area. Dolia in her study observed that, Bender Visual Motor Gestalt indicated some element of organic brain damage which affects cognitive functions. The study does not agree with previous studies, Nolen-Hoeksema noted that their inability to copy can also be explained by the reason that people with psychotic disorder; schizophrenia or depression associated with psychotic

Table 10. The summary table of ANOVA statistics on the difference between psychotic patients and healthy population on perceptual domain of BVGMT.

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	2190.800	3	730.28	86.82	0.01
Within Groups	302.800	36	8.41		
Total	2493.600	40			

features whose symptoms are in remission continue to have attentional problems on the Continuous Performance Test (CPT) like BVMGT-II than do the relatives from normal controls [8]. It may also be that there be other factors, except injury to the frontal cortex and another important area, that underlie weak performance in this test. More so, patient with frotal cortex and other key areas like pariental lobe lesions: temporal lobe, basal ganglia, and limbic area, including hippocampus, thalamus and amygdala are not able to copy designs because of abnormalities in the volume, density of neurons, and metabolic rate of brain areas [9].

The findings of this study showed that BVMGT-II was effective as it discriminated in recall domain between the healthy population, schizophrenia, depression with psychotic features and substance/drug-induced psychotic disorder population group in the visual spatial disorganization participants of this study. This study agreed with previous studies in this area, Nolen-Hoeksema observed that the inability of psychotic patients to recall can also be explained by the reason that people with psychotic disorder; schizophrenia or depression associated with psychotic features whose symptoms are in remission continue to have attentional problems on the Continuous Performance Test (CPT) like BVMGT-II than do the relatives from normal controls.

This study also showed that BVMGT-II was effective as it discriminated in motor domain between the healthy population, schizophrenia, depression with psychotic features and substance/drug-induced psychotic disorder population group in the visual spatial disorganization participants of this study. The findings of this study do not agree with the finding of previous studies on this subject. Ellis and Young noted that the normal findings from the Bender Gestalt test which evaluates visual-motor functions about not having an effective component. This is likely to be because many patients with reduplicative paramnesia are aware of inconsistency between what they see and what they claim but pass over this lightly by simple explanations [10].

The findings of this study equally showed that BVMGT-II was effective as it discriminated in perceptual domain between the healthy population, schizophrenia, depression with psychotic features and substance/drug-induced psychotic disorder population group in the visual spatial disorganization participants of this study. The result of this study agrees with the findings of the previous studies. Silverstein, Elliot, Feusner, Keane, Mikkilinenni, Nansen, Hartmann, and Wilhensbon in their examination of the visual perceptual organization in schizophrenia and body dysmorphic disorder, noted that their perceptual organization reductions were observed in schizophrenic patients [11].

3.1. Implication of the Findings

The present study provides the empirical support for the effectiveness of (BVMGT-II) in the assessment of visual-spatial disorganization of persons with psychotic disorders. Also the findings of this study support the empirical evi-

dence that the BVMGT-II will be effective in the assessment of motor and perceptual function domain of visual-spatial disorganization of persons with psychotic disorders. However, because BVMGT-II could not discriminate between the patient diagnosed with schizophrenics, patient diagnosed with depression and patients diagnosed with substance/medication induced psychotic disorders but discriminated between them and the healthy population, BVMGT-II cannot serve as a diagnostic specific test instrument for psychotic disorders but can simply serve a screening instrument.

3.2. Limitations of the Study

The research has shown that BVMGT-II is effective in the assessment of visual spatial disorganisation among selected psychotic patients. However the result should be viewed within the context of the limitations posed by the method and sample size.

The nature of psychiatric illness is also a source of limitation as the bulk of research population are not easily cooperative owing to their mental state and the effect of long term use of antipsychotic/anti-depressant medication. This study focused solely on psychotic patients, thereby excluding patients with other forms of brain injury.

3.3. Recommendations

It is recommended that Bender Visual Motor Gestalt Test-II should be employed regularly in the clinical setting as a screening instrument for the assessment or distinguishing psychotic patients from healthy population; because it is simple to administer, requires little or no education and it is culture free.

3.4. Suggestions for Future Studies

It is recommended that future researchers in this field of, Effectiveness of Bender Visual Motor Gestalt Test-II in Diagnosis of Visual-Spatial Disorganizations among psychotic patients should include patients with brain injury to see if BVMGT-II could discriminate it from patients diagnosed with schizophrenia, patients diagnosed with depression associated with psychotic features, and substance/medication-induced psychotic disorder.

3.5. Contributions to Knowledge

This study has been able to contribute to knowledge that Bender Visual Motor Gestalt Test (BVMGT-II) is an effective neuro-psychological instrument for the assessment of:

1) Visual-spatial disorganization of persons with psychotic disorder.

2) Motor and perceptual function domain of visual-spatial disorganization of persons with psychotic patient.

4. Conclusions

This research project was embarked upon to study Effectiveness of Bender Visu-

al Motor Gestalt Test in Diagnosis of Visual-Spatial Disorganizations among selected psychotic patients. The independent variable is Visual-Spatial Disorganizations in selected psychotic patients and the dependent variables are the Bender Visual Motor Gestalt Test. The subjects were drawn from the Psychiatric clinic of ESUT Teaching Hospital Enugu. Among participants 55.0% (22) were male and 45.0% (18) were female. The review of literature covered the areas that are relevant to the study. The self-evaluation questionnaire used in this study was without serious modification after a pilot study and tallies with the hypothesis. The findings reveal that there is a statistically significant effect of Bender Copy and recall domain, Motor performance, perception performance Gestalt Test (BVMGT-II) in the assessment of visual-spatial disorganization among psychotic disorders patients. It implies therefore that Bender Visual Motor Gestalt Test (BVMGT-II) will be effective in the assessment of visual-spatial disorganization of persons with psychotic disorders.

The findings of this study show that BVMGT-II will be effective in the assessment of cognitive: copy and recall, motor, perception function domain of visual-spatial disorganization of persons with psychotic disorders. This implies that BVMGT-II is positive and statistically significant in the assessment of motor function domain visual-spatial disorganization of persons with psychotic patients from the healthy population but will not differentiate between psychotic patients. It is plausible that these findings have come from a particular data set, yet the present study gives a direction for the necessity of more integrated research in this field.

Compliance with Ethical

The researcher obtained an ethical clearance from the ethical committee of ESUT Teaching Hospital Parklane-Enugu and all participants filled the consent form to declare their free will to participate in the study.

Conflicts of Interest

The authors declare that they have no financial or personal relationship (s) that may have inappropriately affected their report of the findings of this research.

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