

HOSTED BY



ELSEVIER

Contents lists available at ScienceDirect

## Alexandria Journal of Medicine

journal homepage: <http://www.elsevier.com/locate/ajme>

## Original Article

## Serum cobalamin and red cell folate levels of anti-psychotic treatment and treatment naïve psychiatric patients in a tertiary hospital in Nigeria

AO Shittu<sup>a,\*</sup>, AO Adewoye<sup>b</sup>, HO Olawumi<sup>a</sup><sup>a</sup> Department of Haematology, University of Ilorin, Nigeria<sup>b</sup> Department of Haematology, General Hospital, Katsina, Nigeria

## ARTICLE INFO

## Article history:

Received 28 April 2017

Revised 11 July 2017

Accepted 30 August 2017

Available online xxxx

## Keywords:

Red cell folate

Serum cobalamin

Anti-psychotic treatment

Treatment naïve psychiatric patients

## ABSTRACT

**Background:** Psychiatric disorders contribute significantly to the global burden of diseases. There is an urgent need to curtail the morbidity and mortality associated with psychiatric disorders. Deficiencies of cobalamin and folate have been linked with psychiatric disorders.

**Materials and method:** Sixty-six each of antipsychotic treatment, treatment naïve psychiatric patients and control were recruited for the study. Red cell folate and serum cobalamin were determined with Enzyme Linked Immunosorbent Assay kits and the haemogram using Sysmex XT2000i.

**Result:** Folate deficiency was present in 13.6% of newly diagnosed anti-psychotic naïve psychiatric patients with few of them having neutrophil hypersegmentation (7.6%) and macrocytosis (4.5%). Mean red cell folate levels for anti-psychotic naïve, patients on anti-psychotic and controls were  $350.23 \pm 0.54$  nmol/l,  $370 \pm 0.70$  nmol/l and  $370 \pm 0.51$  nmol/l respectively, with p-values of 0.0001 and 0.3500 respectively when compared with control, while serum cobalamin levels were within the normal reference range in all patients and controls.

Reticulocyte count had 8 times and 3 times likelihood of influencing low serum folate and low serum cobalamin respectively.

**Conclusion:** All patients had Serum cobalamin levels within the reference interval, the same can be said of the RBC folate levels of the greater percentage (95.5%) of psychiatric patients on psychotropic drugs.

© 2017 Alexandria University Faculty of Medicine. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

Psychiatric disorders contribute significantly to the global burden of diseases.<sup>1</sup> Worst still, projections by experts have shown an expected increase in the burden by 2020.<sup>2</sup> There is therefore an urgent need to curtail the morbidity and mortality associated with psychiatric disorders.

Deficiencies of cobalamin and folate have been linked with dementia, psychosis and other psychiatric disorders.<sup>3–6</sup> Deficiencies of both vitamins and development of psychiatric disorders play causal role to each other.<sup>6</sup> A review study conducted by MA Arroll and co-workers has highlighted a number of possible contributory mechanisms which included oxidative stress, one carbon metabolism (Folate and vitamin B12 metabolism), essential fatty

acids insufficiency and immune-mediated responses in the pathophysiology of schizophrenia.<sup>7</sup> Progression to psychiatric disorders due to deficiencies of the vitamins has been attributed to failure of synthesis of S-adenosylmethionine (SAM) due to blockage in the conversion of homocysteine to methionine,<sup>3</sup> while development of deficiencies in the course of psychiatric disorders is due to the use of antipsychotic agents.

For the detection of cobalamin and folate deficiencies, highly sensitive serum methylmalonic acid (MMA) and homocysteine levels would have been more appropriate in the diagnosis of patients with psychiatric disorders. Assay for MMA is complex and the cost of reagents highly exorbitant and not readily available while homocysteinaemia is also found in patients with Chronic Renal Failure,<sup>8</sup> in alcoholism<sup>9</sup> and smoking<sup>10</sup> making its detection not specific for cobalamin and folate deficiencies.

With reduced sensitivity of serum cobalamin notwithstanding, there is still no universally acceptable alternative.<sup>11</sup> Serum folate is also markedly affected by recent diet.<sup>3,11</sup> Red blood cells can store high levels of folate<sup>3</sup> and it is an indicator of tissue folate status since it indicates overall folate turnover in the preceding 2–3 months.<sup>12</sup>

Peer review under responsibility of Alexandria University Faculty of Medicine.

\* Corresponding author at: Department of Haematology, University of Ilorin, PMB 1515, Ilorin, Nigeria.

E-mail address: [drakeem06@yahoo.com](mailto:drakeem06@yahoo.com) (AO Shittu).

<http://dx.doi.org/10.1016/j.ajme.2017.08.009>

2090-5068/© 2017 Alexandria University Faculty of Medicine. Production and hosting by Elsevier B.V.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

From these, serum cobalamin and red cell folate levels are sufficient in detecting appreciable number of patients with low levels of vitamins B12 and folate if deficiencies are truly present.

Early detection and correction of deficiencies of these vitamins have been shown to reverse or reduce progression of psychiatric disorders and prevents long term use of antipsychotics.<sup>13</sup> Studies have also shown that the best response to antipsychotic treatment occurs if cobalamin deficiency is reversed within the first 6 months of commencing treatment.<sup>13</sup> Damage becomes irreversible if deficiency is not reversed within 12 months, hence the need for early detection and correction of the deficiencies.<sup>13</sup>

Several studies conducted locally and internationally have only shown conflicting results. Most of the studies reported low levels of both vitamins,<sup>14,15</sup> while others reported low level of red cell folate with high level of serum cobalamin.<sup>16</sup>

The aim of this study was therefore to assess serum cobalamin level and red cell folate of psychiatric patients on antipsychotics and those that are antipsychotic-naïve and compare the results with that of the previous studies. The study aimed at determining the influence of antipsychotics on the genesis and severity of cobalamin and folate deficiencies.

## 2. Materials and method

**Study Area:** This study was carried out at the Psychiatric Out-Patient Clinic and Department of Haematology and Blood Transfusion of University of Ilorin Teaching Hospital (UITH), Ilorin, Nigeria. UITH is a five star, 504 bedded hospital located at the North Central region of Nigeria. The hospital serves as referral centre for most other hospitals in the region with an estimated population of about 15,450,084<sup>17</sup>

General Adult Psychiatric Clinics are run on Mondays, Tuesdays and Thursdays where patients were reviewed by consultant behavioural scientists.

**Study design:** it was a cross sectional descriptive case control study.

**Study population:** consisted of

1. Newly diagnosed, anti-psychiatric naïve patients.
2. Psychiatric patients already on antipsychotics medication on follow-up.
3. Routine blood donors who were certified fit to donate blood and assessed to be free of psychiatric ailments using General health Questionnaire-12 (GHQ-12) served as case controls.

GHQ-12 is a 12 item versions and self administered questionnaire used to screen for psychiatric morbidity. Its use has been validated in this environment, with a cut-off of 3.<sup>18</sup>

**Sample technique:** a multi-staged technique where all newly presenting antipsychotic-naïve patients who certified inclusion criteria were recruited until the required number was obtained. For those on antipsychotics for follow-up, only those registered with even numbers were recruited for the study. The reason for this was because our data showed that patients on follow-up out-numbered newly presenting ones several folds. Equal number of controls was also recruited for the study.

**Inclusion criteria for study population:**

1. Adult newly diagnosed antipsychotic naïve psychiatric patients aged 18–65 years who met ICD-10 criteria.<sup>19</sup>
2. Adult psychiatric patients on anti-psychotics who met ICD-10 criteria.<sup>19</sup>

**Exclusion criteria for study population:**

3. Presence of chronic co-morbidity/ies like hypertension, Diabetes mellitus.
4. Psychiatric patients on haematinics or multivitamins.

**Inclusion criteria for controls:**

5. Blood donors not on haematinics or multivitamins.
6. Blood donors with no physical morbidity.

**Exclusion criteria for controls:**

7. Blood donors with GHQ-12 >3.
8. Blood donors who did not give consent.

**Sample size:** Sixty-six (66) each of the study populations and controls were used based on the formula by AraoyeMO.<sup>20</sup>

**Ethical issues:** Ethical clearance was obtained from UITH Ethical Research Committee. Written permission was also obtained from Heads of Psychiatry and Haematology departments and Consultants in charge of the patients. A signed informed consent was obtained from every participant before being recruited.

Every participant was given a number to ensure confidentiality. All pieces of information were kept confidential. There was no harm to participants except for slight discomfort during venepuncture. No financial burden on the participants and no punitive measure against those who declined to participate in the study.

**Methodology:** Eight milliliters of venous blood was obtained aseptically from all patients. Four milliliters each was dispensed into EDTA and plain vacutainer bottles.

**Samples in EDTA bottle:** into this sample, 2 ml of 0.2% ascorbic acid<sup>16</sup> was added, thoroughly mixed and stored at –20 °C until analyzed for red cell folate.

**Samples in plain bottle:** from this sample, sera was obtained by centrifugation and also stored at –70 °C until analyzed for serum cobalamin.

**Assay:**

1. **Red cell folate:** Diagnostic Automation Folic acid quantitative Enzyme Linked Immuno Sorbent Assay (ELISA) test using Folate ELISA Test Kit was used to estimate red cell folate on every sample.
2. **Serum cobalamin:** Diagnostic Automation vitamin B12 quantitative ELISA test using Vitamin B12 ELISA Test Kit was also used to estimate for serum cobalamin.
3. **Haemogram:** Full Blood Count (MCH, MCHC, MCV, PCV, Platelet count, Reticulocytes count, Reticulocytes index and Total white blood cell count) was determined on every sample using Sysmex XT2000i automated cell counter.

In each case, manufacturer's instruction manual was strictly adhered to.

**Data Analysis:** data entry and analysis was done using EPI Info version 3.5.1. Results were presented in tabular forms. Mean values of the three groups of respondents were compared and multiple logistic progressions carried out to determine the factors influencing serum cobalamin and red cell folate. A linear relationship between serum cobalamin and red cell folate was also determined.

Statistical significance was tested at a predetermined p-value of <0.05.

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات