HAEMATOLOICAL PARAMETERS AND ABSOLUTE NEUTROPHIL TO LYMPHOCYTE RATIO IN MALES AGED 15-20 YEARS

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ABSTRACT

Studies on neutrophil to lymphocyte ratio have grown recently following the discovery of their immense values in production and prognosis of many medical conditions. It was the desire of the study to establish a range for our environment. NLR is an implication by biomarker that can be used as indicator of systemic inflammation. It is calculated by dividing the absolute neutrophils by the absolute lymphocytes using peripheral samples but sometimes also from cells that infiltrates issues such as tumor. Samples were collected from 268 apparently healthy males aged (15-20years) their absolute neutrophil to lymphocyte counts were established using Mindray three- part differential machine of the ratio of neutrophil to lymphocyte, the calculated of the normal range is statistically determined. The result shows differences in the standard range it was

compared. The result revealed that the mean divided by standard deviations (SD) value for NLR in Owerri Imo state was 1.10 ± 1.61.

Keywords: *haematoloical parameters, absolute neutrophil to lymphocyte ratio, males, aged 15-20 years*

INTRODUTION

Neutrophils and lymphocytes constitute the first line of defense within the body against foreign invaders. Neutrophils and lymphocytes are the first inflammation and regulatory markers, respectively, found in injured areas. They activate major cell types involved in acute and chronic inflammation. The neutrophil-to-lymphocyte ratio (NLR), calculated by dividing the neutrophil count by the lymphocyte count, is used to determine the prognosis of an inflammatory reaction and is a component of routine blood count analyses performed in the clinic (Wang, 2014). Use of NLR as an inflammatory marker has been previously reported (Templeton *et al.,* 2014). A recent study showed that NLR is a strong prognostic indicator for patients suffering from various diseases. Further, NLR has also been associated with poor clinical outcomes in a variety of diseases including myocardial infarction, coronary artery disease, atherosclerosis, chronic obstructive pulmonary disease, and high nuclear grade renal cell carcinoma in obese individuals (Templeton *et al.,* 2014).

Earlier studies demonstrated an association between increased NLR and decreased overall survival and disease-free survival in melanoma, breast cancer, lung cancer, and gastrointestinal cancer (Xue, 2014).

Higher NLR is independent predictor of mortality in patients undergoing angiography or cardiac revascularization. Increased NLR is associated with poor prognosis of various cancers, such as esophageal cancer or advanced pancreatic cancer.

In a recent study, 95% of healthy adult subjects had a ratio between 0.78 and 3.53. 95% range: 2.5% of healthy adults having less than 0.78, and 2.5% above 3.53. Neutrophil to Lymphocyte ratio was first demonstrated as useful parameter after a correlation of a relationship between the neutrophil lymphocyte ratio to reactions of the immune response was noted. A study in 2001 was conducted by the Department of Anaesthesiology and Intensive Care Medicine, St. Elizabeth Cancer Institute in Bratislava by Zahorec which suggested the routine used of the ratio as a stress factor in clinical ICU practice in intervals of 6-12 and 24 hours (Xue, 2014).

The first study to demonstrate that pretherapeutic NLR can be used as a predictor of chemotherapy sensitivity to thoracic esophageal cancer was demonstrated by Hiroshi Sato, Yasuhiro Tsubosa, and Tatsuyuki Kawano in a 2012 study published in World Journal of Surgery journal (Forget, 2017).

AIM

To establish the ranges of Neutrophils to lymphocytes ratios among healthy males aged (15-20 years) in Owerri town.

MATERIALS AND METHOD

Study area

A cross sectional study was carried out in Owerri in Imo state, Nigeria. Owerri is located in the south eastern part of Nigeria. It is located in latitude 5.27° - 5.29 and longititude 6. 55 -7.85E.

Eze R.I., Obeagu E.I., Nnatuanya I.N. and Onyemachi J. (2022). Haematoloical Parameters and Absolute Neutrophil to Lymphocyte Ratio in Males Aged 15-20 Years. Madonna University Journal of Medicine and Health Sciences. 2(1): 149-159

The climate of the area is tropical with the mean daily temperature of 29°c for most of the year. The annual rainfall in this region is between 217 and 240cm. There are other towns and village that surround Owerri town; they include Ohaji, Mbaise, Orlu, Mbano, Okpala town and others.

Study Population

A total number of 268 apparently males in Owerri town, aged 15-20 years were recruited for the study.

Inclusion Criteria

They are apparently healthy males aged 15-20 years.

Exclusion Criteria

Individuals that had history of ill health in the past one week were excluded.

Samples collection techniques

A standard venepuncture technique as described by (Bain *et al.,* 2008) was employed. A sterile dry plastic syringe of 5ml capacity with 21g size needle was used for the collection of blood. A soft tubing tourniquet was applied to the upper arm of the patient to enable the vein to be seen and felt. The patient was asked to make a tight fist which will make the vein more prominent. A suitable vein (cubital vein) was selected for venepuncture. The puncture site was sterilized with 70% ethanol and was allowed to dry. With the thumb of the left hand holding down the skin below the puncture site, the venepuncture was made with the bevel of the needle facing upward in the line of the vein. The plunger of the syringe will be withdrawn at the speed it is taking the vein to fill. When 5mls of blood was collected, the tourniquet was released and the patient was asked to open his or her fist. The needle was removed and the punctured site was immediately covered with a piece of dry cotton wool. The needle was removed from the syringe and 4ml blood was delivered into commercially prepared concentration of ethylenediamine tetra acetic acid (EDTA) container with a concentration of 1.2mg/ml of blood for haematological parameters.

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Methodologies

Automation: The absolute neutrophils and lymphocytes were determined using Mindray BC 5380 haematology three-part diffracting analyser. The neutrophils to lymphocyte ratio for each samples was se calculated.

Statistical analysis

Data analysis was conducted using Statistical Package for Social Sciences (SPSS) version 20 for windows 7. Reference ranges were calculated using nonparametric methods. The medians were calculated and reference values were determined at 2.5th and 95thpercentiles. Mean, median and standard deviations were computed for haematological parameters of the study subjects. The analysis of variance (ANOVA) was employed to compare statistically significant difference. Statistical significance was evaluated using chi-square test at the significant of $P<0.05$.

RESULTS

The minimum and maximum values, Medians, means and standard deviations of Neutrophil to Lymphocyte Ratio shown in table 1 and table 2 presents a comparison of obtained value and normal values (means and standard deviations as well as minimum and maximum values) stated by Cheesbrough (2005).The graphical representation of the median of neutrophil to lymphocytes ratio was presented as fig 4.1 and the comparison between obtained reference range and normal range stated by Cheesbrough (2005) was presented as fig 2.

The absolute neutrophil to lymphocyte ratio is by dividing the absolute neutrophil by absolute lymphocyte.

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Table 1: Shows Reference range, mean and standard deviation, median of neutrophil to lymphocyte ratio among males in Owerri

Parameters	Mean & Standard deviation	Median	Obtained Reference
Lymph(10^9/L)	3.88± 1.83	3.2	2.05 – 5.71
Granu(10^9/L)	2.60 ± 2.13	2.0	0.47 – 4.73
NLR(%)	1.10 ± 1.61	0.6	0.51 – 2.71

KEY;

Lymph#: Absolute lymphocytes.

Granu #: Absolute Neutrophils.

NLR (%): Neutrophils to lymphocytes ratio.

(%): Unit for Neutrophils to lymphocytes ratio.

(10^9/L): SI unit for Absolute lymphocytes and absolute Neutrophils

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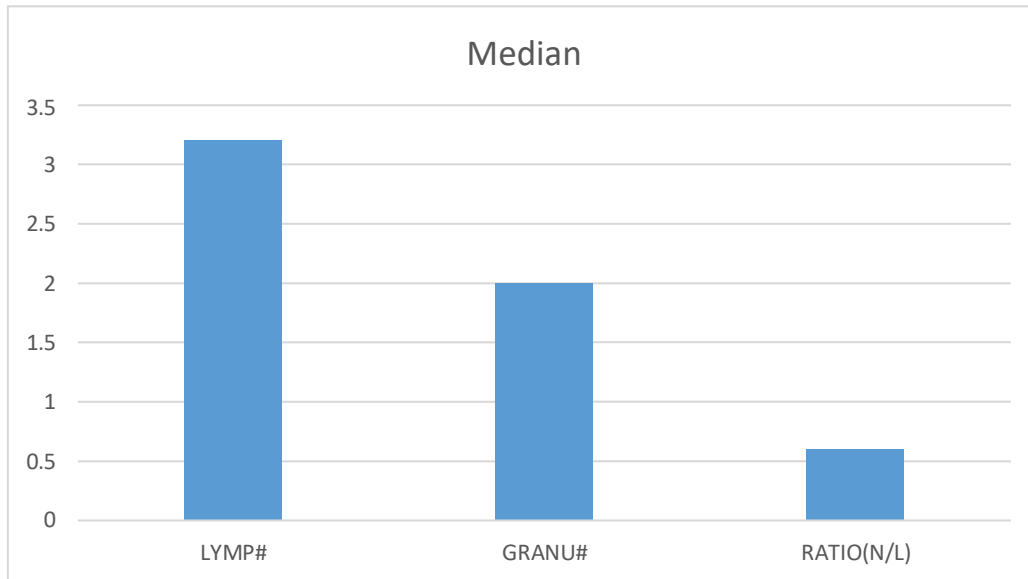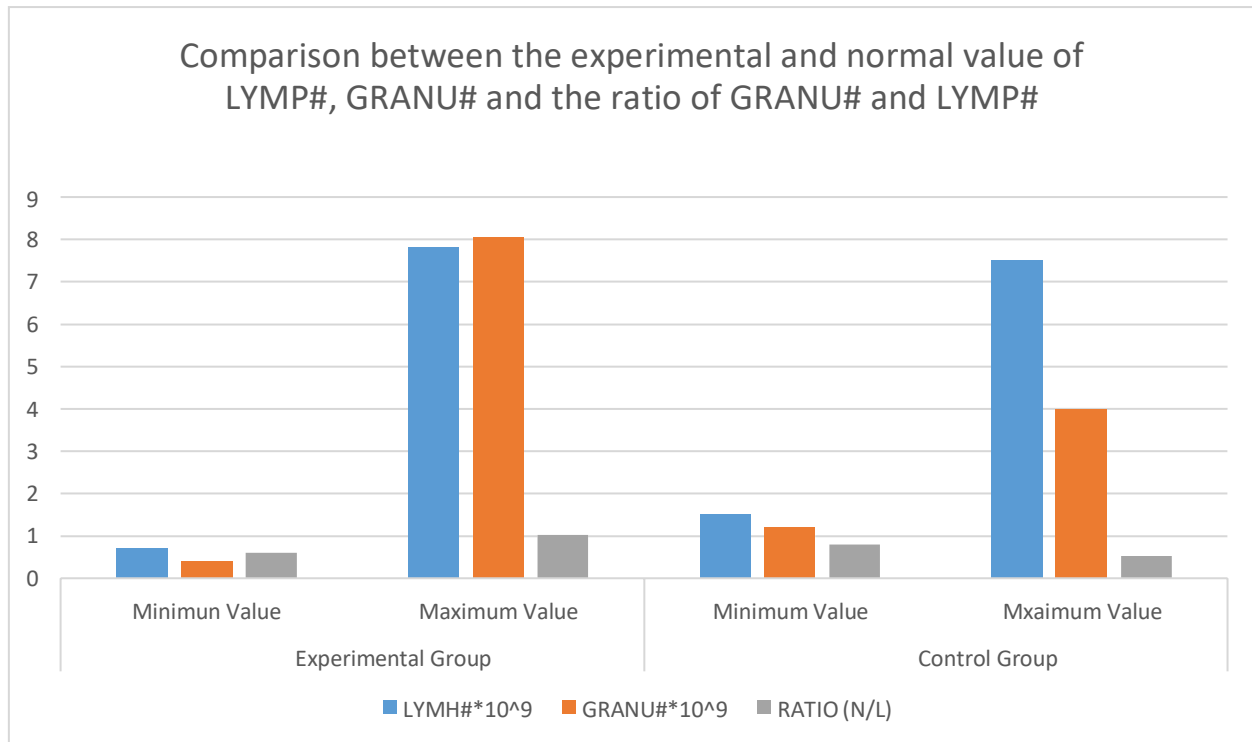
FIGURE 1: shows the median of neutrophil-lymphocytes ratio.

Table 2: Shows the comparison of the obtained range with range reported by Cheesbrough (2005)

Parameters	Obtained reference range	Reference range(2005)	P-value
Lymp(10^9/L)	2.0 – 5.71	1.2 – 4.0	P<0.05

Eze R.I., Obeagu E.I., Nnatuanya I.N. and Onyemachi J. (2022). Haematoloical Parameters and Absolute Neutrophil to Lymphocyte Ratio in Males Aged 15-20 Years. Madonna University Journal of Medicine and Health Sciences. 2(1): 149-159

Granu(10^9/L)	0.47 – 4.73	1.5 – 7.5	P<0.05
NLR (%)	0.51 – 2.71	0.78 – 3.53	P<0.05

Comparison between the experimental and normal value of LYMP#, GRANU# and the ratio of GRANU# and LYMP#

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FIGRURE 2: Shows the comparison of the estimated reference range and the normal range stated by Cheesbrough (2005).

DISCUSSION

 Studies on neutrophil to lymphocyte ratio have grown recently following the discovery of their immense values in production and prognosis of many medical conditions. Those parameters are potent markers of inflammation which underlies the basic pathologies of various diseases. Our result revealed that the mean ÷ SD value for NLR in Owerri Imo State was 1.10 ± 1.61. A study carried out on healthy adults in Nigeria, the mean NLR was 2.8 ± 1.7(Shiny et al 2014). Such differences in NLR values may be an indication that ethnicity and geographical area have effect on NLR. In addition laboratory machines may be using different measuring principles; therefore the use of arbitrary cut off point for risk stratification will be virtually false (Mohammed 2017). The study finding also revealed that there was significant variation in lymphocyte values with reference to the estimated and normal values. There's a significant variation with reference to estimated and normal value of neutrophil and neutrophil to lymphocytes ratio (NLR). Since the reference value of NLR vary with ethnic group and locality, this variation needs to be considered while using the parameters for predictive and prognostic purpose in our environment. Abnormalities in this parameter may be a pointer to a subclinical condition which further investigation will lead to early diagnosis. The median distributions illustrate what happens to the distribution of sample medians as the size of the samples increases.

CONCLUSION

The reference value obtained in the study compared well with the result in the normal references, though there are significant differences. Estimated Neutrophile to lymphocyte ratio have

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significant difference with the normal value, also the estimated Neutrophil to Lymphocytes ratio have significant difference with the normal value. This establishes local reference values will assist the clinicians to provide better care to patients in our locality.

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