Levels of some heavy metals in autistic patients in Nasiriya City, Southern Iraq.

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Abstract:

The aim was to assess the blood levels of heavy metals (Copper – Zinc and lead) in autistic patients where have these metals could be correlated with this disease.

This study was conducted on 498 autistic patients aged between 1-16 years of both sexes , at the autism center in Thi-qar health department official center during 2016 .

Blood samples were collected from patients analyzed for Pb , Cu , Zn .

The results showed increase in the levels of (Cu- Zn and Pb) : Pb> Cu>Zn.

The result also, showed that there is a relationship between the disease and the age, where the age group (4-6 years) recorded the highest percentage, as well as the relationship of a positive correlation with (A blood group) as follows A > B> AB > O , the sex percentage was recorded that (9 :1) males :females .

The conclusion of this high percentage of male to female might be due to sex–affected or from environmental impacts which are have more influence on males .

Keywords: Autism**,** Autistic spectrum disorders (ASD), Heavy metals.

الخلاصة :

الهدف من الدراسة هو تقييم مستويات الدم من المعادن الثقيلة (النحاس ـ الزنك والرصاص) في المرضى الذين يعانون من التوحد حيث يمكن ربط هذه المعادن مع هذا المرض.

اجريت الدراسة الحالية على (498) مرضى التوحد , اعمارهم بين (1- 16) سنة , في مدينة الناصرية , محافظة ذي قار , جنوبي العراق .تهدف الدراسة لتحديد مستوى بعض العناصر الثقيلة (النحاس , زنك و الرصاص) في دم المصابين .

البيانات للمرضى وتراكيز العناصر جمعت خلال عام 2016 ,   من مركز التوحد في قسم الصحة في محافظة ذي قار , المركز الرسمي في المدينة.

أظهرت النتائج أن العناصر الثقيلة التي تم فحصها يمكن أن تكون أحد أسباب المرض ، وأن زيادة عنصر واحد فوق الحدود المسموح بها تسمح باحتمال حدوث المرض. كانت تركيزات هذه العناصر في دم المرضى كمـــــا يلي:

رصاص > نحاس > زنك .

كما أظهرت وجود علاقة بين المرض والعمر ، حيث سجلت الفئة العمرية (6-4 سنوات) أعلى نسبة ، وكذلك علاقة ارتباط إيجابي مع (فصيلة الدم A) وكان الارتباط على النحو التاليA > O AB> B ، وكانت نسبة الاصابة للجنس (9: 1) ذكور: إناث, قد تكون سبب النسبة العالية في الاصابة للذكور بالمقارنة للإناث ان هذا المرض من الامراض المتأثرة بالجنس أو التأثيرات البيئية التي يكون لها تأثير أكبر في الذكور مقارنة بالإناث.

الكلمات المفتاحية : التوحد , اضطراب الطيف التوحدي , العناصر الثقيلة.

1-   Introduction:

Autism is a complex multifactorial epidemic disease develops due to genetic mutations   (5) , so by studying a large number of children around the world, such as environmental exposures to heavy metals (6).

There is a strong probability that most children who become autistic because of their inability to produce glutathione. This may have been a fundamental reason. Low glutathione prevents the brain from detoxification of chemicals., and heavy metals received from diverse sources (7-8).

The prevalence of autistic spectrum disorders (ASD) has increased significantly in countries around the world develops due to genetic mutations that delete glutathione or inhibit its development , environmental factors (1,2) and genetic factors (3 , 4).

High exposures to heavy metals, with glutathione deficiency cause disruption and interference of brain function, and autism spectrum disorders therefore,   detoxification is essential when it comes to getting rid of autism (20, 21) .

With the increase of pollution resulting from the industries and of transportation, especially, in urban areas and with the continued use of traditional treatments . moreover ,the preparations the cosmetic and unhealthy habits increasing the problem of heavy metals poisoning (9).

The significance of focusing on this disease and the increase the rate of diseases in recent years, and the absence of studies at the level of the city this research , was implemented through:

- The aim study to detect the relationship of heavy metals on the disease and whether these metals are one of the causes of the disease, in addition revalue the relationship between disease , age , gender and blood group .
- The possibility of finding solutions or give some advice to reduce the impact of the disease.

2- Materials and methods:

This study was conducted on 498 autistic patients aged between 1-16 years of both sexes , at the autism center in Thi-qar health department official center during 2016 .

Blood samples were collected from patients analyzed for Pb , Cu , Zn according to method of (Rimland, 1968) (10). The detection of heavy metals in the patient's blood was conducted according to the method by (Xueping , and Reny 2002) (11).

2.1 Statistical Analysis:

By using of ANOVA test from SPSS version 17. Software to investigate the significant differences among the metal values.

3. Results and Discussion:

The current study showed highly prevalence of disease in males 89% (442 patients) compared to 11% (56 patients)   females, The ratio was a bout (9:1 males- females),   (Figure 1) . This different with the most performed studies , which include ratio at (4: 1 Males- Females) (12), and other ratio in the study was conducted in Riyadh, Saudi Arabia, recorded (15: 1 Male-Female) (13). Furthermore , this study revealed that there was a significant differences according to sex status . This difference in the ratio between sex, can be due to the different genetic makeup of the sex (3, 4) , and some other sex- Influenced traits or , the difference about the world ratio may be due to some people classified this disease under psychology disease. Some parents may be not recoded their data (especially of female) for the center autism , thus the ratio of female was very lower compare to the world ratio as shown in
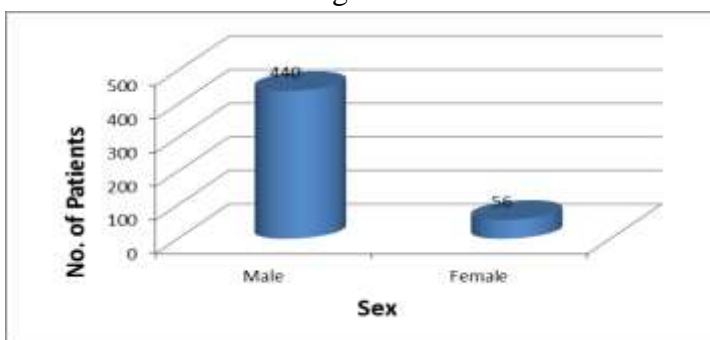
Figure 1.

Figure (1) Relationship between the sex and number of patients.

This study illustrates that patients of age (4-6 years) represents a high ratio with disease compared to other categories, about 43.3% ratio at 216 patient , while the age (1-3 years) about 26.9% at 134 patients. It can be observed that the higher the age, the lower the patients rate for other groups.

The high ratio rise in age (4-6 years) might be because it is easy to observe the movement of children at this age more than (1-3 years). The low rate of age (7-10 years) may be due to the stronger immune system than at least the age groups, this explains the low number of patients in the higher ages. The ability to compensate glutathione by food, or the absence or decrease of vaccines in these ages , because of some studies link this disease to these vaccines, especially the MMR vaccine because of the preservative contained in the vaccine is Thimerasol containing mercury, which is heavy metal (14).
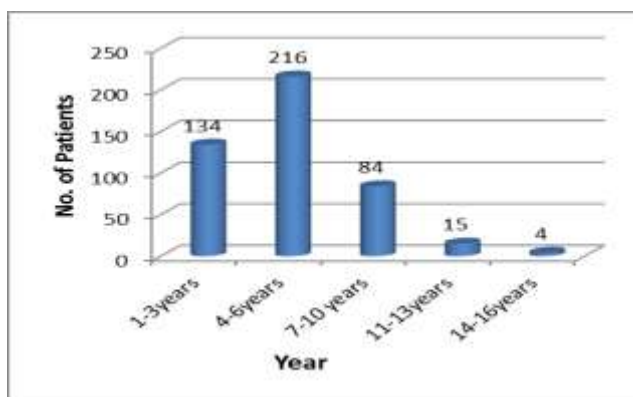
Figure (2) Relationship between age and number patients.

In addition, the blood group (A) has the highly affected with disease when compared to other types , about 60% ratio at 302 patients , while the in other types ranging between 16.2%- 10.6 % patients .

The high ratio might be due to this blood group (A) more sensitive to the disease compared with other blood groups , or close linked this disease with this (A) blood group . Explains that there is a significant correlation between A blood group and diseases (15) .
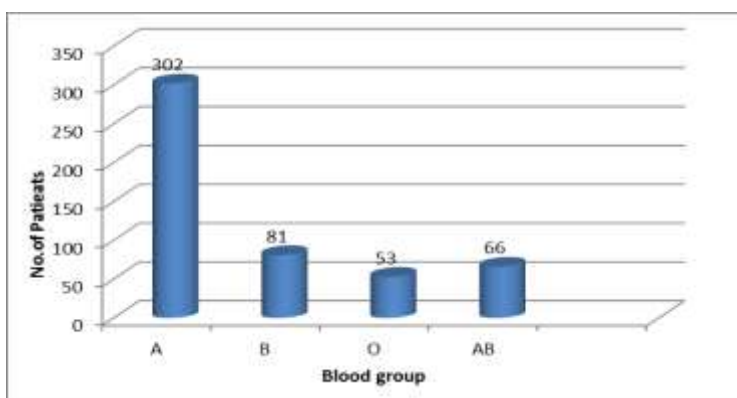

Figure :(3) Relationship between Blood group and patients.

Heavy metals, tend to concentrate in the environment, the food chain and air along with other toxic metals.

The result of this study showed that 97% of patients have highest level of the lead element which is higher than the permissible limit of children when their blood concentration reaches 10 micrograms / dl (17) (484 infected) followed by the copper component by 92% (459) and the lowest ratio is Zn % (Figure 4) . This difference in percentages may be due to the ease the absorption of the lead element and its biological half age in the blood which is more than the other elements under the study   .This may be due to variety of the sources and presence of these elements . Lead finds its way to individuals through food and ambient air as a result of the burning of the fuel containing the element as it is discharged from the car exhaust as well in industrial areas, around mines and oil refineries (18) . Lead is a toxic and harmful element on children and other creatures even at low concentrations . It affects the growth and development of the central nervous system (16)

moreover many countries in the world and , particularly   Asia including Iraq, it is still used in the injectable influenza vaccine . Some infants and toddlers may be have levels over what are considered safe, through vaccination . Many parents of autistic children thought symptoms increase after receiving the vaccine(19).
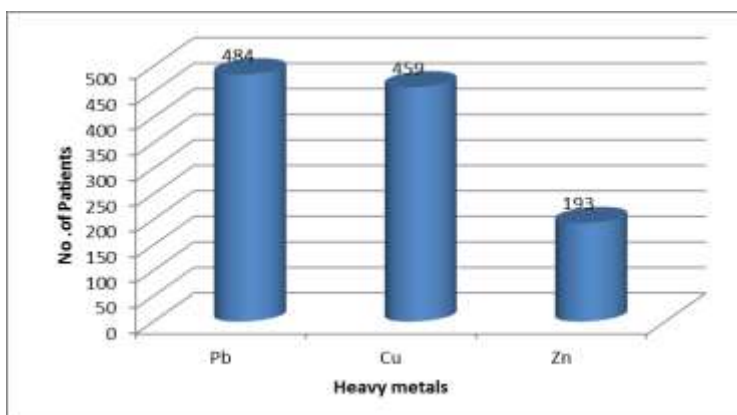
Figure (4) Relationship between (H.M)concentration higher from allowed and number of Patients .

One heavy metal which higher the permissible limit .   Can affect the health condition or cause illness and not necessary all the elements or more than one element cause illness . The result of the study showed (Figure 5) ,that 142 patients   from   the total of infected have higher concentration than the permissible limit of all elements under study . lead poisoning have deleterious effects on the development of brain areas including these implicated in cognition , communication and social functioning also anther elements have deleterious effects on of brain in differenced ratio depending to concentration , condition of element (5 ,6)
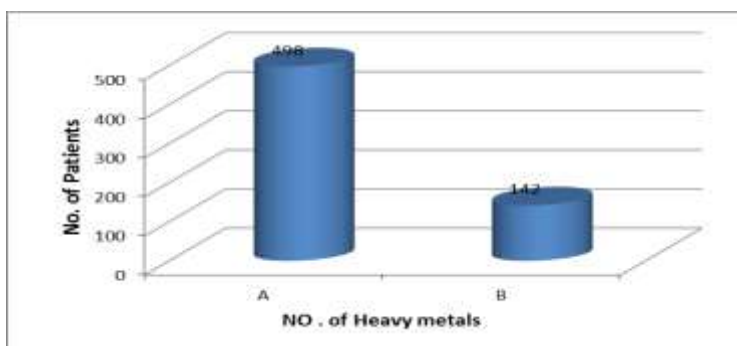

Figure (5) Relationship between   A= Total Patients , and B= Patients have all metals higher from allowed .

4. Conclusion:

The heavy metals are one of many causes of the autism disease. The study focus on measurements of heavy element , It maybe there are genetic and physiological factors , caused this disease . However, needed to ascertain the relevance of (ABO system) to pervasive developmental disorders , Therefore scientific team, includes from different specialties can be helpful to study the disease . In addition the preparation of broad data covering the social factors for the patients to prepare study about this disease a comprehensive . Moreover, the concentration of mercury is necessary to be measured and investigated .Also , attention to feeding for patients .This metal is harmful and has negative effects on health and might be affected the autism patients.

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