

Research Article

Lead Level in Pregnant Women Suffering from Pre- Eclampsia in Baghdad City- Iraq

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Abstract

This study was conducted on the number of pregnant women suffering from symptoms of preeclampsia who live in different areas in Baghdad city. These areas were suffering from air pollution by different pollutants in high rates and it was chosen from among these pollutants lead metal which is a high percentage of air pollution where it was observed by measuring the level of lead in blood serum which taken from pregnant women by 40 pregnant women suffering from symptoms of preeclampsia and 20 pregnant women don't suffering from any abnormal symptoms during pregnancy period and classified as control group , so we found marked a significant rise in lead level in comparison with control group reaching ratio of lead in blood of pregnant women which suffering from symptoms of preeclampsia $38.44 \text{ mg/dl} \pm 3.0 \text{ mg/dl}$ in comparison with control group which $14.56 \text{ mg/d} \pm 2.50 \text{ mg/dl}$, this increase may refer to the amount of lead which found in the air and in excess of the normal limit which exposed pregnant women like all people through the overcrowding of roads and use fuel non-environmentally friendly through breathing which effect on pregnant women health, it has been shown on symptoms of preeclampsia from measuring systolic and diastolic blood pressure and measuring of urea in blood, T-test was used at possibility of (0.001) to see the difference between infected samples and control group, therefore this study suggested that a lead is one of the causes of preeclampsia because live in polluted and unhealthy environment.

Keywords: lead, pollution, preeclampsia, symptoms.

الخلاصة

اجريت الدراسة على عدد من النساء الحوامل التي تعاني من اعراض تسمم الحمل والتي يتواجدن في مناطق مختلفة ضمن مدينة بغداد وكانت هذه المناطق تعاني من تلوث الهواء بالملوثات المختلفة وينسب عالية وقد اختير من ضمن هذه الملوثات معدن الرصاص الذي يشكل نسبة عالية من تلوث الهواء حيث لوحظ من خلال قياس مستوى الرصاص في عينة الدم التي اخذت من النساء الحوامل بواقع 40 امرأة حامل تعاني من اعراض تسمم حمل و 20 امرأة لا تعاني من اعراض غير طبيعية خلال فترة الحمل وصنفت ضمن المجموعة الضابطة حيث لوحظ ارتفاع ملحوظ وكبير في مستوى الرصاص بالمقارنة مع المجموعة الضابطة حيث بلغت نسبة الرصاص في الدم لدى النساء الحوامل التي تعاني من اعراض تسمم الحمل $38.44 \text{ mg/dl} \pm 3.0$ بالمقارنة مع المجموعة الضابطة التي بلغت $14.56 \text{ mg/d} \pm 2.50 \text{ mg/dl}$ وهذا الارتفاع قد يعزى الى ارتفاع مستوى الرصاص الموجودة في الهواء والتي تفوق الحد الطبيعي والتي تتعرض لها النساء الحوامل كسائر الأشخاص من خلال ازدحامات الطرق واستخدام الوقود غير الصديق للبيئة من خلال عملية التنفس والتي تؤثر على صحة المرأة الحامل وقد استدل على اعراض تسمم الحمل من خلال قياس ضغط الدم الانبساطي والانتقاضي وقياس نسبة اليوريا بالدم وقد استخدمت قيمة T الجدولية عند احتمالية (0.001) لمعرفة معنوية الفروق بين مجموعة العينات المصابة والمجموعة الضابطة. وعليه تشير هذه الدراسة الى ان يكون الرصاص هو احد مسببات مرض تسمم الحمل وهذا يحدث بسبب العيش في بيئة ملوثة غير صحية.

Introduction

Lead is toxic and induces a broad range of harmful effects on various organs including the reproductive system [1] [2] [3].

Lead as a neurotoxic can carry a lethal legacy. Young women who live in Lead –contaminated housing or who were lead-poisoned themselves as youngsters can be passed lead on their unborn fetuses [4]. Lead poisoning remains an urgent public health problem in both developed and developing countries [4].

The main target for lead toxicity is the nervous system, both in adults and children [5] [6].

Long –term exposure during pregnancy to even low concentrations of toxic metals , which have the ability to accumulate, often leads to irreversible damage to fetal developments and maternal morbidities including pre-eclampsia [1] [2] [3]. Environment pollution by lead is worldwide public problem. such as elevated blood level among people living in the polluted areas [7] [8].

Lead is a heavy metal and is highly toxic to plants and cumulative poison to mammals so an important symptoms of lead toxicity is causing central nervous system disorder leading to insomnia like disease which are caused due to the discursive of hemoglobin [7].

Lead is one of the heavy metals people most commonly exposed to in the environment. Lead is not biodegradable and the conference for ecotoxicity of lead are increasing [7] [8].

There are innumerable sources of lead in our environment such as paint, plumbing and water supplies from lead pipes or lead- soldered joints, dust and pint chips from older houses having lead paints, air and soil pollution from leaded gasoline, cooking in leaded pots, newsprint and many other sources [7] [8] [9].

Preeclampsia, the most common medical complication of pregnancy, is associated with oxidative stress with lead elements [7].

Long – term exposure during pregnancy to low concentration of toxic metals, such as lead which have the ability to accumulate, often leads to irreversible damage to fetal and maternal morbidities including pre - eclampsia [7] [9].

Materials and Methods

The study was conducted in several areas, it is choked with traffic throughout the day, and it suffers from air pollution in various pollutants emanating from vehicle exhausts in Baghdad city.

Venous blood samples (5 ml) were taken from each pregnant woman (40 women) does not suffer from any abnormal symptoms during different periods of pregnancy and ranked in the control group.

Twenty pregnant women suffering from symptoms such as high blood pressure continues to rise during the six – hour up to 160/10mmHg during the day. And high proportions of urea in the blood which are less than 50 mg during 24 hours.

The ages of all samples (patients and controls) are converged from (23 - 44) years with periods of pregnancy to every one. All of the samples did not suffer from other overlaps intervention such as heart disease, diabetes and kidney. The systolic blood pressure and diastolics for pregnant women was measured using a standard mercury sphygmomanometer (Accoson, Essex, UK).

The study also included a measurement of the proportion of protein in the blood urea. The samples were taken for pregnant women who completed 22 weeks of gestation at least 5 ml of urine from each pregnant woman in this study after centrifugation for 5 minutes at 3000 rpm for the testing of the present of albumin in urine, 5ml of blood sample was collected from the cubital veins.

The blood was separated after centerfugation for 5 minuts at 3000 rpm and the plasma were stored frozen at 200 C°. Untel analysis was carried out for lead estimation by atomic absorption spectrophotometer model 200A (Buck scientific, East Norwalk, UK) with detection limit of 1 mg /dl was employed for blood lead determination, as described by welz [10]. The digested samples analyzed in duplicates by the atomic absorption spectrophotometer methodology using wavelength of 283 nm, the mean value computed.

Statistical analysis:

Mean \pm standard error were calculated for all treatment. Mean of tests and controls were compared using t – test (using a program of statistic for epidemiology) and p – values were obtained. P value was regarded significant if it is less or equal (0.05). Repeated analyses of standard solution confirmed the methods precision.

Results and Discussion

We found in this research significant increase ($p = 0.001$) in systolic and diastolic blood pressure for 24 hrs with a significant increase ($p = 0.001$) in blood lead level in the serum in the preeclamptic women as compared to normal pregnant women as found in Table 1.

Our results are in keeping with the results of Motawei *et al.* [1] [2] [3] who found same results of correlation between lead level in serum and symptoms of preeclampsia, systolic and diastolic blood pressure in women suffering from preeclampsia in Egypt.

As well our results agree with kasper, *et al* [11] [12] [13] who they found that the lead level in the serum was positively associated with systolic and diastolic blood pressure.

Table 1: Preeclamptic women as compared to the normal pregnant women.

parameter	Preclamptic women	Normal pregnant	p-value
Urea 24 hrs (mg/dl)	40±23	8 ±7.10	0.001
Lead (mg/dl)	38.44±3.0	14.56±2.50	0.001
Systolic blood pressure (mmHg)	180.33±9.22	117.8±8.90	0.001
Diastolic blood pressure (mmHg)	20.19±7.901	8.50±7.90	0.001

Mean ± SD

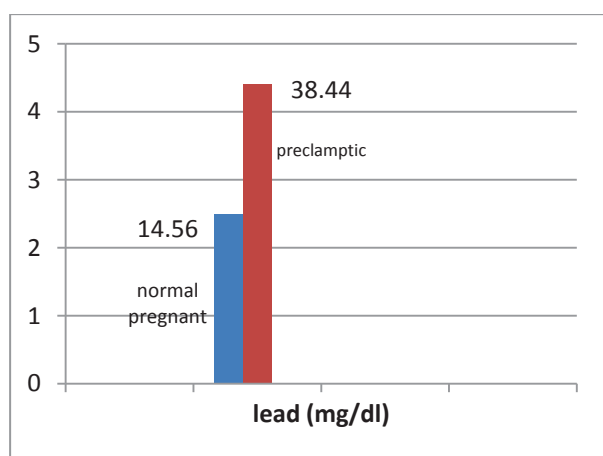


Figure 1: Serum concentration of lead in normal and preclamptic women.

Meanwhile explained Rothenberg et al and Mitra *et al.* [14] [15] found significant positive association between lead level and blood pressure in pregnant women. This is what was said kasper, *et al.* [11] [12] [13] as explained the pregnant women exposure to lead from breathing the air contaminated by leaded gasoline which found in the roads. Exposure to excess toxic elements such as lead in the environmental that increases the production of free radicals, leads to decrease the availability of bioelements necessary for antioxidant defense mechanisms, So acute and chronic low- level lead exposure has been shown to result in adverse health effects [16] [17]. As well our results agree with Line ,et al. who explained the elevated lead level observed in some

rural areas by the fact that some villages are polluted with high concentration of lead in soil and household dust that subsequently carry lead exposure to the population there causing elevated lead level [18] [19] [20].

Air polluted by oxides and minerals more dangerous on human health where through breathing pollutants move by one hundred percent to human blood and features Baghdad city like all cities abundance cars which use fuel have dangerous toxic which include lead which effects significantly on the patients , elderly and pregnant women posing a risk to fetuses ,High lead level in the blood causes anemia and laves of hemoglobin in the blood this may lead to liver kidney and brain damage and it was up to the central nervous system [21].

Conclusions

Through tests conducted in this study and compare with similar studies,it is clear to us that lead which found in high rates in the polluted and unhealthy environment may be a reason of preeclampsia which constitutes a danger on the pregnant woman this lead to the possibility of abortion or may be effect in future on the fetus health.

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