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BLOOD LEAD LEVELS AND ASSOCIATED SOCIODEMOGRAPHIC FACTORS AMONG PRIMARY SCHOOL CHILDREN IN DAMIETTA GOVERNORATE

By

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ABSTRACT

Background: With the worldwide increase of industrial pollution and man made or natural combustion activities, people are all exposed either voluntarily or involuntarily to certain environmental pollutants such as heavy metals and organic hydrocarbons.

Objective: Investigating the associations between socio-demographic factors, and increased blood lead levels (BLLs) among primary school children in Damietta governorate.

Patients and Methods: This was a cross sectional study. It was conducted from January 2015 till January 2016. The study was conducted on Damietta primary schools' students. The largest (in number of children in primary stage) school was selected as the primary target of the study (students number in all classes were 750 children; 741 cases were included in the statistical analysis). After ethical and administrative approval, all primary school children in the selected school were screened for blood lead levels and correlated with other sociodemographic factors. Socio-demographic information obtained from the questionnaire included sex, age, parental educations and occupations (unemployed, general labor, skilled labor, professional worker), neighborhood condition such as whether living in a crowed neighborhood, person directly raising the child, having sibling(s) or not, parental smoking at home and the mother's age when the child was born. Blood specimens were collected, and frozen and collected to the Research Center at Al-Mansoura University hospital for lead analysis.

Results: Serum lead levels ranged from 5 to 36 μg/dl. The mean value (ISD) was 9.67±6.11. Cases with serum lead level more than or equal to 10 μg/dl were 98 out of 741 (13.2%) and assigned as a positive group. 390 cases (52.6%) were males. Males significantly increased in in positive group (69.4% vs 50.1% respectively). Also, there was a significant decrease in age of positive children (8.52±1.62 vs 9.79±1.69 years respectively). Child anthropometric measurements revealed significant decrease of weight, height and head circumference (HC) in positive when compared to negative cases. There was a significant increase of low social level in positive group when compared to negative group. Furthermore, there was a slight significant increase of percentage of rural residence in positive when compared to negative cases. Male gender, rural residence, parent smoking, outdoor play, eating canned foods, waste piles around house and base floor living are risk factors for increased level of lead above 10μg/dl.

Conclusion: Results of the present study shed a light on the situation of serum lead levels in primary school children and associated factors in Damietta Governorate. However, it was just a step on a long road for development an effective strategy for decreasing exposure and harmful effects of lead on children.

Keywords: Serum lead levels; primary school; epidemiology; Sociodemographic.

INTRODUCTION

The influence of pollutants on public health has been increasingly acknowledged **(Wells et al., 2010).** Lead is a confirmed multi-target toxicant with effects on the gastrointestinal, hematopoietic, cardiovascular, nervous, immune, reproductive and excretory system **(Lanphear et al., 2005 and Herman et al., 2007).** The most sensitive populations to lead exposure from various sources are pregnant women and young children **(Papanikolaou et al., 2005).**

Lead exposure is the inherent accompaniment of economy development and is inevitable for human being. The blood lead levels (BLLs) and susceptibility to lead toxicity can be influenced by many factors such as environmental exposure, life styles, diet habits and nutritional status **(White et al., 2007).** Lead exposure is a child health concern around the world, especially in developing countries. Children's developing neurological systems are vulnerable to lead toxicity, as it can cause intellectual dysfunction **(Hubbs-Tait et al., 2005),** and increase negative behaviour outcomes **(Chen et al., 2007 and Braun et al., 2008).** Even low-level lead exposure can cause intelligence deficits **(Bellinger, 2008).** No threshold for lead toxicity has been established **(Liu et al., 2008).** Studies in developed countries have shown that blood lead levels (BLLs) above 10 ?g/dL were associated with age, gender, race/ethnicity, use of ethnic remedies, cosmetics or goods, immigrant and refugee status, income level, age of housing, location of residence, parental occupation and exposure to tobacco smoke **(Levin et al., 2008).**

Few studies have examined the determinants of BLLs after the phase-out of leaded gasoline. The majority of these studies have focused on gender and age differences, showing that BLLs were higher in boys and increased with age **(Zhang et al., 2009).** However, other investigations have shown the opposite trend, where BLL was highest among toddlers and then declined with age **(Charalambous et al., 2009).**

The present study was designed to investigate the associations between socio-demographic factors and increased blood lead levels (BLLs) among primary school children in Damietta governorate.

SUBJECTS AND METHODS

This is a cross sectional study. It was conducted from January 2015 till January 2016. The study was conducted on Damietta primary schools' students. Data about the number and type of Damietta primary schools were obtained from Data and Statistics Unit in Directorate of Education, Damietta. The total number of schools was 80 schools: 70 public schools, 4 language school and 6 private schools. The total number of primary school students was 42824 students. A representative area for gover-norate was selected (Dumyat district); then town (New Damietta) was selected as a representative for the district as their primary schools can contain children from both urban and rural areas. The largest (in number of children in primary stage) school was selected as the primary target of the study (students number in all classes were 750 children; 741 cases were included in the statistical analysis). After ethical and administrative approval, all primary school children in the selected school were screened for blood lead levels and correlated with other sociodemographic factors.

Self-administered questionnaire was given personally to every student. After explaining the objectives of the study to the student, he/she was asked to send the questionnaire to the parents to complete it and not to leave any item empty. The distributed self-administered questionnaire was collected when the students returned them back on the next day. Socio-demographic informations obtained from the questionnaire included sex, age, parental educations and occupations (unemployed, general labor, skilled labor and professional worker), neighborhood condition such as whether living in a crowed neighborhood, person directly raising the child, having sibling(s) or not, parental smoking at home and the mother's age when the child was born. Blood specimens were collected, frozen and collected to the Research Center at Al-Mansoura University hospital for lead analysis.

Five ml venous blood samples were drawn from antecubital veins and collected in heparinized tubes. Samples were directly centrifuged at 800xg for 6 minutes to separate plasma from whole blood. Each plasma friction was then pipetted into two ultra-cleaned Eppendorf tubes (2ml) and levels of lead were determined by atomic absorption spectrophotometry. The cutoff levels of lead ≥10µg/dl were considered to be excessive for infants, children and women of child-bearing age. Children were divided into two groups, the first included cases who had lead levels ≥10µg/dl and the second who had lead concentrations < 10µg/dl (normal children).

Statistical analysis: Data entry, coding and analysis were accomplished with the aid of computer's statistical package for social science (SPSS), version 16 (SPSS Inc. USA). Results were represented in tabular forms. Quantitative data was represented as mean ± standard deviation (SD), while qualitative data were represented as relative frequency and percent distribution and for comparison between both groups, independent samples student (t) test or Chi square (X^2) were used for quantitative and qualitative data respectively. P value < 0.05 was considered significant.

RESULTS

In the present work, serum lead levels ranged between 5 and 36 µg/dl. The mean value was 9.67±6.11. Cases with serum lead level more than or equal to 10 µg/dl occurred in 98 out of 741 (13.2%), and they were assigned as a positive group, and cases with serum lead levels < 10 µg/dl were 643 (86.8%) were assigned as a negative group (Table 1).

In the present study, 390 cases (52.6%) were males and 351 (47.4%) were females, and there was statistically significant increase in percentage of males in positive group when compared to negative group (69.4% vs 50.1% respectively). In addition, the child age in the present work ranged between 7 and 12 years, and there was a significant decrease in age of positive when compared to age of negative cases (8.52±1.62 vs 9.79±1.69 years respectively). Child anthropometric measurements revealed significant decrease of weight, height and head circumference (HC) in positive when compared to negative cases (25.16±3.67, 119.46±7.64, 50.64±1.14 vs 29.04±4.15, 129.77±8.78 and 50.85±0.95 successively). There was significant increase of low social level in positive group when compared to negative group. There were significant increases of middle and high social levels in negative when compared to positive cases (91.3%, 7.6% vs 65.3%, 6.1% respectively). However, middle social level is the most prevalent in both positive and negative groups. Furthermore, there was a slight significant increase of percentage of rural residence in positive when compared to negative cases (59.2% vs 47.9% respectively - Table 2).

In the present work, mother's age ranged between 19 and 36 years with a mean age of 28.21±4.09, and there was a significant increase of mother's age in positive group when compared to negative group (29.52±3.83 vs 28.01±4.09 respectively). Mother education was illiterate, primary, middle, higher or postgraduate in 12.2%, 36.7%, 29.6%, 19.4% and 2.0% in positive cases, compared to 0.3%, 8.7%, 21.5%, 62.4% and 7% in negative cases; with a significant increase of low educational level in positive group when compared to negative group (Table 3).

In the present work, father's education was illiterate, primary, middle, higher or postgraduate in 7.1%, 31.6%, 39.8%, 19.4% and 2.0% respectively in positive cases, compared to 0.0%, 1.6%, 27.1%, 62.5% and 8.9% respectively in negative cases with significant increase of low educational levels in positive when compared to negative cases.

Father's work was labor worker, skilled worker and professional job in 38.8%, 51.0% and 10.2% respectively in positive group; compared to 1.2%, 74.3% and 24.4% respectively in negative group, with significant increase of manual workers in positive cases, and significant increase of skilled workers and professional jobs in negative cases. In addition, there was a significant increase of smoking fathers in positive when compared to negative groups (89.8% vs33.3% respectively -Table 3).

As regards to risk habits, there was a significant increase of outdoor playing in positive cases when compared to negative cases (56.1% vs 44.9% respectively). In addition, there was a significant decrease of cases who practiced this action (washing hands before eating) in positive cases when compared to negative cases (55.1% vs 79.5% respectively). On the other hand, there was no significant difference between positive and negative cases as regard practicing hand to mouth activity (25.5% vs 24.0% respectively), eating canned foods (39.8% vs 36.7% respectively), and presence of waste piles around house (30.6% vs 21.9% respectively - Table 3).

There was significant increase of cases that inhabit base floor in positive when compared to negative cases (67.3% vs 36.2% respectively).

There were significant increases of anorexia, constipation, learning difficulty and night terrors in positive cases when compared to negative cases (55.1%, 62.2%, 34.7% and 34.7% successively vs 27.5%, 18.2%, 12.9% and 7.3% successively).

Male gender, rural residence, parent smoking, outdoor play, eating canned foods, waste piles around house and base floor living were risk factors for increased level of lead above 10µg/dl (Table 4).

Table (1): Distribution of serum blood lead levels in studied cases.

Serum blood lead levels \ Groups	n	%
≥10 (Positive)	98	13.2
< 10 (Negative)	643	86.8
Total	741	100.0
Serum lead levels (Mean ±SD; range)	9.67±6.11; 5.0- 36	

Table (2): Comparison between positive and negative children characteristics

Characteristics of children \ Children types		Positive (n=98)	Negative (n=643)	F	P value
Sex	Male	68(69.4%)	322(50.1%)	12.72 #	0.001*
	Female	30(30.6%)	321(49.9%)		
Mother's age (years)		29.52±3.83	28.01±4.09	3.41$	0.001*
Child's age (years)		8.52±1.62	9.79±1.69	6.634 $	<0.001*
Weight (kg)		25.16±3.67	29.04±4.15	8.74 $	<0.001*
Height (cm)		119.46±7.64	129.77±8.78	11.005 $	<0.001*
HC (cm)		50.64±1.14	50.85±0.95	1.98 $	0.048*
Social Level	Low	28(28.6%)	7(1.1%)	142.77 #	<0.001*
	Middle	64(65.3%)	587(91.3%)		
	High	6(6.1%)	49(7.6%)		
Residence	Rural	58(59.2%)	308(47.9%)	4.33 #	0.037*
	Urban	40(40.8%)	335(52.1%)		

* = significant # = Chi square test; $= student (t) test

Table (3): Parent's characteristics and risk factors of studied children

Characteristics of parents \ Children types		Positive (n=98)	Negative (n=643)	F test	P value
Mother's age		29.52±3.83	28.01±4.09	3.41	0.001*
Mother's education	Illiterate	12(12.2%)	2(0.3%)	151.53	<0.001*
	Primary	36(36.7%)	56(8.7%)		
	Middle	29(29.6%)	138(21.5%)		
	Higher	19(19.4%)	401(62.4%)		
	Postgraduate	2(2.0%)	46(7.2%)		
Father work	Labor worker	38(38.8%)	8(1.2%)	207.07	<0.001*
	Skilled worker	50(51.0%)	478(74.3%)		
	Professional	10(10.2%)	157(24.4%)		
Smoking father		88(89.8%)	214(33.3%)	112.48	<0.001*
Outdoor playing		55(56.1%)	289(44.9%)	4.27	0.039*
Washing hand before eating		54(55.1%)	511(79.5%)	27.88	<0.001*
Hand to mouth activity		25(25.5%)	154(24.0%)	0.11	0.73
Eating canned food		39(39.8%)	236(36.7%)	0.34	0.55
Waste piles around house		30(30.6%)	141(21.9%)	3.61	0.06

* = significant

Table (4): Risk estimate of studied variables.

Variables \ Estimation	Odds ratio	95.0% CI interval
Male gender	2.26	1.43-3.56
Rural residence	1.57	1.02-2.42
Parent smoking	17.64	8.98-34.62
Outdoor playing	1.56	1.02-2.40
Washing hands before eating	0.31	0.20-0.49
Hand to mouth activity	1.08	0.66-1.77
Eating canned foods	1.14	0.73-1.76
Waste piles around house	1.57	0.98-2.50
Base floor living	3.62	2.31-5.70

DISCUSSION

Ubiquitous in the environment, lead is a poison of multiple affinities. Floating in the air or attaching to objects make lead can be absorbed into the body of children through the respiratory tract, gastro-intestinal tract or skin **(IARC monograph on organic and inorganic lead compounds, 2006).**

Elevated lead level has severe harmful effects on infant health. Symptoms related to toxicity occur from mid to high levels of exposure and they depend on the amount of lead in the blood and tissues. High lead levels are associated with impaired neurocognitive development, anemia (due to either disruption of heme synthesis or hemolysis), renal and gastro-intestinal effects **(Dapul and Laraque, 2014).**

Children are more vulnerable to lead exposure for three reasons: (1) young children are more at risk of ingesting environmental lead through normal mouthing behaviors; (2) absorption from the gastrointestinal tract is higher in children than adults; and (3) the developing nervous system is thought to be far more vulnerable to the toxic effects of lead than the mature brain **(Koller et al., 2004).**

Although high blood lead levels (BLL) (BLL>100 ?g/dL) can entail acute neurologic symptoms, such as ataxia, hyperirritability, convulsions, coma, and death. BLL as low as 10 ?g/dL have been also correlated with poor neuro-cognitive outcomes and behavioral disorders. This is of special concern in young children as neuro-cognitive impairment has been found to be associated with the degree of exposure to lead between the ages of 12 and 36 months **(Moya-Alvarez et al., 2016).**

The present study was designed to investigate the lead levels among primary school children in Damietta governorate, and tried to search for associated factors with higher lead concentration and possible effects on children health.

In the present study, serum lead levels ranged between 5 and 36 µg/dl. The mean value was 9.67±6.11; and cases with serum lead level more than or equal to 10 µg/dl is (13.2%), and cases with serum lead levels < 10 µg/dl were (86.8%).

We selected this cut off value to differentiate children with upper (positive group) or lower (negative group) according to previous values estimated by the US Centers for Disease Control and Prevention (CDC). Blood lead concentrations of ≥10?g/dL or greater were considered “elevated” or “levels of concern” **(CDC's Advisory Committee on Childhood Lead Poisoning Prevention, 2007).**

Laamech et al. (2014) reported that the mean of blood lead levels (Pb-B) in all children was 55.531?g/l. This BLLs mean is in higher than that reported in the present work. However, in 190 Egyptian school children of the same age range, the level was (62.2 ?g/l) exposed to high traffic density around their school **(Abdel Rasoul et al., 2012).** This can be attributed to high environmental pollution in Cairo. In addition, results are higher in comparison with the mean reported by **Mostafa et al. (2009)** for 100 children from Cairo city (median: 90 ?g/l, range: 30–280 ?g/l). Such a high BLLs median can be related to high exposure of children to traffic exhausts in the mega city of Cairo. In addition, the percentage of children who had blood lead level ≥ 10 ?g/dl (13.2%) was lower than the percentage reported in the previous two studies on Egyptian children (25% and 43%, respectively).

The mean lead concentration in the present study was higher than that reported by **Rahbar et al. (2015)** who reported in Jamaican children. On the other hand, the level in the present study was much lower than **Sullivan (2015)** who reported in children who lived near established smelters and several backyard smelter communities. However, **Lalor et al. (2007)** reported a mean blood lead concentration in several groups of school children that were at a higher risk of lead exposure.

In the present work, we found that children living in Damietta have higher blood lead concentrations than children in developed countries. For example, the geometric mean blood lead concentration of children in this study was more than that of a sample of 2–5 year-old children in California **(Tian et al., 2011).** Similarly, it is higher than that of a sample of 6–19 year-old children from Canada **(Wong and Lye, 2008).** In addition, the levels observed in this study were higher than those reported for children in a large nationally representative sample in the US **(Tian et al., 2011)**. Furthermore, the geometric mean blood lead concentration in the present study was higher than that of a sample of 1–6 year old children in Shanghai, China (**U.S. Environmental Protection Agency, 2012).** Going with results of the present study, **Lalor et al. (2007)** reported that 16% of the children in their sample had elevated blood lead concentrations (≥ 10 ?g/dL), a percentage significantly higher than the 6.4% observed in the sample of **Rahbar et al. (2015)**.

In the present study, 52.6% of cases were males and 47.4% were females, and there was statistically significant increase in percentage of males in positive group when compared to negative group. These results were in agreement with some studies that had been shown higher BPb concentrations in male than in female children **(Rahbar et al., 2002, Jedrychowski et al., 2009, and Neesanan et al., 2011)**, which is explained by differences in playing and mouthing behavior **(Ko et al., 2006)** and playtime activities **(Chen et al., 2012).**

The present work revealed that there was significant decrease of weight, height and head circumference (HC) in positive when compared to negative cases. These results were in agreement with **Little et al. (2009)** who reported an inverse correlation between children's growth and high BLLs. However, **Guo et al. (2014)** could not found such association.

There was a significant increase of smoking fathers in positive when compared to negative groups. These results were comparable to previous work, where it was reported that, with respect to other lead exposure, children exposed to passive smoking had significantly elevated BLLs in comparison to children not exposed to tobacco smoke **(Laamech et al., 2014).** The exposure to passive smoking can explain well the relatively high BLLs in children from the rural area that is exposed neither to heavy traffic nor to industrial emissions. A cigarette generally contains 0.6–17 ?g of lead **(Nnorom et al., 2005).** Many studies showed that parents' smoking habits or passive smoking had an impact on children's BLLs **(Str?mberg et al., 2008 and Charalambous et al., 2009). Barradas (2011)** even found a dose-response relationship between the amount of tobacco smoked by the mother and BLLs of children**.**

In the present study, there was a significant increase of low social level in positive group when compared to negative group, where there was significant increase of middle and high social levels in negative when compared to positive cases. However, middle social level is the most prevalent in both positive and negative groups. These results went in agreement with previous reports, where it had been reported that children with lower socioeconomic status (SES) are more likely to have greater exposures to many chemical contaminants **(Naess et al., 2007).** For example, **Ahamed et al. (2010)** reported that children with the lowest SES status who lived in Lucknow, India had significantly higher blood lead concentrations compared with other SES levels. On the other hand, **Rahbar et al. (2015)** do not find a significant difference between the geometric mean blood concentration in children from families who owned a car (i.e. higher SES) and those who do not (i.e. lower SES). This can be attributed to different environmental conditions and difference in sample size.

In the present work, as regard to mother education, it was illiterate, primary, middle, higher and postgraduate in 12.2%, 36.7%, 29.6%, 19.4% and 2.0% in positive cases, compared to 0.3%, 8.7%, 21.5%, 62.4% and 7% in negative cases; with significant increase of low educational level in positive group when compared to negative group. In addition, father's education was illiterate, primary, middle, higher and postgraduate in 7.1%, 31.6%, 39.8%, 19.4% and 2.0% respectively in positive cases, compared to 0.0%, 1.6%, 27.1%, 62.5% and 8.9% respectively in negative cases with significant increase of low educational levels in positive when compared to negative cases. These results reflected that children for parents with lower education had significantly higher lead contractions. Previous reports found that children living below the poverty line and having parents with lower education are associated with higher BPb concentrations **(Bernard and Mc Geehin, 2003; Moralez et al., 2005 and Liu et al., 2012).** These results are in agreement with the present study. In addition, it had been reported that, in male and female children, BPb concentrations were significantly affected by father's income and mother's education. In female children, BPb concentrations also showed significant differences according to father's education and father's job. Thus, BPb concentrations in female children seem to have been affected by SES more than in male children. As higher BPb concentrations were observed in male children, factors other than those examined in the present study are likely to have contributed to their lead exposure levels. Previous studies **(Rahbar et al., 2002 and Nuwayhid et al., 2003)** on the relationships between lead exposure and SES did not refer to gender differences, taking gender differences into account, could be important in preventive measures against lead toxicity in children **(Iriani et al., 2012).**

In the present study, there was a slight significant increase of percentage of rural residence in positive when compared to negative cases (59.2% vs 47.9% respectively). These results were in agreement with those reported by **Kangmin et al. (2009)** that children living in industrial areas had significantly higher BLLs than those in urban and suburban areas, and suburban areas higher than urban areas. The lead in industrial zone mainly came from lead smelting, batteries and other lead-related operations. On the other hand, it was reported that, environmental monitoring results showed that the lead content in atmosphere, indoor dust, outdoor soil and crops of industrial zone was significantly higher than that of urban, rural and suburban areas **(Li et al., 2001).** However, we noticed that children in rural areas had higher BLLs than those in urban areas. The change may be due to a number of industrial enterprises gradually shifted to the suburban areas, increased transport vehicles gradually in suburban areas, suburban children have more access to soil, poorer environmental governance, weaker health conditions in suburban areas, and so on **(Li, 2005).**

As regard to presence of waste piles around house, there was a non-significant difference between positive and negative cases (30.6% vs 21.9% respectively). These results contradicted with those reported by **Guo et al. (2014)** that the elevated BLLs of children are significantly associated with e-waste piles around the house. This difference can be explained by the nature and amount of waste piles around house. There was a significant increase of anorexia, constipation, learning difficulty and night terrors in positive cases when compared to negative cases. These results were in agreement with **Jiang et al. (2010)** who reported that clinical correlates with elevated BLL – such as night terrors, biting stationery, impaired concentration, and constipation, difficulty in learning, anorexia, and spasm – were assessed to determine possible association. Their results show that anorexia, spasm and impaired concentration were significantly associated with increasing BLL.

Male gender, rural residence, parent smoking, outdoor play, eating canned foods, waste piles around house and base floor living were risk factors for increased level of lead above 10µg/dl. These results were comparable to previous studies, where it had been reported that, sources of environmental lead contamination can be difficult to pinpoint because the pathways to lead absorption are various: (1) deteriorating lead-based paint from walls, windows, and doors; (2) transportation of lead contamination to the house by other means; (3) playing with toys which contain lead; (4) absorption of leaded dust through hand-to-mouth behavior; and (5) being in polluted environment. The most common pathway could be hand-to-mouth behavior especially among young children. However, it is hard to know when and how they interact with lead contamination. Possible sources for lead include leaded paint, lead contaminated soil, lead in plumbing, automobile exhaust, by-products of both mining and metal working, and various consumer products **(Akkus and Ozdenerol, 2014).** In addition, results of the present study were in agreement with **Guo et al. (2014)**

who reported that girls tended to have less risk of high BLLs than boys. They added, one could speculate that boys tended to more frequently have outdoor activities or engage in the activities of e-waste recycling, which might put the boys at high risk of exposure to lead. Furthermore, **Teppala et al. (2010)** reported that, among other likely determinants of blood lead levels that were considered in this study, weak to strong correlations were found between blood lead levels and home ownership, age, smoker in a household, paternal education, removal of shoes before entering a home, child playing on sidewalks or yard, child playing with furry toys, and exposure of child to traditional cosmetics and home health remedies. With the exception of child’s age, most of these covariates can be culturally mediated.

In short, results of the present study spot a light on the situation of serum lead levels in primary school children and associated factors in Damietta Governorate. However, it is just a step on a long road for development of an effective strategy for decreasing exposure and harmful effects of lead on children.

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العلاقة بين مستوي الرصاص بالدم والعوامل الإجتماعية والديموجرافية لدي أطفال المدارس الإبتدائية بمحافظة دمياط

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خلفية البحث: مع التطور الصناعي المستمر الذي شهده العالم في السنوات الأخيرة، ازداد تعرض الإنسان لملوثات بيئية مثل المعادن والمواد العضوية الهيدروكربونية.

الهدف من البحث: صممت الدراسة الحالية لفحص العلاقة بين العوامل الإجتماعية والديموجرافية وزيادة مستوي الرصاص لدي أطفال المدارس الإبتدائية بمحافظة دمياط.

مواد وطرق البحث: تم إستخدام قطاع عرضي، في الفترة من يناير 2015 إلي يناير 2016. وقد أجريت الدراسة على طلاب المدارس الإبتدائية بدمياط. وتم إختيار أكبر عدد ممكن من الأطفال في المرحلة الإبتدائيه كهدف أساسي من الدراسة (عدد الطلاب في جميع الصفوف كان 750 طفلا، وإشتملت الدراسة علي 741 حالة من الأطفال في التحليل الإحصائي). بعد الموافقة الأخلاقية والإدارية، تم عرض جميع أطفال المدارس الإبتدائية التي إختيرت لقياس مستويات الرصاص في الدم وإرتباطها بالعوامل الاجتماعية والديموجرافية الأخرى. وشملت المعلومات الديموجرافية والإجتماعية التي تم الحصول عليها من الإستبيان :الجنس والعمر ومستوى التعليم لدي الوالدين وكذلك المهن التى يعملون بها (العاطلين عن العمل، والعمل العام، العمالة الماهرة، عامل مهني) وكذلك العوامل المحيطه مثل ما إذا كان يعيش في حي مزدحم، وتدخين الوالدين بالمنزل وكذلك عمر الأم عند ولادة الطفل. تم جمع العينات وحفظها بمركز الأبحاث بجامعة المنصوره لقياس مستوي الرصاص.

النتائج: أسفرت نتائج الدراسة عن تراوح مستوي الرصاص بين 5 إلي 36 ميكروجرام لكل ملليتر، بمتوسط مقداره 9.67±6.11 ميكروجرام/مل/ وبلغ عدد الحالات أكثر من 10 ميكروجرام 98 حالة بنسبة 13.2% وتم إعتبار تلك المجموعة الموجبة، بينما تم اعتبار الحالات أقل من 10 ميكروجرام كالمجموعة السالبة، ومقارنة كلا المجموعتين بالنسبة للعوامل التي تم قياسها. ووجد أن نسبة الذكور في الدراسة كانت 52.6%، وزادت نسبة الذكور في المجموعة الموجبة مقارنة بالمجموعة السالبة (69.4% مقابل 50.1% علي الترتيب)، بينما وجد انخفاض يعتد به إحصائيا في عمر أطفال المجموعة الموجبة (8.52±1.62 مقابل 9.79±1.69 علي الترتيب). وكما وجد إنخفاض يعتد به إحصائيا في كل من الوزن، الطول ومحيط الرأس لدي المجموعة الموجبة مقارنة بالمجموعة السالبة. ووجدت زيادة يعتد بها في مستوي المعيشة (المستوي الإجتماعي) لدي المجموعة الموجبة مقارنة بالمجموعة السالبة. وزيادة طفيفة في نسبة الحالات القادمة من مناطق ريفية. لذلك وجد أن ارتفاع مستوي الرصاص بالدم يرتبط بالآتي: جنس الذكور، الإقامة بمناطق ريفية، تدخين الأب، اللعب خارج المنزل، تناول الأطعمة المحفوظة، وجود مخلفات الصرف بجوار المنزل، والمعيشة بالطابق الأرضي.

الإستنتاج: ربطت الدراسة الحالية بين مستوي الرصاص والعوامل الديموجرافية والاجتماعية المؤثرة في ارتفاع هذا المستوي لدي أطفال المدارس الابتدائية بمحافظة دمياط، ولكنها مجرد خطوة علي طريق طويل لتصميم إستراتيجية فعالة لتقليل أو لمنع التعرض للرصاص في تلك الفئة العمرية حيث أنها تتأثر سلبا علي المستوي الصحة بهذا العنصر.