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## RESEARCH ARTICLE

## THE PROTECTIVE ROLE OF GARLIC EXTRACT ON WEIGHT OF UTERUS INDUCED BY LEAD ON MICE UTERUS

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### Abstract

#### (i) OBJECTIVE:

The study was conducted to evaluate the protective role of garlic extract on the weight of uterus exposed to lead acetate in an animal model.

#### (ii) STUDY DESIGN:

Laboratory based Randomized Control Trial

#### (iii) PLACE AND DURATION OF STUDY:

Department of Anatomy, Army Medical College in collaboration with National Institute of health from April—June 2013

#### (iv) MATERIAL AND METHODS:

Thirty female BALBc mice were selected. 10 animals were placed in each group. Group A being the control was given normal diet. Group B was given lead acetate at a dose of 30mg/kg/day. Group C was given lead acetate 30mg/kg/day and garlic extract 500mg/kg/day through oral gavage tube for 60 days. Animals were sacrificed and dissected at the end of 60 days. Uterus was removed and weight of uterus was measured using a precision balance.

#### (v) RESULTS:

There was decrease in weight of uterus in group B when compared to Group A. But the results were statistically insignificant when group A was compared to group B, and when group B and C were compared.

#### (vi) CONCLUSION:

The weight was affected in lead acetate treated group which improved when treated with garlic extract.

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### Introduction

Lead is one of the most ubiquitous toxic material to which we are exposed in our day to day life. It is used in the making of pipes, paints, enamels, soldered fillings, bullets etc.

From the view point of human reproduction, lead is known to cause a number of adverse consequences in both men and women. Lead is even found in some popular brands of lipsticks. The amount of lead present in lipsticks is six times the amount found in candy, approved by FDA. According to Neman (2008) most lipsticks contain lead. She reported that chance of breast cancer increases with increasing dose of lead in lipsticks. Lead poisoning due to occupational exposure is very common in adults leading to reversible changes in mood and personality (Dhir and Dhand, 2010). Lead poisoning is defined by the American Academy of Pediatrics as blood lead levels higher than 10µg/dl (Ragan and Turner, 2009). Same levels were considered as a cause of concern by World Health Organization (Barbosa et al., 2005)

Lead being one of the reproductive toxicant, can affect the gonadal structure and functions and can cause alterations in fertility (Qureshi and Sharma, 2012). The effects on the physiology, histomorphology, development and biomarkers have been observed on different organs of animals and humans. In most of the previous studies, the harmful effects of lead were noted (Eugenia et al., Yousaf and Abdullah, 2010., Ait et al., 2009).

In recent years, research work threw light on the use of plants on the reproductive health of man and animals (Raji et al., 2012). Garlic (*Allium Sativum*) is one of the studied plants, with a long history of therapeutic use. Health benefits of garlic have been extensively reported (Sharma et al., 2010; Asadaq and Inamdar, 2010). The preventive and curative effect of combined supplementation of garlic and vitamin B complex against lead toxicity in albino mice is reported before (Khan et al., 2008). Some previous studies have reported that garlic not only provides protection against lead toxicity but it can perform a therapeutical role against lead toxicity (Bhattacharjee et al., 2003). Reports on the effects of garlic on female reproductive system are yet to be established (Raji et al., 2012). The rationale of current study is to observe the effects of lead acetate on female reproductive organs and the protective role of garlic extract.

## **MATERIAL AND METHODS:**

This laboratory based randomized controlled trial was conducted in the Department of Anatomy, Army Medical College Rawalpindi, in collaboration with National Institute of Health (NIH), Islamabad from April—June 2013. The experiment was carried out with permission of ethical committee on animal experiments, of the Army Medical College, Rawalpindi.

The animals were randomly divided into three equal groups using random number table. Thirty female BALB/c mice weighing 25-27 grams were used in the experiment and were housed in controlled environment of Animal house of NIH, Islamabad. Mice were fed with NIH laboratory diet for two months.

Animals in group A served as Control and were fed on normal diet. Mice in experimental group B were given lead acetate at a dose of 30 mg/kg body weight once daily for two months by oral gavage tube. Animals in group C were given lead acetate at a dose of 30mg/kg body weight once daily along with garlic extract 500 mg/kg through oral gavage tube once daily for two months.

At the end of 60 days, the animals were anaesthetized by placing ether soaked cotton in the jar. The animals were placed on a clean sheet of paper on a dissecting board. The midline incision was made on the skin of the abdomen by scalpel. The flaps in the body wall were spread open by making lateral incisions and were pinned back to expose the organs. Uterus was removed.

### **Weight of uterus**

Uterocervicovaginal weight was recorded using a precision balance (fig-1).

### **Statistical analysis**

The data was analyzed by using statistical package for social services (SPSS) version 18. Descriptive statistics were used to describe the results. The significance difference was determined using ANOVA and Post Hoc Tuckey test. Results were considered significant at  $p < 0.05$ .

## **RESULTS**

The mean uterocervicovaginal weight of the animals was  $0.019 \pm 0.0057g$  for the control group and  $0.016 \pm 0.0052g$  for experimental group B. The values of mean in experimental group B were lower than the control group (table-1). The weight was  $0.019 \pm 0.0057g$  for control group C; which was not different from group A. Results were statistically insignificant when the three groups were compared (table-2).



Figure- 1 Photograph showing recording of uterus weight of control group using precision balance

	Group A (n = 10)	Group B (n = 10)	Group C (n = 10)	p-value	significance
Uterus Weight	0.019 ± 0.0057	0.016 ± 0.0052	0.019 ± 0.0057	0.385	> 0.05

TABLE-1: Comparison of mean values of uterus weight between groups

Values were described as Mean ± SD

TABLE-2 Statistical significance of uterus weight in control group A and experimental group B and C

\*p-value <0.05 significant

\*\*p-value <0.001 highly significant

	Group A vs. Group B		Group A vs. Group C		Group B vs. Group C	
	p-value	significance	p-value	significance	p-value	significance
Uterus Weight	0.454	> 0.05	1.000	> 0.05	0.454	> 0.05

## DISCUSSION

objective of this study was to see the effects of lead acetate on the weight of mice uterus and the protective role of garlic extract. In the present study lead induced changes in the weight of uterus which was ameliorated with administration of garlic extract. The experimental groups were compared with the control group, as well as with each other. The results of group B were compared with group C and of group A with group C. In the present study, there was no statistical significant difference when the mean values of uterus weight were compared with each other among groups. Therefore lead acetate and garlic extract did not affect the organs weight significantly. These findings were consistent with previous studies on low doses of lead acetate (Raji et al., 2012). The weight of the organs were also found decreased in a few studies in which other researchers reported reduced weight gain after high dose exposure to lead (Khan et al., 2008).

This study showed slight decrease in weight experimental group B as compared to control group A. After treatment with garlic extract, there was relatively increase in weight of uterus as compared to experimental group B. But the results were statistically insignificant between control A and experimental group B. This might be due to exposure to low dose of lead acetate which did not significantly affect the weight of the uterus. The results were not significantly different between experimental group C and control group A showing that lead acetate led to slight decrease in weight which improved after co administration of garlic extract.

## CONCLUSION

The results lead to the conclusion that persistence and exposure to lead in our environment seemed to have effects on the weight of uterus which improved after treatment with garlic extract. The weight was slightly reduced in group B exposed to lead acetate for 2 months as compared to group C which was co exposed to garlic extract. But the results between the three groups were statistically insignificant as the mean readings were close to each other. This might be due to the low dose of lead acetate used in this study. Hence the day to day exposure to lead in our environment may affect reproductive organs over a period of time due to chronic exposure. This may be an underlying cause of primary or secondary infertility. Secondly garlic in this study has provided little protection of the tissue exposed to lead.

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