Role of mercury toxicity in kidney disease incidence in Pakistan

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بسم الله الرحمن الرحيم

In the name of

ALLAH,

The most Compassionate,

The most Merciful

RESEARCH COMPLETION CERTIFICATE

Certified that the research work contained in this thesis titled, “Role Mercury toxicity in Kidney diseases incidences in Pakistan” has been carried out and completed by M.Abubakar, ID: 14002140002. The quantum and the quality of the work contained in this thesis is adequate for the award of Degree of MS/M.Phil.

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<u>DECLARATION</u>

I M.ABUBAKAR S/O ABDUL JABBAR ID: 14002140002 Session **2014-2016** hereby declare that the matter printed in the thesis titled **<u>“Role of mercury toxicity in kidney disease incidence in Pakistan</u>”** is my own work and has not been printed, published and submitted as research work, thesis or publication in any form in any University, rresearch institution etc. in Pakistan or abroad**.**

Dated: ________________ ________________

(M.ABUBAKAR)

DEDICATION

To

My Family

For their abundant support, for their patience and

understanding, and for their love

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ABSTRACT

Background: High level of mercury can cause severe effects on kidneys including mental disorder. If its level exceeded from 50 µg/dL then it can be very harmful for people. Goal of the present study is to evaluate serum uric acid as biomarker like blood urea and serum creatinine biomarkers of kidney disorder and to check the co-relation of abnormal level of mercury with serum creatinine, serum urea and serum uric acid. **Methods:** Hundred subjects were randomly enlisted in this study, having kidney disorders, for example, renal disorder, and co-relation of mercury with biomarkers was analyzed by Atomic Absorption Spectroscopy (AAS). **Results:** Serum uric acid level was raised in 55 patients while blood urea and serum creatinine level was found in 72 and 83 patients individually. High serum uric acid concentration was observed in 70.73% females ($p=0.0003$) and 44.07% males ($p=0.2692$). The co-relation between mercury (Hg), serum creatinine, serum urea and serum uric acid was found insignificant. **Conclusion:** co-relation between mercury (Hg), serum creatinine, serum urea and serum uric acid level was insignificant. Serum uric acid is raised up to high level in patients with impeded renal function in all members. Higher levels of serum uric acid were not essentially associated with serum creatinine and blood urea level in all patients.

Keywords: **Serum creatinine, serum uric acid, blood urea, renal failure, mercury (Hg)**

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Abbreviations	Full Text
AKD	Acute Kidney Disease
CKD:	Chronic Kidney Disease
GFR	Glomerular Filtration Rate
SUA	Serum Uric Acid
UA	Uric Acid
AAS	Atomic Absorption Spectroscopy
AES	Atomic Emission Spectrometry
ICP-OES	Inductively Coupled Plasma Optical Emission Spectroscopy
ICP-MS	Inductively Coupled Plasma Mass Spectrometry
WHO	World Health Organization

1. Introduction

Nowadays, a comprehensive study has been carried out on severe effects of heavy metals and trace elements. Heavy metals can be measured through blood, urine, hair, nails and other tissues (Schultze *et al.*, 2012). Heavy metals such as lead, chromium, cadmium, copper, and mercury are major environmental pollutants and their toxicity is a problem of increasing significance for people. The term “heavy metals” states to any metallic element that relatively has a high density and are toxic even at low levels. Metal contamination problems are now very common in various countries with several documented cases of metal poisonousness in foundries, smelters, mining industries, coal-burning power plants and agriculture (Nagajyoti *et al.*, 2010).