

URINARY EXCRETION OF AFLATOXIN AND LIVER CANCER IN KARACHI

Pages with reference to book, From 112 To 114

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Abstract

Two hundred urine samples from apparently healthy subjects were examined for aflatoxin. Aflatoxin was detected in the urine of 9.5% of subjects from the lower and 5% from the upper socioeconomic groups. Liver cancer is also more common in less privileged individuals. Aflatoxin excretion had no relationship with the age or sex of the subjects studied (JPMA 36: 112, 1986).

INTRODUCTION

Primary liver cancer is more prevalent in Sind than other provinces of Pakistan.¹ Factor associated with this pattern have not been studied. Aflatoxin consumption has often been correlated with primary liver cancer.²⁻⁶ Since the climatic conditions in Karachi are conducive to the growth of *Aspergillus* species, cereals, spices and dry fruits get contaminated with this fungus^{2,4,5} Fungus contamination is more likely in areas where edibles are sold in open markets rather than in hygienically packed food items in supermarkets.

It was planned to study the pattern of consumption of aflatoxin by analysing the urine samples of healthy subjects collected from various areas of Karachi and correlate it with their age, sex and socio-economic status.

MATERIAL AND METHODS

Collection of urine sample: 24 hours samples were collected from 200 apparently normal subjects belonging to various socio-economic status from different areas of Karachi.

Column Gel clean up for Aflatoxin: Each sample of 24 hours urine to which 2ml of HC1 was added to prevent aflatoxin decomposition was mixed with chloroform in a ratio of 2: 1 respectively. The analysis of aflatoxin in urine was done by TLC method followed by column Gel clean up and then column chromatography.⁷ Fluorescence of aflatoxins was visualised with especially constructed lamp hood which corresponded with the excitation wave length of 365 nm for all the major aflatoxins.

RESULTS

TABLE 1
Sex frequency in relation to Urinary Aflatoxin excretion
in the Upper Socio-economic Stratum of
Karachi Population.

Localities	Examined		Positive		Total %
	Male	Female	Male	Female	
1. Bahadurabad	2	1	1	—	1
2. Clifton	1	1	—	—	—
3. Defence Society	1	2	—	—	—
4. Drigh Road	2	2	—	—	—
5. PECHS	15	6	—	1	1
6. J.P.M.C.	3	2	—	—	—
Total	24	14	1	1	5.26%

TABLE II
Sex frequency in relation to Urinary Aflatoxin in
the Middle Socio-economic Stratum of
Karachi Population.

Localities	Examined		Positive		Total%
	Male	Female	Male	Female	
1. Saddar	6	4	—	—	
2. F.B. Area	7	11	—	1	
3. Garden Road	8	3	1	1	
4. Liaquatabad	5	4	—	1	
5. M.A. Jinnah Road	2	—	—	—	
6. Nazimabad	14	14	1	—	
Total	42	36	2	3	6.4%

TABLE III
Sex frequency in relation to Urinary Aflatoxin
excretion in the Lower Socio-economic Stratum of
Karachi Population.

Localities	Examined		Positive		Total%
	Male	Female	Male	Female	
1. Badin	—	1	—	—	
2. Hajipur Road	1	—	1	—	
3. Kharadar	6	1	—	—	
4. Korangi	8	3	1	1	
5. Landhi	7	1	1	—	
6. Lyari	6	1	—	—	
7. Malir	6	2	—	—	
8. Mahmudabad	5	5	—	1	
9. Martin Road	—	1	—	—	
10. S.I.T.E.	20	3	1	1	
11. New Karachi	3	4	—	1	
Total	52	22	4	4	9.5%

Tables I, II and III show the number of cases from different areas of the city. The population examined irrespective of communities was roughly divisible into three socio-economic groups. People belonging to the upper class (p.a. income more than 36000/.) were examined from 6 localities (Table I): those belonging to the middle class (p.a. income Rs.13000/. Rs.36,000/.) from 6 localities (Table II) and the rest belonging to the lowest class (p.a. income up to 12000/.) were examined from 11 localities (Table III). Five per cent were positive in the 1st, 6% in the 2nd, and 9.5% in the third group. Analysis of data of liver cancer at the PMRC Research Centre, Karachi also shows a higher prevalence of liver cancer in individuals of low socio-economic group (Figure 1).

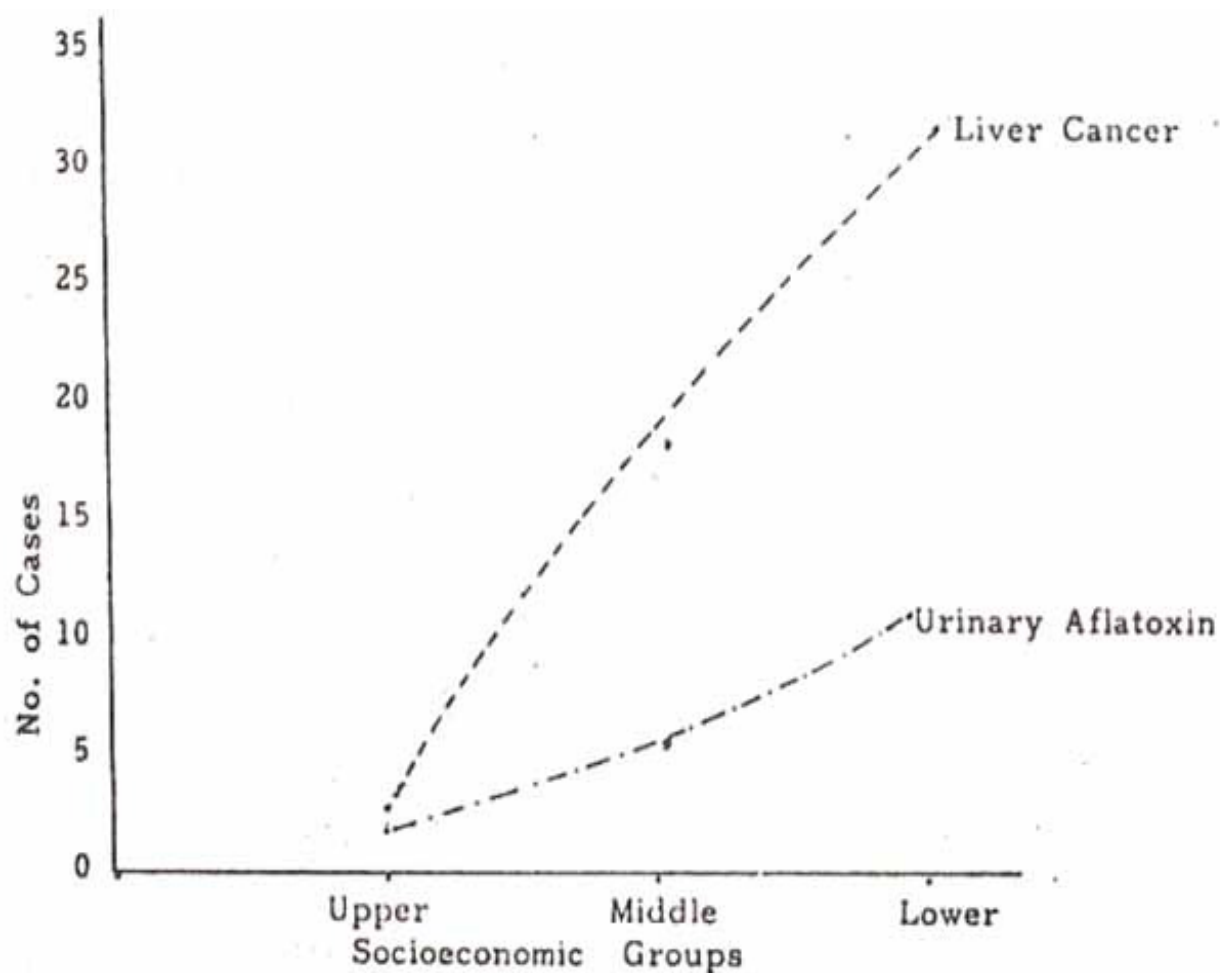


Figure 1. Urinary Aflatoxin excretion and Liver Cancer in various socioeconomic groups.

TABLE IV
Frequency of Urinary Aflatoxin in relation to Liver
Cancer in various Socio-economic Groups in Karachi.

Socio-economic groups	Aflatoxin positive				Liver Male	Cancer Females
	Examined Males	Examined Males + Females	Examined Females	Examined Females +		
Upper	24	1	14	1	1	2
Middle	42	2	36	3	10	11
Lower	62	6	22	6	19	14

Table IV shows the number of aflatoxin positive males and females as well as number of male and female patients suffering from hepatic carcinoma belonging to the 3 socioeconomic strata.

DISCUSSION

The greatest risk for aflatoxin contamination was present in the developing countries where dietary staples were often stored under conditions which favoured the growth of fungi. Such a condition exists in Pakistan especially in Karachi where the climate is hot and humid and even in the winter the climate is favourable to promote the growth of fungi thus an increased risk of contamination of cereals and other spices which are sold open in the market and freely consumed by the local population.^{3,5,9-12} The report of PMRC¹ has indicated a gradual increase in liver cancer as we travel south from the northern areas and in Karachi it has been found to be the highest.

Results of this study indicate that excretion of aflatoxin in urine is directly related to the environmental and economic conditions prevailing in various areas of Karachi. The liver cancer data also shows the similar results (Figure 1). The pattern of aflatoxin ingestion and excretion and that of liver cancer suggest a cause and effect relationship between fungal toxins and hepatic malignancy.

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