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Does Arsenic Consumption Influence the Age at Menarche of Woman

The people of nine districts of West Bengal surrounding 38,865-km²(1) are facing several problems due to the consumption of arsenic, as arsenic contaminated groundwater is being used for drinking purpose, agriculture, cooking of food and washing of utensils. It is established by several authors that constant exposure to arsenic is associated with cancer of skin, lungs, bones, kidneys, liver, bladder *etc.*(1,2). It also depletes body stores of iron, vitamin C and other essential nutrients leading to intrauterine growth retardation, decreased immune defenses and disabilities associated with malnutrition(3). Therefore, theoretically there arises a possibility that the use of arsenic poisoning water for a long time may affect the age at menarche (AGM) as it has a definite correlation with malnutrition. Therefore, the present communication attempts to determine whether an association exists between arsenic and AGM.

The present sample consists of 385 females (15-20 years) out of which 175 girls are from arsenic affected area of Ashokenagar and Basirhat in the district of north 24-Parganas, West Bengal, where the tube-wells were marked by the government as containing arsenic-water above permissible dose (0.05 mg/liter). But the villagers are still using this water (for 10-12 years) due to lack of alternative water supplies. However, control data (210 girls) was collected from a non-arsenic area (Guma) of the same district, after matching some conditions (social status, monthly income, education, food habits, family size, living conditions and birth rank of the subject). Printed questionnaires were used to collect information. Statistical comparisons were carried out through the use of χ^2 -test and student's t-test.

Both affected and non-affected groups are from Bengali Hindu family, mostly engaged in agriculture having lower socio-economic strata and protein-poor diet. According to economic condition, each group was divided into three categories- high (>2000), medium (1000-2000) and low (<1000). 81.71% of affected and 77.62% of non-affected girls are illiterate and others are in school standards.

The differences between two groups are non-significant with respect to both education ($\chi^2 = 0.982$, $df = 1$, $p > 0.05$) and economy ($\chi^2 = 0.403$, $df = 2$, $p > 0.05$). They are again identical with regards to family size ($\chi^2 = 1.803$, $df = 5$, $p > 0.05$). But the mean AGM of affected group was found to be later (14.04 ± 1.05) than the other group (13.28 ± 0.97), which is statistically significant ($t = 7.32$, $df = 383$, $p < 0.001$). AGM of the former group also deviates from several earlier studies(4) on Bengali Hindu Women.

It is well established that though menarche is a normal physiological process, it is influenced by geographical, physical, pathological, psychological and sociological factors including education, occupation, nutrition and hygienic living condition(4,5). In the present study affected group attained menarche significantly later than the other, though both are enjoying all similar environmental conditions (like economy, education, family size, food habits, geography *etc.*) except the consumption of arsenic for long time, for which the females from affected area are suffering from several chronic diseases (as diagnosed by the doctors).

Thus though our data can not directly prove the influence of arsenic on AGM, it does not also reject the hypothesis of the association. As it is the first study of

documenting this association, detailed evaluation with much more data over a wide area is, therefore, needed to accept or reject the hypothesis with certainty.

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Evaluation of IPPI Coverage Survey in Two Districts of Bihar

Pulse Polio immunization with OPV is being conducted two times each year in all 550 districts in the country since 1995. The

Government has launched comprehensive Pulse Polio Program all over India on October 14, 2001 to give polio drop to all children up to five years of age. In Bihar, this program was conducted during October 14-18, 2001. UNICEF requested Institute for Research in Medical Statistics (IRMS), Delhi to evaluate the reach at this program so