Harmful levels of lead and arsenic in common foods: research

Karachi, December 5, 2016: Unusually high levels of lead and arsenic, heavy metals most commonly associated with human poisoning, have been found in common foods. These are the findings of a research study - conducted by the Aga Khan University in collaboration with Japan's Jichi Medical University – that were presented at a seminar *Heavy Metals, Food Safety and Child Development* at AKU on Monday.

Lead and arsenic are two chemicals deemed to be of major concern to public health, according to the World Health Organization's International Programme on Chemical Safety, since both elements have toxic effects that can cause irreversible neurological damage and even trigger a wide range of chronic diseases.

To determine the cause of lead and arsenic exposure, AKU researchers looked at common sources of lead and arsenic exposure including petrol, foods, drinking water, house-dust, respirable dust and soil across urban and rural areas of Pakistan. In addition, blood samples from pregnant women, newborns and young children were taken to assess their health risk.

Surprisingly, drinking water and *surma* (kohl) were not the main sources of lead exposure. For pregnant women, foods such as potatoes and boiled rice and for children, food and house-dust were found to be the most important contributors of lead exposure.

The women and children who took part in the study had blood lead levels significantly higher than the 5 µg/dl (microgrammes per deciliter) used as a reference level for health risk by the U.S. Centers for Disease Control and Prevention (CDC).

Describing the findings of the study, Dr Ambreen Sahito, research coordinator for the study, stated that more than "60 per cent of newborns and about 90 per cent of children aged 1-3 years had blood lead levels that exceeded CDC

guidelines, with grave lifelong consequences. Finding of the research are also relevant to Sustainable Development Goal 3 that calls for efforts to reduce deaths and illnesses caused by exposure to hazardous chemicals."

Dr Zafar Fatmi, professor of Community Health Sciences at AKU, revealed that Pakistan's population has a relatively higher exposure to lead than other countries.

"Food contamination can occur during production (farming), processing (in industry or at home) or packaging (if materials are contaminated with lead) and this calls for food processes to be regulated and monitored at each stage. Policymakers will need to pay closer attention to how lead contaminants are entering food chain."

Dr. Fatmi said that the next step was a systematic investigation to reveal at which point in the cycle food is contaminated. Research is also needed into the most commonly contaminated food items, he added.

Exposure to lead can be limited by simple home activities: hand hygiene, mothers and children washing their hands and washing well, as well as regular wet mopping. *Poocha*, swabbing, lessens house-dust – containing air pollutants and paint contaminants – reducing lead exposure among children substantially, said Dr Shahla Naeem a member of the AKU research team.

A second study looking into arsenic exposure had equally surprising findings. It is often thought that drinking water and 'unsafe' cookware determines arsenic exposure. The researchers looked deeper into the issue by cooking with water that had been boiled and in pans made of four different metals. What they found was that regardless of the type of cookware used, chicken had at least 15 times more arsenic than potatoes and up to 5 times more arsenic than lentils that had been cooked in identical water.

Explaining the policy implications of the arsenic study, Dr Fatmi, Dr Sahito and Dr Ghani pointed out two areas of concern.

"Water standards do need to be considered. The government needs to provide

a safe drinking water supply for communities living along the riverbanks as groundwater is a well-known source of arsenic."

"Equally important is food standards. We suspect that chicken feed or vaccines given to poultry could be the source of arsenic in meat." It was pointed out that the U.S. Federal Drug Authority has banned an arsenic-based poultry vaccine in April 2015 and regulatory authorities should consider doing the same in Pakistan.

However, speakers stressed that the public should not stop eating chicken for fear of arsenic exposure. Dr Fatmi said: "While more research is needed on this topic, it's important to note that people shouldn't stop eating chicken altogether as it is an important source of protein. For the public, health risks from arsenic exposure are not only determined by the amount of toxins found in food but also by the rate of consumption and the body mass (height and weight) of the consumer."

Epigenetic studies are underway, in collaboration with the Japanese that investigate how lead and arsenic exposure affect genes and could potentially lead to chronic diseases. Such research would help understand the long-term impact of heavy metals on public health, speakers added.

The studies have been funded by Japan's Ministry Of Health, Labour and Welfare with support from AKU's University Research Council. Dr Abdul Ghani, Dr Ambreen Sahito and Dr Shahla Naeem from the Aga Khan University's Community Health Sciences Department and Professor Fujio Kayama from the JICHI Medical University spoke at the event.

Professor Asad Saeed from Karachi University, Amna Khatoo and Seema Ashraf from the Pakistan Standards and Quality Control Authority, Mr Yahya from the Sindh Environmental Protection Agency, Professor Masood Kadir from the AKU's Community Health Sciences Department and Dr Ghazala Rafique from the AKU's Human Development Programme were also present at the seminar.