Asthma Prediction Tool for Pre-school Children

At present modified asthma predictive score (mAPI) can be used in children aged less than three-years presenting with ≥4 wheezing episodes per year, to predict the likelihood of development of asthma. Although, it has some limitations, such as need of blood eosinophil levels and allergy skin prick tests which are difficult to perform in young children. Therefore, a team of researchers from University of Toronto and McMaster University developed a symptom-based screening tool to identify the children at risk of persistent asthma at 5 years of age, known as CHILDhood Asthma Risk Tool (CHART). On the basis of history of number of wheezing episodes, use of asthma medications, and visit to emergency department or hospitalizations for wheeze before three of age, CHART categorizes children into “high risk”, “moderate risk” or “low risk”, groups and predicts the risk of future asthma.

The predictive performance was tested among the participants of CHILD Study cohort (N=2511), CHART assessment surpassed the physician assessment and mAPI in predicting persistent wheeze and asthma diagnosis in these children at 5 years. For external validation, CHART was applied to a general population cohort (Raine Study [Australia], N=2185) and a high-risk cohort (CAPPS [Canada], N=349). Similar prediction for persistent wheeze was obtained in the Raine Study in children at 5 years of age and CAPPS at 7 years of age.

This simple tool could be incorporated for routine screening in primary care to identify children at high risk of asthma to take steps for timely control of symptoms and introduction of preventive therapies. (JAMA Network Open, 06 October 2022)

Impact of Air Pollution on Cardiac Health of Adolescents

Studies have documented the negative effects of air pollution on the cardiovascular health in the adult population. A team from the Pennsylvania State University College of Medicine analyzed the data collected from participants (322 adolescents) of the Penn State Child Cohort (PSCC) during the follow-up, to evaluate the impact of breathing fine particulate matter on heart rhythms of adolescents.

For data collection, nephelometer were used for obtaining the 24 hour PM2.5 concentrations for each participant, simultaneously 24 hour ECG data was obtained using a Holter monitor to identify cardiac arrhythmias, including premature atrial contractions and premature ventricular contractions (PVCs). Study findings revealed that PM2.5 exposure was associated with an acute increase in number of PVCs, while no association was found with premature atrial contractions. An increase of 10 µg/m³ in the PM2.5 was associated with the 5% (95% CI, 1%-10%) increase in PVC counts within 2 hours after exposure in this population based sample of adolescents. Thus, by improving the quality of air the risk of SCD can be reduced in adolescents. (Journal of the American Heart Association, 14 September, 2022)

Maternal Consumption of Ultra-processed Food and Overweight/Obesity in Offspring

Childhood obesity is rising at an alarming rate all over the world. Sedentary lifestyle along with the high consumption of the ultra-processed food is an important cause. Development of obesity can be attributed to the combined influence of genetic susceptibility and environmental factors. Studies have shown an association between maternal intake of healthy diet during pregnancy and lowered risk of childhood obesity in the offspring. In a population based prospective cohort study, published from the Harvard Medical School, USA, association between maternal intake of ultra-processed food during pregnancy and child rearing period, and risk of overweight or obesity in the offspring during childhood and adolescence was assessed. Among the 19,958 mother-child pairs with a median (IQR) follow-up of 4 (2-5) years, 2471 (12.4%) offspring developed overweight or obesity. Authors reported that after adjusting for established risk factors in mother and offspring, maternal consumption of ultra-processed foods during the child rearing period was associated with overweight or obesity in offspring. No significant association was found between peri-pregnancy intake of ultra-processed food and risk of overweight and obesity in offspring. These findings highlight the need to modify the dietary recommendations for the women in reproductive age group, to improve the offspring health. (BMJ, 05 October, 2022)

Bionic Pancreas in Type 1 Diabetes

The current automated insulin delivery systems need continuous input of the amount of mealtime carbohydrates consumed and adjustment of settings to deliver the right amount of insulin. Solution for this problem has been found by a team from Boston University in the form of “Bionic Pancreas”–an automated insulin delivery system which uses next-generation technology to deliver insulin with minimal user input. Recently, the effectiveness of Bionic Pancreas was assessed in a multicentric, randomized control trial involving person with type 1 diabetes aged between 6 to 79 years. Participants were assigned in a 2:1 ratio into group 1 (receiving bionic pancreas treatment with insulin aspart or insulin lispro, N=219) or group 2 (receiving standard care i.e.any insulin-delivery method with unblinded, real-time continuous glucose monitoring, N=107). At 13 weeks, the use of a bionic pancreas was associated with a statistical significant reduction in the glycated hemoglobin level than standard care. No significant difference was noted in the number of severe hypoglycemia events between the two groups. (NEJM 29 September, 2022)

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