

Mumbai scientists come up with special face mask to detect tuberculosis quickly in children

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MUMBAI: City scientists have come up with a special face mask that can detect tuberculosis quickly in children without them having to undergo complex procedures such as gastric lavages or needle-guided biopsies.

Though TB is one of the oldest known diseases, detecting it in children has always been difficult as, unlike adults, they cannot expectorate phlegm for a TB diagnosis. It is to get around this that a team of researchers from the Worli-based Foundation for Medical Research (FMR) devised the non-invasive mask-based testing.

"During Covid, we found that respiratory aerosols expelled by patients could be captured non-invasively in a modified N-95

mask and be tested using RT-PCR (polymerase chain reaction)," said FMR director Dr Nerges Mistry. The method was extended to TB detection in a pilot project completed recently in three city hospitals. The modified N-95 mask has a gelatine cover on the inside to capture respiratory aerosols, be they SARS-CoV-2 virus or TB bacilli. Fifty children from three hospitals - Wadia Hospital in Parel, JJ Hospital in Byculla and Dr Vikas Oswal's centre in Govandi - were enrolled into the study in which they were asked to speak or cough for 10 minutes after wearing the mask. "Using this method, we could confirm TB in children with 75% sensitivity and 95% specificity in untreated patients similar to GeneXpert in gastric lavage or sputum samples," said the project's main researcher Dr Ambreen Shaikh from FMR. The team even detected TB in some kids who didn't have a productive cough. "It has been called SMaRT-PCR or sampling with mask and PCR," she said.

The results of the pilot study, which was funded by industrialist Nadir Godrej, have been published in the 'International Journal of Infectious Diseases' and 'Nature Scientific Reports'.

Children infected with TB progress rapidly and death rates can be as high as 96%, if untreated. In India, about a third of estimated kids with TB are detected and treated. India is home to almost 30% of global paediatric patients.

"There is a case detection gap of almost 60% in some paediatric age groups. We certainly need newer methods to close this gap," said BMC executive health officer Dr Mangala Gomare. FMR plans to carry out larger sample size clinical studies in some city hospitals. A senior doctor said the test is still in nascent stages and hasn't yet been used to detect drug-resistant TB cases.

Dr Varinder Singh of Lady Hardinge Medical College, New Delhi, said child-friendly TB tests are the need of the hour. "We need tests that are easily accessible and painless," he said. Many children need to be in hospital to undergo tests like gastric lavage for TB detection. Dr Shaikh said over 90% kids who participated in the SMaRT-PCR pilot study found the test "comfortable".