CHALLENGES of Air Pollution Health Impact study

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Background of the Study

Under the Malé Declaration sub-activity 4.1.2 'Measuring health effects of air pollution through cohort, time-series or cross-sectional studies', a cross-sectional study with longitudinal follow-up was carried out by the Department of Occupational & Environmental Health (DOEH) of National Institute of Preventive & Social Medicine (NIPSOM), Dhaka to assess the impact of air pollution among school children in selected schools of Dhaka City

Background of the Study…

- **Title of the study was `Assessment of Impact of Air Pollution among School Children in Selected Schools of Dhaka City, Bangladesh'.**
- The main objective of the study was to determine whether there was an association between concentrations of $PM_{2.5}$ and PM_{10} with changes in respiratory symptoms and lung function (PEFR) in asthmatic children in Dhaka City.
- The study was conducted into three phase; 1st Phase– planning and preparation, 2nd phase- data collection and 3rd phase- data analysis and report.
- Three schools which are within one kilometer of air quality monitoring were selected for the study. Of which two are boys school and one is girls school

Background of the Study…

- Initially a base line survey of 1618 school children from three schools was conducted to identify students with clinical evidence of asthma
- From the Class V to IX a total of 180 students, of which 120 asthma group and 60 non-asthma group were randomly selected for the study
- On a daily basis under the supervision of teachers and technicians, Peak Expiratory Flow Rate (PEFR) of the selected students was measured every morning & afternoon and a diary of respiratory symptoms was maintained.
- Data was collected for 42 days, which covered dry and rainy season.
- Air quality monitoring data of the particular day of data collection was collected from the AQMP

Initial Challenges

- **The study correlating the health effects of school children with air pollution was a first initiative**
  - a group of multidisciplinary people like public health specialist, epidemiologist, biostatistician, clinician, personnel from air quality monitoring department and department of environment were involved to conduct the study.
  - during protocol development guidance from experts and specialists were sought
  - to get a concise description of the air pollution exposure. meetings were arranged with experts from DoE & AQMP
  - strategic plan and implementation modality of the study were developed

Initial Challenges…

- **To conduct the study smoothly and properly, and to complete study in time, and for a quality research**
  - a guideline and a time table was developed
  - role of the investigators and other staff involved in the study was clearly explained particularly the specific area of responsibility.
  - Personnel involved with data collection were properly trained. Necessary training manual and SOP were developed for the training
  - A coordination and Monitoring Committee was formed for smooth implementation of the study
  - Meetings were arranged regularly particularly with the personnel involved with data collection to ensure quality data collection and integrity of the research

Methodological Challenges

- **Air pollution exposure:**

  Air pollution data on the individual level was not available and individual exposure measurements was not available or possible. Ecological exposure assessment of ambient air pollution concentrations were considered as exposures of individual subjects.

- **Lung Function test (LFT)**

  Lung function test is an important measure to correlate the effects of air pollution particularly for asthmatic children. LFT was done for all the students of three school in base line survey. And for the selected students LFT was done both in morning and afternoon though out the whole data collection period.

Methodological Challenges…

- **Selection of boys and girls schools**

  For same ecological exposure of air pollution, we had to find out both boys and girls schools within same distance (one kilometer) of AQM center. Initially most of the schools denied to participate in the study particularly for long data collection period

  - several meetings were arranged with the school authority and committee to motivate them.
  - ultimately permission from higher authority (Education Ministry and from Director General of Education Department) had to undertake to include the selected schools

Technological Challenges

- **Lung Function test of all the selected students both in morning and evening**
  - to perform LFT properly within short time before the class begin in the morning and immediately after end of school , each of the selected students was provided with Peak Flow Meter to all the selected students
- **To handle Peak Flow Meter properly and to record reading correctly**
  - always a close supervision by the respective teacher and technician for each of the students was must, because both the time the students tried to use Peak Flow Meter hurriedly and there was lot of chance to make mistake. Some times at the end of school the students tried to escape.

Technological Challenges…

- **Orientation and development of skill of the teacher and concern personnel**
  - Orientation and hands on training several times on Peak Flow Meter of school teachers and other concern people were done until and unless they became skill to use it. For which a training manual and a SOP was also developed
- **Failure of instrument (Peak Flow Meter)**
  - Both at morning and evening the Peak Flow Meters were checked by technician and trained teachers, if any problem or malfunction found the instrument was replaced quickly and for which always a number of extra Peak Flow Meter was kept in hand.

Behavioral Challenges

- **Support from headmaster and respective school teacher**
  - before implementation of the study several meetings were arranged with the school authority and teachers to motivate them to participate, cooperate and to fix appropriate time period for conducting the two phases of the study.
- **Response of the parents as well as agree to allow their child to participate in the study**
  - to get response from the parents during baseline survey and to allow his/her child for participating in the study several requests over telephone and through letter from school teachers as well as from researchers were done

Behavioral Challenges …

- **Support from students**

  - to encourage and to get support from the students for data collection, a gift (pencil box/geometry box etc.) was given. Moreover, the participating students got breakfast during data collection day.

  - for other students a general gift item- a large screen television set for each of the participant school was given.

Behavioral Challenges…

- **Use of health diary**
  - Every participating student was given a diary (note book) to record their daily health status particularly their respiratory problems in their home. But this programme could not be successful even after several guidance and instruction the students did record their health status properly
- **Frequent closure of schools and examination of students**
  - due to political reasons there was unscheduled frequent closure of schools and with this date of examination also changed. For which the data collection programme needed to change and re-fix but sometimes which became very difficult

THANKS