Regional training workshop on building country capacities in estimating the health impacts of air pollution using time series analysis[a]

Introduction

Evidence has shown that air pollution is a risk factor for ischemic heart disease, stroke, chronic obstructive pulmonary disease, lung cancer, and acute lower respiratory infection (1). It also has causal association with type II diabetes mellitus, neonatal mortality and mortality due to neurologic disease, particularly Alzheimer's disease (2,3).

Recent estimates indicate that air pollution is the second leading cause of death and the foremost environmental risk factor in the Eastern Mediterranean Region (EMR) (4). EMR has the second highest age-standardized mortality rate attributable to air pollution among all WHO regions, with more than 570 000 premature deaths occurring annually due to air pollution (4). And climate change is expected to exacerbate the situation in the coming years.

To empower EMR countries with the skills to conduct time series analysis, which will help them understand the relationships between exposure to particulate matter and health, including mortality, the WHO Regional Office for the Eastern Mediterranean held a regional training in February 2024 for representatives of the ministries of health and environment, research centres and universities from 7 countries in the region.

Summary of discussions

There is a significant gap in research, knowledge and understanding of the health impact of exposure to air pollution in the EMR (5). None of the 66 studies in a recent systematic review on the issue in different countries was from the EMR. There is therefore a need to invest in research and collaborations on air quality and its health implications in the region.

The EMR has the highest levels of PM10 and it is affected the most by safety data sheet, thus making the assessment of the health impact of ambient air pollution in the region a necessity to comprehensively understand the long- and short-term health impact and recommend appropriate methodologies for assessment (6).

Understanding the effects of anthropogenic and nonanthropogenic particulate matter on health is challenging due to the complexity of air quality mixture in composite source profiles. Discrepancies emerge when comparing the effects of desert dust and anthropogenic particulate matter concentrations independently. Using time series data for multiple years, as well as multiple locations, can help in estimating the short-term effects of dust exposures on daily health outcomes, while adjusting for air temperature, seasonality, days of the week and other potential time-varying confounding factors (7).

Most of the available evidence on the short-term impact of particulate matter have been obtained from studies in single cities, single countries or single regions, posing significant challenges to the comparison of results and to synthesizing effect estimates. Multi-country time series analysis is a crucial tool for bridging these limitations. It offers a unified approach that adopts the same analytic protocol and model specifications for the estimation of globally representative associations of PM10 and PM2.5 exposures with daily mortality (8).

Considering the transboundary nature of safety data sheet, pooling data from multiple countries can help in determining common patterns, identifying regional disparities and gaining a deeper understanding of the complexity of particulate matter exposure exacerbated by frequent safety data sheet (9).

Multi-country studies have been conducted in Europe, the United States of America, Latin America and Asia (10), but no collaborative effort has been made, as of the time of the meeting, to conduct a multi-country study in the EMR. Multi-country time series analysis will provide reliable evidence for policy formulation and targeted interventions in the EMR. It will enable a collaborative approach that will facilitate harmonization of monitoring and data collection practices across countries, thus enhancing comparability and reliability of findings. This will enhance the capacity of EMR countries to tackle their pressing air pollution challenges and safeguard the health and wellbeing of their populations.

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[a] https://applications.emro.who.int/docs/WHOEMCEH174E-eng.pdf?ua=1

Recommendations

To Member States

- Conduct research to generate evidence on the short-term impact of air pollution on health using standardized protocol and disseminate the findings.

- Participate in multi-country time series analysis studies to derive regional estimates and contribute to WHO air quality guidelines updates.

- Identify dust indicators and study dust composition to better understand its health burden.

- Develop better mortality surveillance systems, focusing on daily all natural-cause and cause-specific mortality.

- Enhance accessibility to health and environmental data for all relevant national stakeholders.

To WHO

- Provide technical and capacity-building support to EMR countries for epidemiological studies, particularly using time series analysis.

- Develop a standardized protocol for conducting time series analysis and disseminate it to countries for use in national studies.

- Facilitate training on environmental epidemiology, focusing on air pollution and health.

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