most associated with low sociodemographic and environmental indicators are found to be ARI and external causes of mortality. This is quietly evident in Amria and Borg Al Arab sub-districts.

INTRODUCTION

Understanding the patterns in mortality during early childhood provides better information for prevention, research and medical care. The development and evaluation of effective programs to reduce the burden of mortality requires a detailed knowledge of disease or mortality distribution and causal pathways. The general population-wide intervention programs are too expensive to implement. Therefore, it is necessary to investigate whether the distribution of adverse health outcomes in a population are either random or tend to aggregate in clusters before starting a program for prevention to limit such programs to high risk units.[1,2]

Advances in GIS and mapping technologies provide the public health professionals the opportunity to quickly analyze spatial distribution of under 5 mortality, therefore, investigating whether the distribution of mortality is either random or whether there are areas where mortality seem to aggregate. GIS helps to explore regional difference in mortality and to identify areas where mortality is high to develop specific preventive measures targeted at these geographic areas. [2-5] The spatial distribution of under-5 mortality may be in the form of: point patterns (dot maps) which display the distribution of individual deaths based on their residential locations (address matching), or in the form of area patterns chloropleth maps (polygon) in which U5MR is calculated and visualized at the level of census tracts or other types of administrative districts.[6-12]

There could be also a temporal dimension (year of death) as well as a spatial dimension (spatio-temporal analysis) to the mortality and by comparing annual distribution of mortality rates over time spatial trend could be detected and with the application of interpolation analysis the U5MR could be predicted.[2,4]

Certain geographic factors operating at the level of communities may profoundly affect child health. Such factors may include environmental pollution

geographical distance to a health care facility and regional variation in scioeconomic status.[13]

Clearly, there is a need for an innovative approach such as a GIS to describe and investigate the underlying causes of under 5 mortality. GIS provide visualization of mortality rate which is useful in identifying pattern and relationships when data are displayed from a geographic perspective, and integrate environmental (pollution and toxic exposure) and socioeconomic information (income, education and unemployment) that may influence under 5 mortality.[14-21]

Several researches used GIS to test the association between the exposure to various environmental pollution and the observed spatial pattern of child morbidity and mortality. Geschwind et al., [20] and Clarke et al., [21] investigated the proximity of residences of infant with congenital malformations and perinatal deaths to hazardous waste sites. Kohli et al.,[22] investigated the association between child with leukaemia and residence at areas with high levels of ground radon radiation. Researches suggested that the majority of under 5 deaths are preventable through application of measures to reduce environemental threats to children's health.[23,24]

This study was carried out to investigate the distribution and causes of under five mortality in Alexandria using GIS technology.

MATERIALS AND METHODS

Study setting and design

This study is a retrospective study where the target population is the registered information of under five deaths and live births available at the Health Information Center and CAPMAS in Alexandria from 1996 to 2001 The second study setting is the Remote Sensing and GIS laboratory at the Institute of Graduate Study and Research, Alexandria University.

Data collection

Data about under-five deaths included the date of birth, sex, residence. date of death, cause of death and data about live births from 1996-2001 This data records are obtained from the Health Information Center in Alexandria