Challenges of Epidemiologists of Developing Countries in the 21st Century

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Abstract- There are many published articles which cover current and future challenges of epidemiology. However, up until now, most of them are written by developed world epidemiologists. Therefore, despite a common use of assumptions, they did not have the opportunity to discuss the different range of practical tasks and priorities away from developed countries. The topics covered are; facing poverty, non-democratic government that has links to developed countries, man-made and natural disasters, handling low-quality data and accessing it, and finally improving contribution to the world epidemiological knowledge for the 21st century.

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Introduction

In 2002, the leaders of 12 developed world epidemiology associations met in Philadelphia during the American Public Health Association (APHA) convention. They started a discussion on current and future challenges of epidemiology, and the outcomes were published in an article entitled: "Challenges of epidemiology in the 21st century: Comments from the leaders of several epidemiology associations" (1).

In the article five areas of ethics, research-related challenges, advocacy, epidemiological training, and professional organizations have been identified as the current and future challenges of epidemiology. These areas were presented as a perspective of the developed world especially North American epidemiological associations. There are also other published articles, newer (2-4) and/or older (5-10) than the mentioned article, which follow the same theme and sometimes produce the same results.

However, up until now, none of them have been written by developing world epidemiologists. Therefore, despite a common use of assumptions, developing world epidemiologists did not have the opportunity to discuss the different range of practical tasks and priorities away from developed countries. Although the same general principles apply between rich and poor countries, the priorities requiring immediate action are quite different.

More recently, a few developing world epidemiologists were commissioned by the International Epidemiological Association (IEA) to discuss the epidemiological situations in their regions (11-14). Although this move has provided a great opportunity, more discussions are needed. Therefore, in the present article, another perspective of developing world epidemiological challenges in the current time period is introduced. Hopefully, this article triggers a debate over this rather important but neglected issue.

Dealing with poverty

Since poverty is a worldwide phenomenon which has a substantial ill-health consequence, it has been considered as one of the most important tasks of epidemiologists all around the world (15-18). However, poverty does not hit different parts of the world equally. The rates of "extreme poverty" (live on less than $1 a day) also "absolute poverty" (live on less than $2 a day) in developing countries especially within sub-Saharan Africa and Southern Asia are higher than any other parts of the world (18,19). Moreover, it is estimated that 77% of India's population or about 836 million people earn less than $0.5 a day, and the rate of poverty is on the rise in this country (20).

Evidence also suggests that those living on less than $1 a day, compared with those living on less than $2 a day, have a twofold to threefold greater risk of having access not only to unsafe water and sanitation but also to malnutrition among their children, and being exposed to

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indoor air pollution (21). As a result, poverty in its bigger and wider concept, i.e. not only economic deprivation but also having low life expectancy, illiteracy, poor nutrition, etc. is the root cause of most health related problems. Furthermore, poverty is to blame for communicable and non-communicable diseases, injuries, and other ill-health problems in developing countries (22-24).

Poverty also affects the health of the people living in the developing world from a different perspective, and that is providing less money and budget for studying health related problems from an epidemiological point of view (25,26). As a result, these complex interactions of diverse side effects of poverty lead to not only having more health related problems but also having fewer opportunities for conducting high-quality epidemiological studies within the developing world.

Dealing with non-democratic governments with links to developed countries

Historically, some developing countries especially those with natural valuable resources such as oil, diamonds, etc. are ruled by a non-democratic government with links to developed countries that protect the profit of some developed countries rather than the benefit of their own people. By "non-democratic" I mean that such a government is not elected by the people and takes the control of the country by other means such as a coup or by traditional family groups controlling the day-to-day government. By "links to developed countries" I mean that the existence of such a government depends on the aids and support that they have received either covertly or overtly by some developed world governments.

These types of non-democratic government with links to developed countries usually consist of corrupt politicians and/or armies that spend national budgets on arms rather than health and education. Evidence suggests that some non-democratic governments are spending $10 to $20 per capita on military expenditure versus spending merely $1 per capita on health (27). As a result, there is always ongoing political unrest to change this type of government with links to developed countries of some developing countries. Again, these complex interactions lead to more health related problems and low opportunity for conducting high-quality epidemiological research (28,29).

Dealing with man-made and natural disasters

Developing world countries are more prone to natural (earthquake, flooding, volcano, drought, etc.) and man-made (wars, armed conflicts, occupations, etc.) disasters (30-33). Let us have a look at the geographical distribution of mortality caused by war-related injuries. The World Health Organization (WHO) estimates that in the year 2000 war-related injuries were the 11th and the 18th leading cause of death in the African Region (AFR) and the Eastern Mediterranean Region (EMR), respectively. However, it was the 62nd leading cause of death in the American Region (AMR) and the 66th in the Western Pacific Region (WPR) (34).

Similarly, evidence also suggests that natural disasters hit poor people more than the rich people. It happens since deprived people often live wherever they work (e.g. fishermen live on the seashore) or wherever the land is inexpensive (e.g. at the foot of volcanoes, or in seismically active regions) (35). Therefore, the results of a recent study highlight that in the twenty-first century deprived people have two times greater exposure to natural disasters than affluent people. Furthermore, deprived people in East Asia and Pacific, South Asia, and Sub-Saharan Africa are most exposed to natural disasters (36).

This not only means that the health situation of people living in developing countries has deteriorated more by exposure to disasters but also it means that for epidemiological investigations of such exposures we need to develop proper epidemiological methods (37,38). It is obviously evident that we need some well-designed approach and methods to gather necessary information as soon as a disaster occurs and continue to gather the necessary information up to 10 or even 20 years after the incident occurs to study both short and long-term impacts of the disaster (39).

Dealing with low-quality data and dealing with difficulty in accessing that low-quality data

In the developing world, the quality of existing health-related data which is usually gathered by different governmental organizations is usually low. There are incomplete data and missing variables that make an epidemiological investigation at a national level very difficult to conduct. Moreover, key information that is required for assessing and addressing health inequities, especially measures of social status, are lacking in such databases (40,41).

Besides, if the data is related to some specific and sensitive health-related issues such as suicide, homicide, drug addiction, mental and social disorders, then it would be difficult or even impossible to access such data for epidemiological investigations (42,43). This happens especially in countries with non-democratic governments with links to developed countries due to

censorship policies. These again lead to more health-related problems and less opportunity to study them from the epidemiological point of view.

Improve contribution to the world epidemiological knowledge

All of the above-mentioned problems plus the difficulty in writing in English for some epidemiologists in the developing world leads to less contribution to world epidemiological knowledge. A bibliometric analysis in the domains of epidemiology, public health, preventive, occupational, and environmental medicine has revealed that whilst USA researchers retain a leadership position in the production of scientific papers in these fields less developed regions would need to substantially improve their scientific productions (44).

Unfortunately, even wealthy developing countries such as Saudi Arabia, Qatar, and Kuwait only spend nearly 0.2% of their gross domestic product (GDP) on science, substantially less than developed and even some other developing countries such as the Islamic Republic of Iran (45). Under such circumstances the health related problems of the people in the developing world, such as poverty, man-made and natural disasters, etc. may not come to the eyes of the people and scientists living in the developed world.

Is there a solution?

There are at the very least five areas that epidemiologists in developing world should deal with. These are poverty; non-democratic government with links to developed countries; man-made and natural disasters; handling low-quality data and accessing it, and improving contribution to the world epidemiological knowledge. Is there a solution to tackle these constellations of problems?

Yes, there is a real solution. In my point of view, a close mutual collaboration between the epidemiologists and epidemiological associations in developing countries and also with epidemiologists and epidemiological associations in the developed world could have a substantial impact on the current situation (46-48). This close collaboration might not only help to better investigate the current health-related problems in the developing world, but it may also help to magnify these problems in the eyes of people and scientists living in the developing world.

Fortunately, evidence suggests that there are positive ongoing movements in this regard. For instance, the International Clinical Epidemiology Network (INCLEN) which was established in 1980 (49) could be named as a successful example. The INCLEN aim has been to reinforce the research competence in the developing world through the expansion of Clinical Epidemiology Units (CEUs) (50). In 2007, a strategic alliance between the Journal of Clinical Epidemiology (JCE) and INCLEN had been launched (51). Subsequently, in 2013, the JCE has published 10 commissioned articles which highlight the contemporary activities and dilemmas that the Indian Clinical Epidemiology Network faces (52). These articles would otherwise not have the opportunity for publication.

One more issue

And there is one more issue; this mutual collaboration should also be able to produce strong epidemiological evidence for developed world governments' foreign policies (53,54). This evidence should inform developed world governments about all ill-health consequences of their interfering in developing world political situations either by protecting non-democratic governments from toppling or by occupying such countries for spurious reasons. This may be referred to as "political epidemiology" although developed world governments might never be restrained by such evidence.

We always consider epidemiology as a "responsible knowledge" that provides scientific evidence to prevent or control human health-related problems. For instance, epidemiological studies provide enough evidence on the adverse outcomes of smoking and try to appropriately transfer this evidence to the people. The rest is up to the people to quit smoking or not. Similarly, "political epidemiology" studies should provide and properly communicate enough evidence on the adverse outcomes of some certain governmental policies. The rest is up to the governments and the people.

It is worth mentioning that in the case of the relation between smoking and health-related problems; there are some scientists who would like to see more responsibilities from the epidemiologists by lobbying against the planting and manufacturing of tobacco (55). In the same way, I would like also to see the day when political epidemiologists as the responsible scientists lobby against some certain governmental policies that bring ill-health consequences for the people in every corner of the world.

As Dans and Dans just very recently have stated (52) "clinical epidemiology [or perhaps in the context of the present article, it is better to say that the whole science of epidemiology] is not always about exotic design and earth-shaking findings. It is as much about local needs in

poor countries around the world, and how local physicians [with the help of their colleagues in health and other sectors] find ways to address them."

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