The globalization of epidemiology: critical thoughts from Latin America

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Epidemiology in Latin America, as in the rest of the world, has been developed for the purpose of contributing towards understanding the causes and determinants of the phenomena of health and disease in specific contexts. However, in that continent it has specific characteristics.

Methods

The paper explores epidemiology in the Latin American continent, emphasizing on the one hand epidemiology as a knowledge-producing, scientific discipline, and on the other hand, epidemiology in *praxis*, with its firm commitment to contributing towards transforming the health of the population.

Results

It has been possible to identify at least eight idiosyncrasies that characterize epidemiology in Latin America. It is being forged with a strong connection to the evolution of the discipline in an international context; however, it has its feet firmly planted in reality, seeking to extract from that reality elements that may contribute towards diminishing the serious health problems in that society.

Conclusions

This paper presents a picture of the development of epidemiology in Latin America. It is very clear that as well as a lively, intense, intellectual debate, there is a frantic search for alternatives that will increase Latin American populations' possibilities of survival. However, one important aspect is that these two elements—theory and *praxis*—present consistent dialectic relationships and feedback; this is the main wealth of Latin American epidemiology.

Keywords

Epidemiology, Latin America, theory, praxis
In order to gain a perspective on epidemiology in this setting and at the present time, it is first necessary to understand the epidemiological scenario in Latin America. The coexistence of the so-called ‘diseases of underdevelopment’ and the ‘modern life diseases’ creates complex epidemiological patterns in which new problems are superimposed on the problems that already exist rather than replacing them. This increases the burden of disease and as a consequence increases the requirement for more resources to repair the damage.

Secondly, it is necessary to understand that preceding the superimposition of diseases there is a superimposition of risks in which the new risks are added to those already in existence. The chance of disease and health problems occurring increases as a result of the inability to solve various basic and structural problems (such as sanitation and habitation), of maintaining inadequate living conditions, of inadequate mechanisms regulating damage to the environment, unemployment, and the growing increase in tension in social relationships, etc. This occurs within the context of immense social and health inequalities.

Any analysis of the health standards prevalent in Latin American societies shows that important changes have occurred; however, not all have been positive, leading to contradictory sentiments of either satisfaction or dismay. A preliminary analysis of trends in global health standard indicators therefore highlights facts such as a significant increase in life expectancy with marked reductions in indicators such as child mortality and proportional mortality due to infectious diseases. This process, which has been apparent since the beginning of the 20th century and which intensified at the beginning of the 1950s, is evidence of significant improvements in the health of the population. On the other hand, the increase in problems such as violence, environmental, and occupational health-related problems, the reappearance of old problems such as dengue and cholera, the persistence of the old endemic diseases (tuberculosis, schistosomiasis, leishmaniosis, malaria, etc.), the increase in chronic and degenerative diseases (cancer, cardiovascular disease, etc.), together with general deficiencies in the healthcare system including a growing and unmet demand, are in stark contrast to the improvements that have been achieved. Such contrasts now require epidemiologists to make greater efforts and to carry out consistent analyses in order to understand this complex and paradoxical situation, together with its implications for policies for the protection, prevention, and promotion of health.

Epidemiology in Latin America has a rich and relatively recent history, which is still being built upon. However, over the last two or three decades, the speed of events relating to the development of the theoretical and applied aspects of the discipline in this continent have been impressive. Witness to this is the significant growth of its academic output and its increasing application in the health services. However, in line with the large social, economic, and historical differences between countries, in this specific field development is also very uneven.

To better understand recent developments in epidemiology in Latin America, it is necessary to emphasize the two distinct sides of the coin: on the one hand epidemiology as a knowledge-producing, scientific discipline in a state of constant upheaval in order to reaffirm its conceptual bases and refine its methods, and on the other hand, epidemiology in praxis, with its firm commitment to contributing towards transforming the health of the population.

To give some idea of the magnitude of this work, various indications of these changes are apparent in the field of epidemiological research. In Brazil alone, where data in this field is routinely collected, in 2000, there were 176 research groups with at least one line of research within the field of epidemiology—in total some 320 research topics involving 813 researchers, 422 of whom have doctorates. There can therefore be no doubt that a respectable scientific community with a reasonable degree of maturity exists as shown by its scientific output which is steadily increasing in quantity and quality. This growth is repeated in the area of epidemiology applied to the health services. Epidemiology services or national epidemiological centres exist as part of the organization of Departments of Health of many countries. Today there are thousands of professional epidemiologists working in the health systems of various countries, including a large number with high-level academic training. The strong link between academic and applied epidemiology is one of the major characteristics of epidemiology in Latin America which will develop further in the future. One demonstration of this is the fact that in addition to Latin American and Ibero-American meetings, epidemiologists’ meetings occur in several countries. For example, in Brazil, The Brazilian Congress of Epidemiology occurs every 3 years; the last one, in 2001, attracted more than 3000 participants. Several public health and epidemiological scientific journals are now published in different countries.

Further reflection on this point must be focused on the basic essentials for the development of epidemiology in this continent. In order to consider these points, one must ask what motivations have inspired the work of this immense group of researchers and professionals, who simultaneously work in epidemiology and develop it further in their daily activities whether in the universities or in the health services. What are the specifics of Latin American epidemiology and on what bases are the processes of growth and development built?

The two faces of epidemiology, science and practice, give rise to two perspectives: a scientific perspective, which is by nature universal, diffuse, and abstract, and the in praxis perspective, which is local, focused, and concrete. The establishment of consistent dialectic relations between scientific activity and praxis is applied in concrete contexts. I believe that from this relationship, at times a confrontation, it becomes possible to extract the specificities of epidemiology in any place in the world in which it is being carried out, including Latin America.

The fundamentals of epidemiology in Latin America

It is possible to identify at least eight idiosyncrasies that characterize the development of epidemiology in Latin America, some of which occur in other places as well.

Strong epidemiological traditions of the developed world

Epidemiology in Latin America has been greatly influenced by the best methodological traditions of epidemiology practised in the academic centres of developed countries. Several of us have had the opportunity to study or to interact with academic and scientific centres of the best academic calibre in Europe and in the US. One fact in itself is sufficient to demonstrate the importance of this: in Brazil in the 1980s and 1990s at least 84 Brazilian
epidemiologists obtained their doctorates in Europe or in the US. Today, these doctors work in academic centres and in groups carrying out epidemiological research and training in Brazil, many of them in leadership positions. Study designs and complex analyses involving the most up-to-date methodological resources in epidemiological investigation are currently being utilized in many Latin American countries. If these efforts are limited it is primarily due to financial constraints and not to any lack of ability to carry out the work. 

Epidemiology as a social and political issue
Epidemiology in Latin America was developed and has constantly confirmed itself as being part of the larger movement of social medicine or collective health. Using these as references, its social and political sense has been amplified to share the utopias and principles of humanism and the social and ethical justice that has guided it throughout the ages. It seeks to articulate its rationality and scientific objectivity with the whole complex reality of the sanitary conditions in Latin America and is thus pressed to concentrate its forces on priority subjects with regard to the health of the population and to increase its commitment to seeking solutions.

From epidemiological theory to practice
Epidemiology in Latin America has been constructed with a clear awareness that its historical role included a commitment to transforming the health of the population. This implies the construction of a theoretical basis that includes the health—sickness—care process as part of the social organization, and as a consequence it is unthinkable that changes in health will occur without major changes at a societal level. Therefore, alongside a need at the conceptual level to understand sickness and health as two sides of a dialectic process that is part of the social context and not as isolated entities, there is also an attempt to stimulate a practical approach leading to the transformation of the existing situation.

Epidemiology uncovering the inequalities in health
Epidemiology in Latin America has been developed under the strong influence of the concept of social determination of diseases, originating from the fruitful traditions of 19th century European medical-social research, which in Latin America underwent intense development from the 1970s onwards, obviously updated in time and context. In this continent, at the time devastated by harsh dictatorships, by immense social inequalities, and by the abject poverty in which a large part of the population lived and still lives to this day, epidemiology was and continues to be an important means of revealing the iniquitous social and health situation that still prevails. Above all, however, epidemiology has taken on the task of rebuilding lost links with respect to the role of the form of societal organization in the determination of diseases. Beside these structuralist visions, the importance of the cultural and day-to-day dimensions in the theoretical models has grown in importance in recent times.

Epidemiological transition and modernization
Epidemiology in Latin America has taken some ideas from the original theory of epidemiological transition and reconstructed them. This so-called theory was derived from the conservative idea of inexorable phases of social and economic development in peripheral countries, which reproduced the phases of development experienced in core countries. In the health area, it was believed that modernization meant precise, linear phases that would lead us to a world free first of all from infectious disease and later perhaps free from disease in general. The peripheral countries would merely follow the core countries in these supposedly fixed and unavoidable steps. Connecting their criticism with the debates taking place in the fields of social sciences and economy, which exposed the relations of dependency and exploitation between core and peripheral countries, enabled some epidemiologists to denounce the negative effects of this belief in linear and ethnocentric principles contained in the theory of transition and to foresee the damaging effects of globalization and neoliberal politics on Latin America. It allowed them to predict that the overall picture of health conditions, already showing progress in some areas, would become worse in many others, such as in the re-emergence of infectious diseases and in the increase in violence.

Understanding what epidemiological knowledge means
Latin America has been successful in generating a very special body of individuals within the body of the epidemiological community, hybrid epidemiologist–epistemologists who have contributed with important considerations on epidemiology as a scientific discipline and with regard to the relationships established with other sciences and fields of practice within our context. This has amplified our capacity to understand not only the historical sense of our discipline but also our roles as social actors in its construction. Epidemiological reflections on subjects such as: cause, determination and risk, the relationship between the individual and society, the relationship between epidemiological knowledge and sanitary practices, among others, have been published in Latin American epidemiological literature since the 1970s.

Transdisciplinarity
In Latin America, epidemiology has been building a framework for and the radical practice of transdisciplinarity that, taken to its ultimate conclusion, has permitted convergence and dialogue between epidemiology and various other disciplinary fields. Latin American epidemiologists therefore have ample, effectively transdisciplinary areas of contact open to them that transcend their traditional partners, such as statisticians and clinicians, to include new, no less important partners: sociologists, anthropologists, economists, geographers, philosophers, bioengineers, toxicologists, molecular biologists, and mathematicians, among others. This process, which is only just beginning, will certainly lead to significant consequences for the future of epidemiology. As in other parts of the world, Latin American epidemiologists, having understood how complex and multifaceted the objectives of epidemiology are, have slowly begun to rebuild its paradigms and methods, an effort which will surely extend across the borders of the present...
disciplinary frontiers and which will be fed by this trans-
disciplinary exercise. One important aspect worth noting is that
several Latin American epidemiologists have developed their
work on health conditions and their causes with no exclusive
compromise with the quantitative methodologies. For a long
time, the use of non-quantitative methodologies has been
acceptable to Latin American epidemiologists.20,30–32

The mission of epidemiology
Finally, it must draw attention to one aspect, which, despite its
subjective nature cannot be underestimated. Something that goes
beyond the apparent rationalism and objectivity of a scientific
discipline. In Latin America, whether in services or in academia,
there is a sense of mission and of commitment among epidemi-
ologists, creating a clear feeling of urgency to overcome historical
cycles and phases not yet conquered in Latin America process
of social and sanitary development. At the present time this
may seem strange, at least to some, but it is not in conflict with
the historical traditions of epidemiology. One needs only to
remember that epidemiology was conceived to confront concrete
health problems and we, Latin American epidemiologists, have
principally accepted the challenge to overcome these problems.33

Trends
In summing up, we can say that epidemiology in Latin America,
more than in most of the developed world, is being forged with
a strong connection on the one hand to evolution of the
discipline in an international context, as should occur in any
scientific discipline that seeks to achieve maturity. On the other
hand it has its feet firmly planted in reality, seeking to extract
from that reality elements that may contribute towards
diminishing the serious health problems in that society. In
dealing with the process of the production of knowledge and
the refinement of its concepts, models, and methods, there is
a need for dialogue with other disciplinary fields able to
contribute to making this happen. In addressing the knowledge
and transformation of a concrete health reality, it is necessary to
develop a practical approach that involves it within a given
social and sanitary reality, a process that is first of all political.
The refinement of the paradigms of this model of knowledge–
action represents one of the challenges for the new stages of
epidemiological development.

Moving from knowledge to action
Two interdependent and not always clearly outlined spaces are
thus defined, knowledge and action. Simultaneously we have
epidemiology as a scientific discipline (that studies health,
disease, and its determinants) and as a professional area of
collective health (which produces and analyses information,
develops technology, and prevention strategies). In the tension
that exists between scientific discipline and professional field,
epidemiology in Latin America offers its disciples, regardless
of where they are, the dialectic challenges between theory
and praxis, between dreaming and fulfilling that dream,
between utopia and reality, between the technical and the
political.7

As an example of a relevant issue in the Latin American
epidemiological literature development and which could also be
relevant to the international debate on this topic are approaches
related to the social determinants of disease. A recent and
extensive review of studies on this topic showed that the total
number of such studies, empirical or conceptual, has grown
exponentially in the last 30 years.34 This showed that an
intricate, sophisticated network of knowledge has been built up
around this theme, which supports an important debate based
not only on empirical studies but also on different theoretical-
conceptual approaches.

Alongside these debates, extensive scientific output is ongoing,
as can be seen from the growing number of journals, books, and
scientific meetings in the area of epidemiology throughout Latin
America. By studying health conditions and their determinants,
many epidemiologists have sought to contribute towards an
understanding of the transitional phase in which Latin America
currently finds itself. In addition to fundamental questions such
as inequality, which now include dimensions of gender and
ethnicity, topics such as violence and its impact on health,
problems of malnutrition and obesity, which today exist side
by side, the chronic diseases in this context, the sum of environ-
mental problems of different origins, such as: pollution by
agricultural pesticides, industrial pollution and the inadequate
sanitary conditions prevalent in both rural and urban areas, have
been in the agenda of Latin America epidemiology.

The case of the dengue epidemic, which is spreading all over
Latin America in the last decade, is paradigmatic.34 Aedes
aegypti, the mosquito that acts as vector of the dengue virus, has
been extremely efficient in adapting itself to the deteriorated
urban surroundings and to the habits and customs that have
developed in our cities. In this case, biomedicine has so far been
unable to offer us anything concrete for its control. There are
no vaccines or efficient drugs and the preventive measures
available, which are aimed at using chemical control to
eliminate its transmitter, A. aegypti, have proven to be expensive
and largely ineffective. It remains for us to implement a strategy
for confronting the problem, not only on a biological basis but
also on the socio-environmental and cultural context. In other
words, as a last resort we need to reorganize and apply the
proposals that epidemiological knowledge and public health
have been building throughout decades based on the
information and mobilization of society and the cleanliness of
surroundings. However, our public health systems, with their
dependence on the biomedical interventions, have had diffi-
culties in implementing such options. However, as consequence
of public awareness, which has increased in parallel with the
increase in the number of cases of severe dengue haemorrhagic
fever, public health measures have sometimes been imple-
menced. These have included environmental measures taken
directly by State health agencies or by mobilization of the
population to actively participate in it.

In a situation of great technological dependence, the high cost
of transfer of such technologies, the low effectiveness of a
significant part of them, associated with the low ethical profiles
present in this process of transference, a theme of growing
relevance to Latin American epidemiologists has been the
evaluation of technology, programmes, and health services.35–37
This demonstrates both their immense effort to put their
academic activities into practice and their commitment to
contribute to a fairer and more effective health system that
would use the sparse resources available more efficiently.
Protecting the health of the population

Another no less important area and one linked in certain aspects to the previous one, is the efforts made by epidemiologists to strengthen a series of regulatory activities, classically defined as being the role of the State. In the modern world, one of the functions the State is supposed to accomplish is to regulate a numerous and complex series of vital parameters, many of which have implications for health: pollutants, food additives, various insecticides, radiation, etc. In developed countries a series of agencies has therefore been established in the areas of medication, food, environment, work, etc. to establish parameters to reduce negative effects on health. Epidemiological knowledge has been fundamental in many of the decisions taken by these agencies to establish parameters and tolerance levels. However, even in these countries, when seen from the perspective of the population suffering from such effects, such regulatory activities have been shown to be insufficient. Technical, scientific, and political difficulties have been offered to justify these insufficiencies. Now consider the same situation in the context of peripheral countries. In the process of globalization and in the implementation of neoliberal politics, large corporations and governments have tried to discourage these regulatory activities that belong to the State. In Latin America, civil society, with its diverse popular and scientific organizations, has to play a leading role in the struggle to put pressure on States to force them to carry out regulatory activities and to implement policies to reduce the existing risks to the great majority of the population caused by inadequate economic and social policies. In this context, the epidemiological information produced in academic centres gains great relevance for these actions and epidemiologists become important contributors to these movements.

Conclusion

This paper has presented a picture of the development of epidemiology in Latin America. It is very clear that as well as a lively, intense, intellectual debate, there is a frantic search for alternatives that will increase our populations’ possibilities of survival. However, one important aspect is that these two elements—theory and practice—present consistent dialectic relationships and feedbacks; this is the main wealth of Latin American epidemiology. However, it must not be forgotten that to be scientifically productive and to generate consistent, solid results in the long-term, all this requires complex political architecture whose mentors are our national and continental associations of public health or epidemiology.

References


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