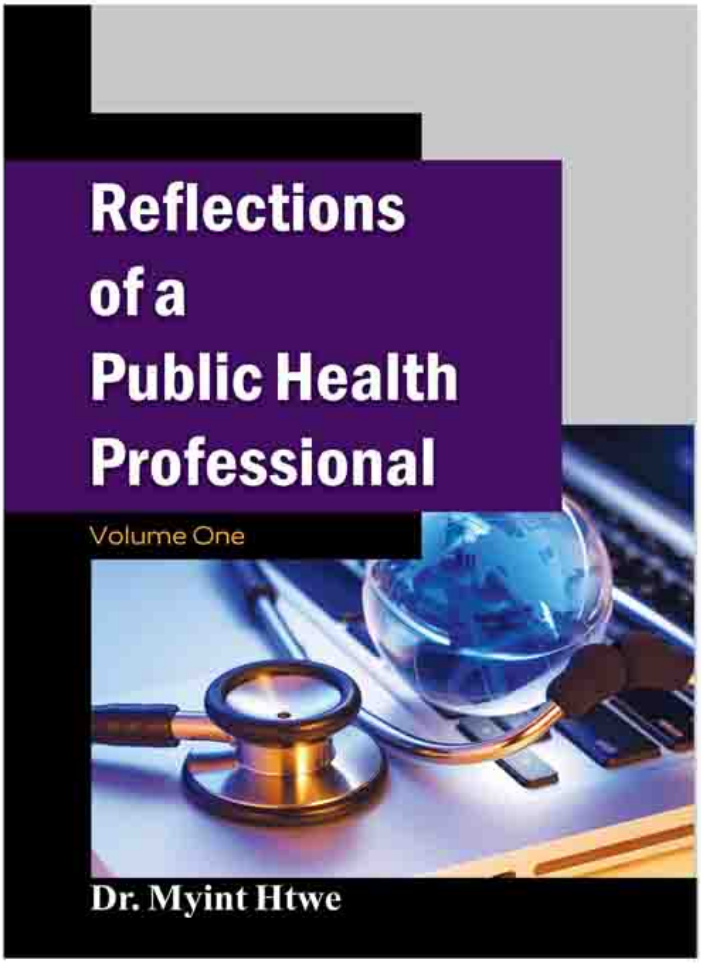
Epidemiological Methods for Policy Analysis



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18. Epidemiological methods for policy analysis

(This article is based on the background paper prepared by the author, then Regional Adviser on Medical Research, WHO-SEARO, for the meeting of WHO Scientific Working Group (SWG) on Formulation of National Health Research Policies and Strategies, Jakarta, Indonesia, 6-8 December 1999 (SEA-RES-112).

Policy makers require information on the current and future scenario of the health status of the population and its determinants and trends. In addition, the likely implications of policy interactions, i.e., *health policy versus health research policy versus development policies* (housing policy, energy policy, agricultural policy, industrial policy) need to be exposed for detailed review. Generation of this information and its concomitant analysis can be facilitated by the use of methods and principles from several social science disciplines as well as biological and medical science especially epidemiology (e.g., social epidemiology, clinical epidemiology). The purpose of this article is a sincere attempt to explore various epidemiologic methods that can be applied as well as their indications and caveats.

Policy analysis is usually based on analysis of information on existing research findings, expert judgement and even outcome of studies using modeling techniques (Shortell and Solomon, 1982). Epidemiologic methods are very useful in looking into each step of the policy cycle or policy process. Basically, there are four stages in policy process (Walt, 1994). These are:

(i) problem identification and issues recognition;
(ii) policy formulation;
(iii) policy implementation; and
(iv) policy evaluation.

Several cyclical models with varying number of steps are also available. It is important to mention that policy making is not always a linear process. It may have different feedback loops in the policy cycle or process.

How the epidemiologic methods can contribute in policy formulation was aptly explained by Ruwaard et al (1994). He mentioned that the conceptual model for policy making has four interrelated nodal points, i.e., (i) autonomous developments (ii) health policy (iii) determinants and (iv) health status. Each nodal point can be further explored by using epidemiologic techniques.

It is to be noted that there is often a time lag before the results of epidemiologic analysis can exert some influence on health policy. It may take five to ten years before such policy (decisions) can be evaluated (Holland & Wainwright, 1979). In the long-term perspective, epidemiologists need to recognize the existing policy system and adapt their work to the system.

Epidemiologic methods are applied as part of policy analysis

Epidemiologic methods can be applied on the following situations, which are inherent in the policy cycle (Spasoff, 1999):

(i) *Assessing the health status of the population, through conceptualization and measurement of health – an essential impact indicator to assess the effectiveness of the health policy.*

(ii) *Assessing health needs and risks and to cross-reference with the existing policies (health and research) and strategies – an indicator to show whether health policy is addressing the problems or issues facing the people.*

(iii) *Studying the population-level determinants in the context of the existing policy – an indicator necessary for readjustment of existing policy.*

(iv) *Evaluating and synthesizing evidence regarding potential interventions (successes and failures) in relation to the strategies proposed according*

to the policy – an indicator to elucidate whether the current policy together with its inherent strategies and interventions is acceptable in light of the prevailing scenario.

(v) Analyzing differential effects of various interventions in relation to the strategies proposed according to the policy – an indicator to be used in modifying the existing policy, i.e., retrograde analysis.

(vi) Evaluating the objectives in policy implementation especially in the context of rational allocation of resources – an indicator for overall review for policy change.

(vii) Evaluating geographic variations in health status and health system performances and pinpointing the necessity for policy review – an indicator for policy change in the context of geographic consideration.

The above are some of the issues related to policy process which can be dealt with by conducting research using various epidemiologic methods. Epidemiologic methods refer to a wide range of techniques drawn from various disciplines in science. Both descriptive and analytical epidemiology play important roles in the policy cycle or policy process review.

Caveats in using epidemiologic techniques

One needs to be careful in adapting the results of analytical epidemiologic research. Applying the results *in toto* or without any modification may lead to policy failure because analytical epidemiology is usually conducted in carefully selected situations. (Spasoff, 1999). Careful attention should be given when applying the results of mathematical models. It can be said that the most complicated mathematical models are really simplistic when compared to social and biological realities (Stallones, 1980). The more complicated the mathematical models, the more assumptions have to be made. At times, the assumptions may not hold true in real situations.

Sometimes it is difficult to convince the policy makers regarding the findings of epidemiologic research pertaining to policy. It may be due to several reasons. One simple example may be they are too subjective to the power of private or vested interest (Terris, 1980). More often than not, it is difficult to address the questions for analysis or the epidemiologists do not address specific questions for which policy makers need answers. It may take too long to do the work and they do not promulgate the results in avenues or in a manner that policy makers can discern and understand (Spasoff, 1999).

When population health data are interpreted in the context of existing policy, the following issues must be taken into account (Rosen, 1985):

(i) Strength of association with the determinants;
(ii) Regional variation and pattern;
(iii) Data quality;
(iv) Consistency with other indicators;
(v) Consistency with risk factors;
(vi) Trend analysis; and
(vii) Consistency with results of other independent studies and with experiences of local health personnel.

It would be prudent not to make policy recommendations based on the results of one study. Because, the health status of the population or performance of the health system is the outcome of interactions of a multitude of attributes, such as various types of policy, social and cultural characteristics of the population. There is a basic difference in opinion seeking pattern between policy makers and epidemiologists. Health policy makers need clear-cut advice and answers based on the available information. Epidemiologists prefer interval estimates instead of simple answers or yes or no decisions (Spasoff, 1999). A compromise should be reached in order to narrow the gap in this issue.

Basic epidemiologic tools that can be applied in so-called policy epidemiology and policy analysis (Spasoff 1999)

These methods (not exhaustive) are:

(i) Demographic methods;

(ii) Natality, fertility, morbidity and mortality expressions or indicators;

(iii) Life table analysis (survivor analysis, potential years of life lost – PYLL, disability adjusted life years – DALYs, quality adjusted life years – QALYs, quality adjusted life expectancy – QALE, or health adjusted life expectancy – HALE);

(iv) Epidemiologic indicators of effect;

(v) Indicators of association: relative risk (RR), attributable risk (AR), population attributable risk (PAR), odds ratio (OR);

(vi) Various types of epidemiologic study design (cohort, case control, cross-sectional studies);

(vii) Methods used in economic burden of ill health (Direct cost: cost of health care, Indirect cost: cost due to morbidity and premature mortality);

(viii) Methods used in health need assessment in the context of health policy;

(ix) Risk and risk assessment methods, environmental risk assessment, behavioural risk assessment, etc.;

(x) Methods used in assessing causes of health problems;

(xi) Ecological studies where individual level analysis or completely ecologic analysis can be made. However, it is fraught with many methodological problems;

(xii) Methods used in assessment of potential intervention (randomized controlled trials, community intervention trials);

(xiii) Synthesizing evidence (systematic reviews and meta-analysis);

(xiv) Methods used in assessing suitability for policy (efficacy, effectiveness, applicability, efficiency, feasibility, potential coverage); and

(xv) Various research designs for evaluation of health interventions

Conclusion

The task of policy analysis using epidemiologic methods is exceedingly complex. Interpretation of results and overall inference should be given very carefully taking into consideration all assumptions made as well as emerging unexpected situations. This is because today's health problem is a measurable set of people's responses and views to contemporary environments which are inherently linked with the prevailing policies of the country. The ultimate aim of policy analysis using epidemiologic methods is to achieve "evidence-based policy making" (Muir Gray, 1997) through the process of enlightening the policy makers. The most important and difficult final lap in the whole process of policy analysis is how to present the findings to the policy makers. If it is too technical, the findings will be set aside by the policy makers and no progress can be made. Therefore, simple policy briefs supported by strong documentary evidence are preferable.

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