

Application of PHEL - 'Public Health Epidemiological Logic' of Public Health Intervention and Public Health Impact

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ABSTRACT

There is a growing tendency where medicalization of public health through mass therapeutics and secondary preventive measures are being substituted for primary preventive activity. Scaled-up mass therapeutic intervention in the community is being confused with public health intervention. The objective of this paper is to provide a broad public health and epidemiological criteria for public health intervention and public health impact

Keywords: Epidemiology, public health impact, public health intervention, primary prevention

INTRODUCTION

One cannot achieve public health impact merely by reduction in prevalence and reduction of mortality. The reduction in the prevalence and mortality rates need necessarily to be mediated through reduction in incidence to achieve public health impact. The goal of public health at individual level is to lower the probability healthy individual becoming diseased and at community level is to reduce the incidence of disease i.e., prevent emergence of new cases of disease in the community. Therapeutic medicine focuses on old 'prevalent' diseased cases and strives to prevent deterioration and complications in the sick individuals. Secondary prevention only achieves the reduction in the probability of death but no amount of such intervention even with 100% coverage of all the diseases among individuals succeed to give any public health impact except for reduction in the prevalence of disease in question.

In infectious diseases, the clinical treatment of patients would have a public health impact i.e. decline in disease incidence only if the disease in question is a communicable disease and there are chances of man-to-man transmission. In non-communicable diseases, strategies to achieve public health should aim at prevention of onset of risk factor through primordial prevention. Efforts should also be made for modification of existing risk factor through population-based strategies to shift the population distribution of risk exposure than undue emphasis in high risk strategy.

Public health as the name suggests is all about targeting the population and not an individual. It is an incredible way but we

confuse the clinical interventions to the preventive and promotive intervention.^[1] Mass therapeutics among population is essentially a clinical intervention scaled from individual to group of individuals, which does not make it a public health intervention.

CURATIVE SERVICE SHOULD COMPLEMENT AND NOT SUBSTITUTE ONGOING PREVENTIVE SERVICES IN PUBLIC HEALTH MANAGEMENT

Generally, all our interventions at the community level would have a public health goal of lowering morbidity and mortality. The fundamentals of public health and epidemiological principles on which such interventions are based should strive towards attaining those goals. Public health program managers often tend to get over-involved in organizing curative activities for curing the diseased individuals in the community, at the expense of their primary duty of protecting, preserving, and promoting the health of the individuals in the community through a public health approach.^[2] The pressures on public health program officers to work toward lowering the disease load is understandable due to the periodic reporting on the number of cases to higher authorities and the media glare associated with it. This often leads them to over-emphasize on treating the diseased individuals either individually or through mass therapeutics. It is important that public health program officers should get the primary preventive activities initiated parallel to the curative services.^[3] Care should be taken that primary preventive measures in the community should not be neglected.^[4]

MASS DRUG/THERAPEUTIC ADMINISTRATION IS NOT ALWAYS A PUBLIC HEALTH INTERVENTION

Essentially the clinical intervention carried on an individual or on the population level falls under the secondary prevention category. When clinical interventions are carried out in large scale at the community level, it gives a false impression of it being a public health intervention when it in fact is only a therapeutic intervention

(secondary prevention) carried out on the population level. Secondary prevention achieves only the reduction in the probability of death, but no amount of such intervention even with a 100% coverage of all the diseased individuals, will ever give any public health impact, except for reduction in the prevalence of disease in question.

This tendency to medicalize the public health probably draws its influence from the growing trend in practice of clinical medicine where non-medical conditions are increasingly being medicalized e.g., menopause, normal pregnancy, infertility, ADHD, erectile dysfunction, etc. Over the last several decades, these conditions have come to be defined and treated as medical problems, as they've been completely medicalized.^[5]

We see the increasing tendency of public health program officer to encroach into secondary prevention at the cost of neglecting primary prevention, which is a demonstration of escapist attitude or at the worst ignorance of basic fundamentals of public health.

There is absolutely no need for a public health personnel to encroach into a secondary prevention activity, at the cost of neglecting their primary prevention duties. The escapist attitude is demonstrated by the public health program officers in majority of the disease control programs. For example in rabies control, the typical alibi given is that it is difficult to control dog menace, instead one might as well provide pre-exposure rabies vaccine in the community. The same mindset would lead to an increasing medicalization of public health^[6-8] e.g., in diarrhea control programs there would be an over-emphasis on distribution of ORS packets to all children, because taking primary preventive measures like providing safe drinking water and environmental sanitation in community is difficult. In control of malnutrition it is argued that logistically it may be much easier to procure and distribute therapeutic food to a fewer malnourished children, than providing a mid-day meal program to all the children. One can witness advocacy for prophylactic prescription of aspirin to all adults for prevention of CVD because the lifestyle changes needed are difficult to achieve. Similarly one can witness a focus on converting and upgrading all PHCs into a basic emergency obstetric care to manage the maternal mortality rather than providing good reproductive health

services in the community. There are arguments for creating more and more intensive neonatal care units rather than provisions of good child health services at community outreach services. All of these are demonstration of same escapist attitude. To rationalize only mass therapeutic measures, it is argued that mass drug administration in itself is a public health measure as has been in vogue in the control of malaria, filaria and tuberculosis (TB). The point that this argument misses is that mere administration of drugs to the masses is not public health, however, it is at best mass therapeutics. From public health point of view exclusive reliance on therapeutic services without concurrent preventive services is akin to providing first aid to the sick without following it up with correct and appropriate treatment in the clinical medicine. It is important to develop some broad-based public health criteria that constitutes of a public health intervention.

An intervention increases its likelihood of being a public health intervention if it passes the PHEL test,^[9] and if it accomplishes all of the following:

- Prevention of disease at an individual level.
- Prevention of disease at community level.
- Has a definite public health impact—by impacting on disease epidemiology in the community.

PHEL—“PUBLIC HEALTH EPIDEMIOLOGICAL LOGIC” OF PUBLIC HEALTH INTERVENTION

It is important to remember that any intervention carried out at a large scale level does not automatically qualifies itself as a public health intervention level just because ‘public’ is involved. A mass drug therapy in malaria or filariasis becomes a public health intervention not because they are being administered at the mass level but because of its inherent public health rationale and that it has the sanctity of public health epidemiological logic to back it.

If economics and logistics hurdles are overcome, one may argue that a mass drug therapy administration covering all the existing cases of diseased individuals in the community, does help in bringing down the prevalence and the mortality rate. Reduction in prevalence of a given disease and its mortality rate in general and case fatality ratio

in particular through mass therapeutics is argued to help in accomplishing end points of public health goal, and that of bringing down disease burden and mortality in the community. Now it is pertinent here to point out, that in public health or for that matter in any discipline based on a strong logical base, attainment of end point is not the ultimate achievement, but rather the means with which the end point is achieved, that is where the spirit of the scientific temper comes alive. One cannot achieve a public health impact by mere curing the existing cases and reducing the case fatality rate through good clinical management and thereby reducing the prevalence of that disease in the community.

Reduction in prevalence and reduction in the mortality rate should be the good collateral benefits of public health interventions but they should not by themselves be the only end points of public health intervention. In public health scheme of things, the reduction in the prevalence and mortality rates need not necessarily be preceded by reduction in incidence of the disease. In short, reduction in prevalence and mortality should be resultant to the decreased incidence of disease.

At this point we need to differentiate the goals of a therapeutic clinical intervention with the public health intervention:

AT INDIVIDUAL LEVEL

The goal of a therapeutic intervention is to control the disease advancement in the sick individual and to lower the probability of complications and death. On the other hand the goal of the public health is to lower the probability of a healthy individual becoming diseased.

AT COMMUNITY LEVEL

The clinical medicine by its very nature is a highly individualized approach, hence there is no overtly stated community level goal, however there is certainly a fringe benefit of clinical management of cases for public health in reduction of prevalence of diseases by curing the diseased individuals. On the other hand, the goal of the public health is to reduce the incidence of the disease i.e., prevent emergence of new cases of diseases in the community.

The point to be noted here is that while both public health and clinical medicine work toward

attaining the common goal of reduction of disease among individuals as well as in the community, their focus and approach in attaining that goal is contrastingly different, which is as follows:

- The public health focuses on healthy individuals and adopts primary prevention methods. The clinical medicine on the other hand focuses on sick individuals and adopts secondary prevention methods.
- At community level, public health strives to prevent emergence of new ‘incident’ cases among healthy communities, whereas therapeutic medicine focuses on old ‘prevalent’ diseased cases to prevent deterioration and complications in the sick individual.

Of course, treating a sick individual is a form of prevention of progression of disease, which is a secondary prevention, and the rehabilitative care of the diseased is a form of tertiary care. Hence it may be argued that even the curative service are rendering preventive roles. However, primary prevention takes precedence over secondary and tertiary prevention essentially because primary prevention aims at preventing healthy individuals into becoming diseased individuals. Public health by its very nature focuses exclusively on primary prevention whereas clinical medicine focuses on secondary and tertiary prevention.^[10] It must be agreed that the moment a healthy individual becomes sick, it’s a failure of the preventive efforts.

PHEL—“PUBLIC HEALTH EPIDEMIOLOGICAL LOGIC” OF PUBLIC HEALTH IMPACT

The overall goal of public health is to have an impact on the disease epidemiology, which ultimately aims at disease control and elimination.

IN INFECTIOUS DISEASES

The clinical treatment of individual patients suffering from infectious diseases would have a public health impact (decline in disease incidence) only if 3 of the following conditions apply:

- The disease is infectious in nature
- Existence of man-to-man transmission
- Case detection and treatment of 80% existing (prevalent) cases will interrupt infection cycle

in the community thereby leading to reduction in the incidence rate of the disease in the community.

In this case, public health intervention by means of treating the existing cases (i.e., only secondary prevention) covering majority of sick individuals suffering from the particular infectious disease would result in a demonstrable public health impact i.e., reduction in incidence of the disease. In stark contrast, exclusive treatment of infectious diseases that do not have man-to-man transmission would at the most only result in the reduction in prevalence and would not have any impact on the incidence of the disease even if a 100% case detection and cure is attained.

Pulmonary TB, definitely satisfies the above 3 conditions, hence exclusively secondary prevention as a public health strategy would have a public health impact. Hence exclusive reliance on patient therapeutics strategies like treatment and cure of TB patients without organized preventive activities in TB program would have a public health impact.

On the contrary, treating and curing an extra-pulmonary TB case may have a good clinical impact in terms of saving the life of the patient at an individual level, but it would not have a public health impact. Even if the program achieves a high case detection and a cure rate nearing a 100% coverage, it would result only in the reduction in prevalence but would have absolutely no change in the incidence rate of the disease in the community due to the absence of man-to-man transmission. It should be remembered that the primary goal of the public health is the reduction in the incidence rate and not just the prevalence in the community. The reduction of prevalence should be as a result of reduction of the incidence rate and not independent of incidence.

IN NON-COMMUNICABLE DISEASES

The non-communicable disease epidemiology and their control is not just about identifying the risk factors for diseases but also evaluating the control measures or the public health interventions to reduce or eliminate the effect of these risk factors. It is therefore important to be able to predict the impact of removing a particular

exposure (or risk factor) on the incidence of disease in the population. This information can help policymakers decide on how to best allocate the resources to ensure the most beneficial impact on public health.^[11]

Many diseases are caused by multiple causations. For example, congenital malformation at birth may be caused by exposure to radiation, viral infection or genetic predisposition e.g., consanguineous marriages. In order to assess the potential public health impact of advocacy to discourage consanguineous marriage as a strategy on the incidence of congenital malformation, one would require to quantify the disease burden associated specifically with consanguineous marriages.

COMPONENTS IN ACHIEVING PUBLIC HEALTH IMPACT

In a public health research, measures of impact could be obtained by arriving at quantum of the disease that can be attributed to a given exposure or risk factor and whether elimination or reduction of that risk factor would lead to proportionate the reduction of the disease linked to that particular exposure. Public health impact is a policy tool to devise health policy as it helps in quantifying the adverse impact on the 'at risk' population exposed to the given exposure and the overall population impact. Therefore public health impact of a given intervention should strive to achieve objectively the resultant decrease in the relative risk for acquiring the given disease in the exposed individuals and to reduce the prevalence of exposure in the given community. Any intervention in public health if it is effective could be demonstrated by lowering of population attributable risk, which indicates the reduction in disease burden that could be achieved if the risk factor was controlled or eliminated by effective preventive action.^[12]

Intervention strategies to achieve a public health impact in non-communicable diseases should aim at:

- Prevention of onset of risk factors through primordial prevention
- Modification of existing risk factors through population based strategies to shift the population distribution of risk exposure than undue emphasis on high risk strategy.

PRIMARY PREVENTIVE MEASURE ACHIEVES GREATER PUBLIC HEALTH IMPACT

'High risk' strategy by very nature encourages medicalization of public health by concentrating on interventions on individuals who are at the highest risk of developing a disease. Public health professionals are concerned that an uncritical embracing of 'high risk' strategies would displace more effective strategies that aim to shift the population distributions of risk exposures, for example by reducing the population prevalence of cigarette smoking, per capita alcohol consumption, average blood pressure, or the consumption of energy-dense foods. Population-based tobacco control strategies, such as taxing cigarettes and reducing opportunities to smoke, had brought down cigarette smoking rates. These population-based strategies are more efficient than high-risk strategies because fewer resources are needed. There are similar arguments for the greater efficiency of population-based strategies in reducing risky alcohol use, obesity and diabetes. These strategies aim to reduce population access to cheap energy-dense foods and increase opportunities to exercise. Based on the successful experiences in tobacco control, such strategies would probably include: Increased taxes on, reductions in the promotion of, and decreased availability of, energy-dense foods; and redesigning urban environments to reduce sedentary behavior and increase opportunities for incidental exercise in everyday life^[13]

BEHAVIORAL IMPACTS OF OVER-MEDICALIZATION OF PUBLIC HEALTH

Over-emphasis on therapeutic intervention at the cost of primary preventive measures may have a major adverse impact on inclination by the individuals in adopting a positive healthy behavior and amending their lifestyles. The knowledge of availability of a pill for every illness would give an at risk individual a false sense of insurance. Public health professionals are expected to be preservers of health. Hence their activities should be focused at the community level so that the individuals don't fall sick.

As a public health professional our mandate is to intervene before the infectious agent/risk factor sets into a susceptible host. Even if the infectious agent/risk factor manages to get in contact with the host, all efforts of public intervention at this stage should focus on altering the susceptibility of the host to such a level that infectious agents are repelled or vanquished or at the least the risk of developing the disease is reduced significantly.

CONCLUSIONS

In a larger sense, one should dwell on the very role and scope of public health. It is disturbing to note that we are confusing or rather ignoring the very foundations of preventive medicine while making public health recommendations. Therapeutic intervention in public health program should complement primary prevention activities and not substitute it.

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