Zdrowie Publiczne i Zarządzanie 2015; 13 (2): 135–140
www.ejournals.eu/Zdrowie-Publiczne-i-Zarzadzanie, doi:10.4467/20842627OZ.15.013.4316

The false dichotomy between prevention and treatment and why it needs to be addressed

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Abstract

The last decade has seen a substantial growth in health policies stressing the need for "prevention orientated" solutions over treatment provision as an approach to addressing health needs. Such an approach infers that there is a clear distinction between the two approaches and that a shift of resources from current care modalities, with their emphasis on addressing health needs through treatment orientated health services, to approaches that adopt interventions aimed at addressing problems before they arise, will provide better outcomes, not least in terms of use of resources. This paper argues that such an approach is too simplistic and fails to take account of the changing nature of health conditions affecting populations.
The major changes in the epidemiology of health conditions have seen a shift in emphasis away from acute to chronic disease problems. This alteration in the pattern of health conditions means that a key feature of health services is their re-orientation from eradication of illness to its management. The dichotomy between prevention and treatment of a particular condition is both inappropriate, indeed damaging in the debate on how to address health needs. Using examples from a number of elements of the health sector, the paper argues that there is a need to move away from interventions using a empirical base centering on prevention or treatment to one that adopts the idea of managing health conditions, the goal of which is the aim of reducing the impacts of the problem on individuals. Such an approach would allow a more constructive dialogue between all sectors involved in improving the health of society, not least ensuring that the economical aspects of policy making have a more sound base.

Key words: health needs, health policy, prevention

Słowa kluczowe: potrzeby zdrowotne, polityka zdrowotna, prewencja

Introduction

There is a growing emphasis on those responsible for health policy to adopt what has become termed 'a more preventative' approach. Examples of this include the WHO, the Nuffield Trust and the NHS [1, 2]. This orientation of policy towards what is termed prevention however is not limited to policy-making bodies but has found its way into all aspects of the health sector starting with undergraduate education. The central tenant in the argument is that care delivery systems that are focussed towards prevention provide a better use of resources, in many cases savings when compared to those with their emphasis on treatment. Indeed in a response to an accusation of being a 'bean counter' on a BBC Radio 4 programme, Cookson [3] answered his critics by identifying six points as to why he was indeed proud to be one. In defence of one of the points raised against him, he argues that: "Without effective prevention and diagnosis, health problems progress to become more harmful to the patient and more costly to the NHS".

The question that arises is whether this is true? In following the mantra that prevention is best, what exactly are the underlying assumptions being made and to what extent or under what conditions are they valid? For example, if a condition is short lived and the outcome quick, then an approach that prevents its onset may well be appropriate not least if a successful intervention is a single application and prevents future occurrences during an individual's life. Furthermore, if all people are susceptible to the problem an even stronger case can be made for the adoption of such an approach.

The maxim that prevention is better than cure has been first attributed to Desiderius Erasmus over 500 years ago. Since then, numerous authors have continued to argue that in health care, an approach that centres on prevention is more appropriate than one that treats the condition under consideration. However, there are a number of elements that help strengthen this argument that may not hold given changes in both diseases and people. While a 'preventative' approach may well have been valid given certain circumstances, not least when the conditions that the care system are trying to manage were acute in nature and the average life expectancy was shorter than today, these may no longer be valid. For example, our understanding of the epidemiology of disease problems has developed considerably, people are living far longer, new health problems are arising with the majority being long-term conditions. Furthermore, there is a growing recognition that the determinants of ill health lie in the majority outside of the care system. It is the environment that people live in, whether it be housing conditions, access to clean water and education or the qualities of food that impact on determining whether people suffer ill health, especially the acute conditions. Given these developments, there is a need to examine current orthodoxies, especially the dichotomy in thinking between prevention and treatment. This paper argues that such an approach is neither valid nor helpful and fails to take into account the changing epidemiology of diseases and how they impact on individuals and society as a whole.

One illustration of the issues raised above lies with the changes in oral health seen in the vast majority of countries, especially the developed nations. With the adoption of population-based fluoride containing vehicles, levels of decay have fallen considerably. Not only have levels of tooth decay declined but the rate at which it new disease occurs have also fallen. The condition has seen a change from acute to chronic. As a direct consequence people are keeping hold of more of the teeth and for longer. When combined with the increase in life expectancy, new problems are arising. Individuals are now losing what teeth remain later, but with the developments of other co-morbidities, for example dementia, their ability to adapt to the new circumstances have become far more difficult: their qualities of life and the impact of their oral condition is far more severe than if a more treatment focused approach have been adopted earlier.

The argument however is not to debate whether prevention is better or worse than treatment but simply to highlight that the dichotomy using the two approaches is too simplistic. The distinction between prevention and treatment is artificial. What exists is a spectrum of interventions formed at one end of the distribution by activities that are undertaken prior to changes that would be classified as disease while at the other to emergency treatment without which the individual would die.

For all health care systems, possible interventions lie within the extremes of the distribution. All interventions have some component that could be classified as preventive as without action, an individual's health would most likely deteriorate further. As such a better approach is to consider that all interventions are a combination of the two approaches and that the goal in identifying the 'better' solution lies in managing conditions to provide solutions that create minimal health impacts for individuals over their lifespan.

This paper argues for a rethink when assessing care modalities and is divided into four further sections. First, the changing nature of health and disease is outlined emphasizing the growing importance of chronic over acute diseases. The second section provides a more detailed outline of the issues that should be considered and the third section, why adoption of 'life course' epidemiology is critical to provide answers. Finally, a proposed framework for future work is provided.

The changing epidemiology of health and disease

The nature of human diseases has changed remarkably over a relatively short period of time. Omran [4] argued that there had been an epidemiologic transition in the latter third of the 20th century. The transition had seen the high burden of mortality from infectious diseases, primarily epidemic 'childhood' diseases such as pertussis and measles, replaced by one of chronic and non-communicable diseases (NCDs), such as cardiovascular disease, cancer, and diabetes.

Zuckerman et al. [5] expanded on the work by Omran offering reasons for the importance of this shift, not least suggesting that an understanding of epidemiologic transitions can benefit theory and practice in epidemiology using both acute and chronic diseases. They stressed that what they described as:

> (the) neat dichotomy between infections and NCDs is blurred by the chronic course of some infections, such as tuberculosis, and increasing recognition of the role of infection and inflammatory processes in many chronic conditions, such as cervical cancer and coronary heart disease.

The differences between acute and chronic disease are illustrated in **Figure 1**. For acute disease the onset is rapid, the impact of the condition is felt within a short period following its acquisition and the time period to recovery or death is short. For chronic disease the onset is a slow insidious process with a gradual increase in impact. Indeed for many chronic conditions, one of the major issues centres on identifying exactly when an individual is positive, i.e. has the condition, and should therefore start care.

The distinction between acute and chronic diseases needs to be made. The benefits arising from an intervention will vary considerably and are dependent upon a number of factors, not least the span over which any condition impacts. This is determined by two factors: the progression rate and life expectancy with the latter being unknown in any evaluation. As mentioned previously, there is also the critical issue of when does any condition become 'visible', i.e. begin to have a measurable impact on an individual? Even if the rate of the development of a condition remains the same, the overall health impacts will be greater the longer the condition is present.

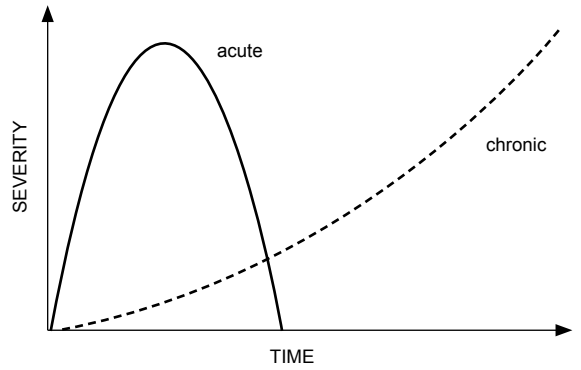

Figure 1. *Life course time lines for acute and chronic disease. Source: Own elaboration.*

The management of an acute condition is in many ways straightforward to define: the short period between onset and impact allows the quantification of various aspects of the measures that attempt to address the problems and the 'better' solutions to be made. These features of acute diseases have made the arguments for prevention over treatment easier to make: data will be available to show the context in which the approach can be justified. Such data are however not available or at best carry considerable caveats when considering chronic diseases. This creates a problem but a problem that need not exist if the approach moves away from 'either one or the other' approaches to a unified approach of managing the condition. When managing the condition, possible interventions are identified and an assessment made of the consequences with outcomes such as health impacts, not simply whether the condition is present or not.

The issues in identifying an approach

In the early 1980s Rose [6] started a debate regarding how best to reduce the health needs of a society using a 'preventive strategy'. He argued that the relative merits of what he termed a 'population approach', namely one in which every member of society received the intervention remained the most effective and efficient manner to achieve the goal of improved health compared to a more targeted one, i.e. proving the intervention to a sub section of the population, either groups, identified using a risk marker such as deprivation, or individuals. His argument was in part based on the idea that any individual is connected to the population and that attempts to improve health by simply tackling those identified with the largest risk score will have minimal impact on the population's health even if the intervention was successful.

This theory has been applied to a number of chronic conditions, including dental caries. For example Batchelor and Sheiham [7] have highlighted that if further improvements in oral health are to occur, the cornerstone of any approach must still remain centred on the adoption of a population-based approach despite the apparent polarisation of the disease: the majority of oral disease tends to be confined to a sub section of the population. Alternatives, including the 'high-risk' approach, the aforementioned identification of individuals whose history suggest that they are the most likely to suffer from future tooth decay, would not deal with the problem effectively. Perhaps most importantly the timing of the intervention to address the problem failed to recognise that simply because individuals at that moment did not have the problem would not mean this would remain the case into the future. The shift from acute to chronic is simply delaying the onset of the problem, not eradicating it. And, as with all chronic diseases, with time not only does the severity of the condition, and hence the impact, grow for the individual, but the number of individuals who develop the condition increases.

However the seductive nature of the individualistic approach continues to dominate thinking: the strong emphasis for interventions in practice settings and continued research efforts to seek improvements in the predictive abilities of risk markers highlight this belief. There has also been an acceptance that a population-based approach will continue if not actually increase the inequalities in disease experience. By implementing a population based approach, those already having the lowest disease experiences will continue to benefit to a greater extent than those with the higher disease experience.

Some of these issues have been challenged, for example McLaren et al. [8] highlighted that the likelihood of increasing inequalities was dependent upon whether the approach was structural, i.e. targets conditions in which behaviour occurs, or agentic, in which the target is behaviour change among individuals. While they recognised that continued scrutiny of Rose's theories was necessary as the epidemiology of a disease changed, the population strategy of prevention continued to hold merit in improving population health and reducing social inequalities. Indeed they argued that strategies of a radical nature actually have the potential to narrow them.

Zulman et al. [9] examined the role of a number of factors in influencing the arguments for a population or targeted approach. They concluded that:

> (...) a population-based approach can be an excellent option if an intervention has almost no adverse effects. But if the intervention has even a small degree of disutility, a targeted approach using multivariable risk prediction can prevent more morbidity and mortality while treating many fewer people.

The application of health economics to these approaches has been somewhat stilted. One exception has been Ahern et al. [10] who reported on the extent to which a population or targeted approach offered a more beneficial solution. When attempting to improve blood pressure, a population wide intervention had better benefit/cost ratios than targeted approaches but also highlighted the importance of understanding the relationship between the risk factors and health outcomes.

However, the dominant rhetoric in these discussions still centres on the battle of prevention versus treatment. What has not been debated is whether there is

a point at which the inefficiencies of prevention, namely the measures have to be enacted prior to the onset of the condition and all markers of future disease are imperfect, or because of other impacts and the development of comorbidities, alternative approaches would give better outcomes. This requires a longterm analysis of conditions: the 'life-course' approach.

Applying the 'life-course' approach to inform policy

The debate on prevention versus treatment ignores the timeframe in the development of any condition within the population. As mentioned previously simply because the condition at one age has not developed, does not mean that it would not appear later. The changing nature of health problems means that there is now a far greater burden of health problems arising from chronic diseases. When combined with an ageing population the management of the condition becomes of far greater significance: it is not about prevention of treatment approaches but the combination which is critical, not least how can the impacts arising from the condition be reduced.

To help provide a better understanding of the temporal relationship between factors and disease, life course epidemiology has evolved. Kuh et al. [11] defined it as:

> (...) the study of long term effects on later health or disease risk of physical or social exposures during gestation, childhood, adolescence, young adulthood and later adult life.

They go on to add that:

> (...) its purpose is to study the contribution of early life factors jointly with these later life factors to identify risk and protective processes across the life course. So far, life course epidemiology has paid particular attention to the long-term effects of childhood and adolescent risk factors on later disease. This is partly a response to the emphasis on adult factors in most post-war aetiological models of chronic disease.

While not disagreeing with the suggested contribution that 'life-course' epidemiology can offer, the emphasis is again on using it as a tool for identifying preventive solutions, not one in which preferred solutions are identified, namely managing the condition. The goal of the interventions is centred on the eradication of the problem: a policy goal that is a legacy of managing acute conditions. This needs to change.

A proposed framework for identifying a "better" approach

As highlighted above, all interventions are formed of a combination of treatment and prevention elements. It is the combination of these that policy makers need to identify to ensure that the goals of the care system are reached in the most efficient and effective arrangement: there is no need to categorise possible interventions into prevention or treatment. The key issue centres on the ability of any measure on helping alleviate the problems, namely reduce the health impact that the condition creates. What is required is an understanding of the impact of any proposed interventions not only in terms of clinical disease but health impacts. Furthermore, this should be quantified over the lifetime of an individual. With the shift from acute to chronic diseases outlined above, the goal no longer is eradication but becomes management of the condition to a level that is acceptable to the individual and society.

As stated previously for chronic conditions, the impact on health is usually one of a gradual onset followed by a slow insidious increase in the effects over time as shown in **Figure 2**. The solid line illustrates the progression of chronic disease with age. Over time the impact of the condition increases. The dotted line shows the new trajectory between age and impact following the implementation of an intervention: the gap between the two curves being the potential benefits that arise. The two double arrowed lines, A and B highlight that with age the benefits of 'altering the trajectory', i.e. managing the condition increases. However, there are two things to note. First, the perception by an individual of the impact score scale is probably non-linear. While difference between the two curves is likely to grow over time, the added benefits are heavily dependent upon the life expectancy of the individual.

To help formulate the 'better' approach, the distinction between prevention and treatment options need not be made, indeed, the false premise that prevention is always better than cure may well give rise to poorer outcomes. Without an understanding of the natural history of the disease and the impact that the condition has the better option cannot be defined.

What is important is the need to map onto the 'life-course' map the impact of possible interventions to see how the trajectory of the condition and hence its impact alters and provides an understanding of how any inter-

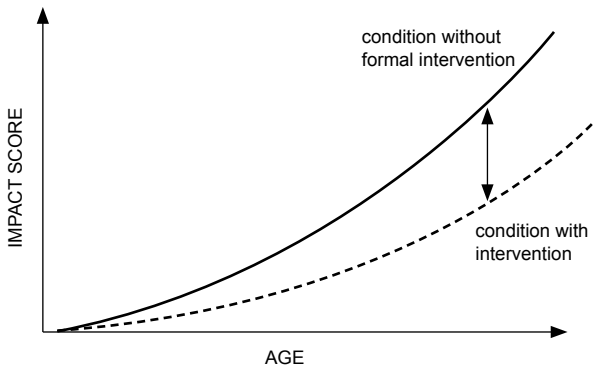

Figure 2. *The goal of chronic disease management.*
Source: Own elaboration.

vention impacts when compared to the 'control' intervention. This has two dimensions: first, the frequency with which the intervention needs to be applied to ensure that it has an impact, and, second, the knowledge of who will actually benefit. Some interventions can be applied as a single measure, for example vaccination that offers lifetime protection, while others need to re-applied at appropriate intervals. But, as highlighted earlier measures that are applied prior to the condition occurring, interventions that will be found at the prevention end of the management spectrum, will in part be inefficient as not all individuals will benefit as they would not have caught the condition or die prior to any impacts arising.

To help improve on the current thinking for the management of 'conditions' a number of elements are required. These include an understanding of the impact of each intervention, the costs of the intervention and the subsequent benefits. When considering where to allocate resources an understanding of the natural history of any condition is required. As stressed previously, the term prevention implies that the intervention is given prior to the condition arising. However, very few conditions involve a single preventative action. For example, while an immunisation programmes may provide cover following its administration throughout life, other interventions need to repeated on a regular basis. Examples include the administration of statins (see Ebrahim et al. [12]).

The second issue is the approach. Rose in his argument for developing 'preventative' approaches proposes three classifications: the whole population approach, in which the intervention is given to all, a direct- population approach, in which groups are identified and receive the intervention, or the 'high-risk' approach, in which individuals are selected. Those interventions at the 'treatment' end of the management spectrum will be provided only to individuals who have developed the condition and even then only when it impacts on them.

A third factor is the sector in which any policy is enacted. The determinants of health lie in the majority outside what is generally defined as the care system. For all conditions it is the more socially economically disadvantaged that tend to have higher levels of disease. This begs an important policy issue that while not novel, is whether the management of a condition should vary depending upon the circumstances that individuals find themselves in. With the current emphasis on guidelines to steer treatment and its derivation through an averaging this system this may be problematic.

Conclusions

The developing science of epidemiology and the methodologies to help understand health and diseases have implications for health care systems, not least their need to adapt both in their structures and policies. In policy terms, although the continual requirement to ensure that on efficiency grounds care systems develop arrangements that make best use of the allocated resources, current rhetoric is failing to take into account the epidemiological changes in health problems. The evolving pattern of diseases has seen a shift away from acute to chronic conditions. The implications of the changes have yet to materialise on the approaches taken to address health problems. Not least the continuous battle of rhetoric based on the idea that prevention is better than cure, i.e. treatment.

This rather simplistic argument continues to be based on a number of assumptions that must be challenged. They include that both either modalities that there is clarity in the approach and an sound evidence base on the benefits over any extended period. This in itself raises further questions about which individuals or sections of society will receive the intervention.

Furthermore for interventions based on prevention this must use an *a priori* argument that the condition will develop as irrespective of a more selective approach targeting groups or specific individuals mean that the intervention is given before the condition presents. The current language is leading to an inappropriate debate that is failing to focus on the key issue of an overall reduction in need.

The more appropriate solution is to move away from the artificial distinction between prevention and treatment and to regard both as interventions on a spectrum, namely the management of health needs. For any intervention, irrespective of its orientation, details of the recipients, the timing of its application (and subsequent frequency) and effect on reducing the trajectory of impacts on an individual's health needs to be quantified along with costs using a life course approach. This approach will help form the basis for a more rationale base to ensure that the health needs for a given population are addressed in an efficient and effective manner.

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