

Evidence-based Health Promotion: Applying it in Practice

M L Wong,*^{FAMS, MBBS, MPH}

Abstract

Introduction: In health promotion, we should use interventions established by evidence to be effective in improving the health of the community. This paper reviews the concepts, evaluation and use of evidence in health promotion. **Methods:** A literature search of evidence-based health promotion and evaluation of health promotion was conducted using Medline, Social Science Citation Index (SSCI), PsycLIT and evidence-based web sites on health promotion, health education and community preventive services. Recent issues of key journals on health promotion, health education and public health were also hand-searched. **Results:** The concept of evidence in health promotion interventions is complex due to its multidimensional nature. Evidence of effectiveness in health promotion is assessed by combining quantitative data on effect change in outcome measures and qualitative data on process evaluation of health promotion activities. Limitations to the use of randomised trials in community-based health promotion interventions include ethical and logistic problems in maintaining randomisation of subjects over long periods, absence of experimental conditions in the real-world setting, contamination of control subjects and the multidimensional nature of health promotion interventions. **Conclusion:** Randomised controlled trials should be used to evaluate the effectiveness of most health education and behavioural interventions in clinical settings. When such trials are not feasible as in community-based health promotion interventions, quasi-experimental designs provide strong evidence. Multiple methods are needed to assess evidence of effectiveness of health promotion programmes. Appropriate practice of evidence-based health promotion requires consideration of quality of available evidence, local values and prevailing resources.

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Introduction

There has been a growing interest in health promotion among health professionals and policy makers in Singapore. This is partly in response to the rising trend of chronic diseases and the finding that many of these diseases are lifestyle related and amenable to change. In 1999, the top 2 causes of mortality in Singapore are cancers (25.9%) and ischaemic and other heart diseases (24.8%).¹ Health promotion comprises efforts to enhance positive health and prevent ill-health among individuals and the communities, through education, prevention and protection measures.² The Ottawa charter proposes 5 approaches for health promotion: building healthy public policy, creating supportive environments, strengthening community action, developing personal skills and reorienting health services.³

Over the past decade, many health promotion programmes have been implemented in the workplace, community, hospitals, schools and other settings in Singapore. Have these programmes been effective? How can these programmes be further improved? Where can we get

evidence about health promotion strategies that work? We should strive to continually improve our existing programmes by learning from proven effective strategies in other countries. Given the constraints of resources, we must invest widely in interventions that are shown by evidence to be most effective.

The use of evidence-based health promotion poses many challenges. First, gaps exist between evidence and practice. Researchers want to contribute to the evidence base and may not be immediately concerned to address the needs of the users for evidence. On the other hand, those involved in health promotion practice, such as doctors, nurses and dietitians, often do not have time for research. They have to act fast, even in situations of insufficient evidence, to respond to community needs or political imperatives. Second, the concept of evidence in health promotion intervention is more complex than that in medical interventions. The use of randomised controlled trials, the gold standard for assessing evidence in medical interventions, is often not appropriate or feasible in health

* Associate Professor

Department of Community, Occupational and Family Medicine

Faculty of Medicine

National University of Singapore

Address for Reprints: Associate Professor Wong Mee Lian, Department of Community, Occupational and Family Medicine, Faculty of Medicine, National University of Singapore, MD3, 16 Medical Drive, Singapore 117597.

E-mail: cofwml@nus.edu.sg

promotion interventions. Health promotion interventions often take place at the community or national level where the expected proportional benefits to individuals are small and beneficial outcomes are delayed.

Notwithstanding these difficulties, the importance of a sound evidence base for health promotion practice to improve the quality and cost-effectiveness of health promotion interventions is recognised. Busy health practitioners need support to retrieve the latest evidence with ease and speed. They also need to learn skills to assess whether effective interventions in other countries can be replicated or adapted to the local setting with the prevailing constraints. This paper reviews the concepts and evaluation of evidence in health promotion programmes and proposes approaches to busy health promotion practitioners to find, assess and use evidence.

Methods

A literature search of evidence-based health promotion and evaluation of health promotion was conducted using electronic databases such as the Medline, Social Science Citation Index (SSCI), PsycLIT and evidence-based web sites on health promotion, health education and community preventive services such as the WHO-EURO Working Group on Health Promotion Evaluation (available at URL: www.who.dk); International Union for Health Promotion and Education Project on Health Promotion Effectiveness (available at URL: www.iuhpe.org); the Guide to Community Preventive Services (available at URL: www.thecommunityguide.org); and the Cochrane Collaboration (available at URL: www.updateusa.com). Recent issues of key journals and books on health promotion, health education and public health as well as the Health Education Authority 'Current Awareness/Journal Articles of Interest to Health Educators Bulletins' were also hand-searched.

Results

Evidence-based Health Promotion: Concepts and Evaluation

Concepts of Evidence in Health Promotion

Rosenberg and Donald⁴ have defined evidence-based medicine as the process of systematically finding, appraising and using contemporaneous research findings as the basis for clinical decisions. Analogous to the definition of evidence-based medicine, evidence-based health promotion can be defined as the process of systematically finding, appraising and using contemporaneous research findings as the basis for decisions in the practice of health promotion. Evidence-based health promotion practice must draw on sound theory and principles of good practice established by research.⁵

The concept of evidence is more complex in health promotion than in medical interventions. This is because of the increasing recognition for health promotion interventions to adopt a socio-ecological perspective on health behaviour. Health promotion is concerned not only with health outcomes like morbidity and mortality but also with outcomes that are difficult to quantify such as equity, community empowerment, and community and social well being. Health policies that are adopted on a collective basis to facilitate individual and collective behaviour change are often more effective but more difficult to evaluate because of the lack of a valid concurrent control group.

The meaning of evidence in health promotion also depends on who defines it and how it is used. Researchers are concerned about meeting the stringent criteria of validity (the extent it measures to what it first sets out to measure) in assessing evidence and satisfying the 'gold standard' that only randomised controlled trials can provide strong evidence. Policy makers and programme managers, however, need detailed information of successful health promotion interventions such as: How does it work? Why does it work in this context? The detailed information will enable them to replicate or adapt successful interventions to their own setting.

Evaluating Evidence in Medical Interventions

Before discussing the level of evidence for evaluating health promotion interventions, it is useful to review how medical and healthcare interventions are evaluated on the basis of evidence. The 'gold standard' for evaluating medical interventions is the randomised controlled trial. This is an experimental design in which patients are randomly assigned to either the intervention or the control group. As factors capable of influencing outcomes are equally distributed between the 2 groups through randomisation, and as the only difference between the 2 groups is the application of the intervention, the randomised, controlled trial provides the best assurance that outcome differences can be attributed to the intervention and not to extraneous factors. The strength of evidence is greatest when findings from multiple randomised controlled trials yield a consistent pattern. The levels of evidence for evaluating preventive services are shown in Table I⁶ and these are also the standards for evaluating medical interventions.⁷ Well-designed, randomised trials using relevant health outcomes such as morbidity and mortality provide the strongest evidence.

Limitations of Applying Randomised Controlled Trials to Health Promotion

Recent views emerged that it may not be appropriate or feasible to use randomised controlled trials to determine the effectiveness of health promotion interventions,

TABLE I: LEVELS OF SCIENTIFIC EVIDENCE AND SUITABILITY OF DESIGN FOR ASSESSING EFFECTIVENESS*

Levels of evidence for evaluating preventive services	
1	Evidence from at least one properly designed randomised controlled trial
11-1	Evidence from well designed controlled trials without randomisation
11-2	Evidence from well-designed cohort or case control analytic studies
11-3	Evidence from multiple time series with or without the intervention (<i>Dramatic results in uncontrolled studies could be regarded as evidence</i>)
111	Opinions of respected authorities, descriptive studies, or reports of expert committees

* Developed by the Canadian Task Force and US Preventive Services Task Force, 1996⁶

particularly those implemented at the population-based level because of the following reasons. First, health promotion is often implemented in the real-world community setting as a multifaceted programme with many activities such as health education, supportive policies, providing health facilities, community participation, and equity in access to healthcare. Randomisation of individuals staying in a housing estate, for example, may not be appropriate, especially for community health promotion programmes employing supportive policies and community participation to facilitate behaviour change. Such randomisation of individuals ignores the influence of the environment on their behaviours and other related health outcomes. In addition, it is impossible to avoid 'contamination' of the control group through diffusion of information by interpersonal communication from the intervention group, especially in a small country like Singapore. One may randomise intact groups of residential areas, students (classrooms) or workers at the workplace. However, it is often difficult to randomise enough worksites, schools or communities to conduct a well-controlled trial with sufficient statistical power. Most health promotion interventions involve participation and individual behaviour change, so it is not possible to use blinding techniques often used in randomised controlled clinical trials.⁸

Second, randomised controlled trials focus only on outcomes such as morbidity or mortality and provide no information about how the programme works. However, process evaluation which provides information on programme activities and hence illumination of why a programme fails or succeeds is very important in health promotion interventions as the findings can be used to improve programme performance.

Third, it is sometimes not feasible to use randomised controlled trials because of a lack of experimental conditions in the real-world setting. Most health promotion

interventions are complex and long-term, and it is impossible to control the conditions under which they are administered for long periods. The value of randomisation in ensuring internal validity is unquestionable but it is not always feasible because of ethical or logistic reasons. For example, it is not ethical to allocate subjects to a control programme without Pap smear screening.

Even if randomised trials can be conducted, the findings cannot be generalised to the general population from which the target group was taken as those who participated in such trials tend to be affluent, better educated and adopt a healthier lifestyle than non-participants.

Current Views on Evaluating Evidence in Health Promotion

It is now accepted that the evaluation of evidence of effectiveness in health promotion should include both qualitative and quantitative data. Quantitative data from outcome research provide evidence as to what works, while qualitative data on health promotion activities, obtained from process evaluation, provide insight on why the programme works or does not work. In 1998, the 51st World Health Assembly urged all member states to adopt an evidence-based approach to health promotion policy and practice, using the full range of quantitative and qualitative methodologies.⁹ WHO also stated strongly that the use of randomised trials to evaluate health promotion is, in most cases, inappropriate, misleading and unnecessarily expensive, and advocate the use of multiple methods.¹⁰ This was further reiterated by the WHO European working group in 2001 and they called for further research on appropriate approaches for evaluating health promotion initiatives.¹¹

A ranking of study designs for assessing effectiveness of community preventive services and health promotion programmes¹² has been developed by the US Task Force on Community Preventive Services (Table II). Where randomisation is not feasible, the greatest evidence comes from strong quasi-experimental study designs in which the

TABLE II: SUITABILITY OF STUDY DESIGN FOR EVALUATING COMMUNITY PREVENTIVE SERVICES AND HEALTH PROMOTION PROGRAMMES*

Greatest	Concurrent comparison groups <i>and</i> prospective measurement of exposure and outcome
Moderate	All retrospective design <i>or</i> multiple pre- or post-measurements but no control comparison group
Least	Single pre-and post-measurements and no concurrent comparison group <i>or</i> exposure and outcome measured in a single group at the same point in time

* Developed by the Task Force on Community Preventive Services, 2000¹²

intervention group is compared with a concurrent comparison group without the intervention on prospective measurement of exposures and outcomes. It is also important to consider the strength and findings of a body of evidence about a particular intervention or type and not just a single study.

Evidence of Effectiveness of Some Health Promotion Programmes

In spite of the difficulties in evaluating health promotion, many studies, including randomised controlled trials or controlled studies without randomisation, have been carried out to evaluate the effectiveness of health education and promotion programmes, particularly those related to smoking, physical activity, diet and sexual risk reduction. A brief review of the evidence of the effectiveness of these programmes is presented.

Effectiveness of Smoking Interventions

A recent meta-analysis of randomised controlled trials showed that brief physician advice of less than 3 minutes significantly increased long-term smoking abstinence rates of 10.2% in the intervention group compared to 7.9% in the control group.¹³ A significant dose response relation was found between the number of sessions and treatment. Smoking cessation interventions delivered by any healthcare provider, such as physician, psychologist, nurse, dentist or counsellor, increased abstinence rates ranging from 15.8% to 19.9% compared to 10.2% among those with no healthcare provider.¹³ The effect of self-help is weak and inconsistent. The most effective treatment of tobacco dependence comprised the use of multiple modalities and pharmacotherapy.¹³

With regard to community interventions, smoking ban and restrictions, increasing the unit price of cigarettes and mass media campaigns (when implemented with other interventions) were found to be effective in reducing exposure to environmental tobacco smoke, reducing tobacco use prevalence and increasing tobacco use cessation.¹⁴ Smoking cessation interventions have also been found to be cost-effective. It cost less than US\$1,000 per year of life saved in comparison to US\$10,000 per year of life saved for the treatment of moderate hypertension.¹⁵

Effectiveness of Dietary Interventions

A meta-analysis to evaluate the effectiveness of dietary interventions in primary prevention of chronic disease showed modest but statistically significant improvements in diet and cardiovascular disease risk status that were maintained for 9 to 18 months.¹⁶ The effectiveness was assessed by changes in reported dietary fat intakes and biomedical measures (serum cholesterol, urinary sodium,

systolic and diastolic blood pressure) in the intervention group minus changes in the control group at 3 to 6 months and 9 to 18 months of follow-up. For dietary fat as a percentage of food energy, the mean net change over 3 to 6 months was -2.5% (95% confidence interval [CI], -3.9% to -1.1%). Mean net changes for the biomedical measures over 9 to 18 months were as follows: serum cholesterol, -0.22 (95% CI, -0.39 to -0.05) mmol/L; urinary sodium, -45.0 (95% CI, -57.1 to -32.8) mmol/24 hours; systolic blood pressure, -1.9 (95% CI, -3.0 to 0.8) mm Hg; and diastolic blood pressure, -1.2 (95% CI, -2.6 to 0.2) mm Hg.

A recent systematic review of the effectiveness of dietary interventions¹⁷ in modifying dietary behaviour showed significant dietary changes for several dietary interventions. All 7 controlled studies that incorporated social support components and small groups into the intervention reported a significant intervention effect for total fat intake. Statistically significant increases in fruit and vegetable intake were also noted in 16 (87.5%) of 22 controlled studies, with the median difference in the change in daily servings of fruits and vegetables between intervention and control groups being 0.6 serving per day. Factors associated with successful interventions included the use of a theoretical planning framework, goal setting, interactive activities such as cooking or taste testing and social support.

Effectiveness of Physical Activity Interventions

A systematic review by the US Department of Health and Human Services showed that interventions to promote physical activity can be effective in a variety of settings using a variety of strategies. The effect change (differences in pre- to post-intervention change between the intervention and control group) of the effective interventions, however, tended to be small, in the range of 5% to 10% absolute increase.¹⁸

A recent systematic review by the US Task Force on Community Preventive Services¹⁹ found strong evidence of the following approaches being effective in increasing physical activity in community settings. These included:

- i) informational approaches such as community-wide campaigns and point-of-decision prompts to encourage use of stairs;
- ii) behavioural and social approaches such as school-based physical education, social support interventions in community settings (e.g., setting up a buddy system or contracting with another person to complete specified levels of physical activity), and individually adapted health behaviour change programmes; and
- iii) environmental and policy approaches such as creation of or enhanced access to places for physical activity, combined with informational outreach activities.

Effectiveness of Interventions to Promote Condom Use

A systematic review of 10 well-designed, controlled, rigorous studies on health education/promotion interventions to increase condom use and prevent transmission of sexually transmitted diseases (STDs) among women showed favourable intervention effect with condom use increase ranging from 25% to 56% within a time period of 3 to 6 months post-intervention.²⁰ Features of the more effective interventions include the use of planned frameworks, combination of strategies, needs assessment before programme planning and involvement of the target group in planning.

A health promotion intervention, implemented by Wong et al²¹ to increase condom use among female brothel-based sex workers in Singapore also showed a significant increase in condom use in the intervention group (+20.8%) compared to the control group (-5%). These changes were corroborated by a statistically significant proportional 77.1% reduction in cervical gonorrhoea incidence in the intervention group compared to a non-significant proportional reduction of 37.6% in the control group at 5-month follow-up.²¹

Conclusion

The concept of evidence in health promotion is complex, as health promotion interventions are often multifaceted and are concerned with not only improvement in quantifiable outcome measures such as health status but also with community empowerment and equity that are difficult to quantify. While randomised controlled trials are considered the gold standard for evaluating most health education/health behaviour interventions like smoking cessation programmes in the clinical setting, the use of such trials in community health promotion interventions is often not feasible and inappropriate. In these circumstances, we should use a quasi-experimental design, in which the intervention group is compared with a concurrent comparison group on prospective measures of exposure and outcome. Multiple methods, using both quantitative and qualitative data, are needed to evaluate the evidence of health promotion to reflect its multidimensional nature and a holistic view of health.

Recommendations: Putting Evidence Into Practice

Health promotion practitioners in Singapore face many challenges in the use of evidence to guide decision making in health promotion. They may not know the most efficient ways to search for evidence. In some cases, sufficient 'evidence' of effectiveness simply does not exist, and may be impossible to conclusively establish, because it would require studies of such size, complexity and cost as to be impractical. We suggest that health promoting practitioners take the following steps when

applying evidence to daily work or practice: (i) find the evidence, (ii) appraise the evidence and (iii) translate it into action.

Finding the Evidence

Evidence of effectiveness of health promotion programmes can be obtained from relevant journal publications, Cochrane Collaborative research trials and national agencies such as the National Cancer Institute in the US, the US-based agency for Health Care Research and Quality and the Health Education Authority in the UK. For busy health promotion practitioners who cannot find time to read numerous publications, a more efficient way is to contact researchers or colleagues or alternatively search for articles on systematic reviews or meta-analysis on health promotion interventions. Systematic reviews give concise summaries of the best available evidence as rigorous and standardised methods are used to select, critically assess and synthesize relevant studies. Meta-analysis is a statistical analysis of a large collection of analyses from individual studies for the purpose of integrating the findings. The US-based clinical practice guidelines on smoking¹³ and the Surgeon General Report on physical activity,¹⁸ for example, provide good summaries of systematic reviews.

Websites also provide good evidence reviews and summaries of evidence-based recommendations on health promotion and preventive interventions. Examples include those established by the WHO-EURO Working Group on Health Promotion Evaluation (available at URL: www.who.dk); International Union for Health Promotion and Education Project on Health Promotion Effectiveness (available at URL: www.iuhpe.org); US Task Force on Community Preventive Services (available at URL: www.thecommunityguide.org); and the Cochrane Collaboration (available at URL: www.updateusa.com). The current Evidence-based Guide to Community Preventive Services prepared by the Centers for Disease Control and Prevention and the National Institute of Health (available at URL: www.thecommunityguide.org) has already been made available on the Internet, a summary of the evidence reviews and recommendations on interventions to reduce tobacco use and promote physical activity. The Division of Cancer Control and Population Sciences (DCCPS) at the National Cancer Institute in US posts systematic reviews on dietary interventions at their website <http://dccps.nci.nih.gov/DECC/>.

Assessing the Evidence

The best interpretation of evidence in health promotion uses data from many sources and combines different methods of data collection, including qualitative and quantitative methods. The simplified checklist in Table III

TABLE III: CHECKLIST TO ASSESS QUALITY OF EVIDENCE IN HEALTH PROMOTION INTERVENTIONS

2.1 Assess quality of evidence for outcome data

- What was the evaluation design: randomised control group design? Prospective study with comparison group?
- Are study participants/programme recipients representative of the target population?
- What is the sample size? How was it obtained?
- How similar is the study to your area?
- Is the sample representative of the wider population it is supposed to represent?
- Were steps taken to reduce bias in self-reported behaviour?
- Self-reports of behaviour e.g. smoking validated with independent biochemical tests?
- What was the follow-up rate?
- Were steps taken to control for confounding?
- When was the study done and how relevant are the findings to your problem now?
- Was there a detailed and clear description of the intervention?
- Was process evaluation included in the study?

2.2 Assess quality of evidence for qualitative data

- Is the researcher continually examining the ways in which their own presumptions may have impacted on the findings (reflexivity)?
- Did the researcher attempt to explain the data in other ways?
- Did the researcher use triangulation i.e. draw conclusions from a number of different sources and data collection methods?

Adapted from: Perkins E R, Simnett, Wright L. Evidence-based health promotion 1999.²²

is a guide for the practitioner to assess the quality of evidence for health promotion interventions. It is most important to assess whether the change in outcome measures could be attributed to the intervention. Randomised controlled trials provide the strongest evidence. For population-based health promotion interventions, where randomised controlled trials are not feasible, evidence should come from strong quasi-experimental designs in which the intervention group is compared with an equivalent comparison group without the intervention on pre- and post-intervention outcome measures. As self-reported behaviour may be biased, the reader should check whether the researcher took steps to reduce self-reporting bias or validate self-reported behaviour with biomedical measures. He should also check whether process evaluation was conducted to provide in-depth information about programme activities and the social and environmental context in which health promotion activities took place, so that he can make reasoned judgements about which particular features have been effective and could be applied to his local setting.

Translating the Evidence into Action

The health promotion practitioner has many opportunities to translate evidence into practice at different levels: the individual patient encounter in the clinical setting, small

group setting, institution or workplace setting and the community setting. However, he has to adapt the intervention, proven to be effective in other settings, to fit local circumstances and test them in practice. If appropriate evidence is available at the individual health promotion level, it still has to be integrated with social factors and the patient's context and values to allow each patient to decide on the 'supposedly effective' approach. Similarly, when applying the best available evidence of population-based programmes to the local community setting, the health promotion practitioner has to consider the cultural acceptability and the feasibility of its implementation, given the prevailing resources in the country. Thus, appropriate practice of evidence-based health promotion requires consideration of three elements: quality of evidence available, values (of the country, healthcare system and patient) and context (country and patient). Having said this, we can learn by looking at the best available evidence on effective strategies as these can be considered as the likely 'best practices'. General principles from these successful programmes can, in most cases, be applied universally.

Generating Evidence

In some cases, sufficient 'evidence of effectiveness' simply does not exist. When health practitioners have to respond quickly to a health problem, they have to generate their own evidence by using a planned approach to conduct a systematic assessment of population health needs and analyse the organisational and administrative context for successful intervention. Models of planned approaches include the PRECEDE-PROCEED²³ model, the social marketing model²⁴ and the social learning theory.²⁵ Evidence of success is assessed by the achievement of pre-determined health targets.

Evidence-based health promotion is still a young and evolving discipline in Singapore. Practitioners and researchers need to collaborate and learn from each other on how to accelerate the dissemination of evidence into practice. Further research is needed to refine and strengthen other trial methodologies (community trials and before and after trials) and qualitative research in health promotion.

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