

SUPPORTING DECISIONS WITH BEST EVIDENCE

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Chapter Summary

It is important in decision-making, policy development, and the establishment of new programs to improve public health that these initiatives be supported by scientific evidence. Evidence-based practice is based on evaluation research that highlights interventions that have been found to be effective. This chapter covers the emerging area of evidence-based public health. It provides an opportunity to gain a comprehensive overview of concepts in best evidence, to understand distinctions between evidence-based medicine and evidence-based public health, to explore resources that provide evidence-based practice information, and to develop techniques for searching and finding research to support best evidence in the field of public health.

Note that the text of this chapter is in the public domain and may be copied, adapted and used freely for the training of members of the public health workforce.

Learning Objectives

Public health workers will benefit from this chapter by being able to

- Define evidence-based public health and distinguish it from evidence-based medicine;
- Become familiar with key concepts in evidence-based public health;
- Apply key concepts to searching and evaluating the public health literature;
- Learn strategies for effective retrieval of evidence-based public health resources;
- Identify Web-based resources that support best evidence research and practice.

Applications of Learning

The strategies and resources in this chapter will enhance public health workers' competencies in:

Analytic assessment skills: Identifies relevant and appropriate data and information sources.

Introduction

The evidence-based movement in the health sciences is over a decade old, and its beginnings are tied to evidence-based practice in medicine. The first appearance of the term evidence-based medicine occurred in the fall of 1990 in a document describing the residency program at Canada's McMaster University:

Residents are taught to develop an attitude of "enlightened skepticism" toward the application of diagnostic, therapeutic, and prognostic

technologies in their day-to-day management of patients. This approach, which has been called “evidence-based medicine,” is based on principles outlined in the text Clinical Epidemiology. The goal is to be aware of the evidence on which one’s practice is based, the soundness of the evidence, and the strength of inference the evidence permits. The strategy employed requires a clear delineation of the relevant question(s); a thorough search of the literature relating to the questions; a critical appraisal of the evidence, and its applicability to the clinical situation; and a balanced application of the conclusions to the clinical problem. [Source: Guyatt, G. and Drummond Rennie. 2002. User’s Guides to the Medical Literature: A Manual for Evidence-Based Practice. Chicago: American Medical Association, p. xiv.]

Some of the key concepts in this description are evidence and critical appraisal. Evidence can be defined as that “which furnishes proof,” and critical appraisal can be defined as an evaluation process “which determines the significance or worth of something by careful appraisal and study.” These concepts became a fundamental principle for a new approach to patient care, using evidence-based principles and a philosophy that evidence from the medical literature should support clinical decisions. As a body of literature began to emerge, it was soon recognized that evidence-based medicine approaches could be applied to other fields, including public health. Within this field, some of the principal user groups are practitioners, policy makers, researchers, the general public, and health sciences information professionals.

There are notable differences between the two disciplines of medicine and public health. however, that require distinct approaches to the application of evidence-based practice. Evidence-based public health is defined as “the development, implementation, and evaluation of effective programs and policies in public health through application of principles of scientific reasoning, including systematic uses of data and information systems, and appropriate use of behavioral science theory and program planning models.” (Brownson, EBPH, 2003.) The chart below helps identify some of the key differences in practice.

Definitions and Comparison of Disciplines: Evidence-Based Medicine and Evidence-Based Public Health

Evidence-Based Medicine	Evidence-Based Public Health
Definition: The process of systematically finding, appraising, and using contemporaneous research findings as the basis for clinical decisions	Definition: The process of systematically finding, appraising, and using contemporaneous clinical and community research findings as the basis for decisions in public health
Steps in the Process: 1) Formulating a clear question from a patient’s problem; 2) Searching the literature; 3) Appraising the evidence; 4) Selecting the best evidence for clinical decision; 5) Linking evidence with clinical experience, knowledge, practice, and the patient’s values and preferences; 6) Implementing findings in clinical practice; 7) Evaluating results.	Steps in the Process: 1) Formulating a clear question from a public health problem; 2) Searching the literature; 3) Appraising the evidence; 4) Selecting the best evidence for a public health decision; 5) Linking evidence with public health experience, knowledge, practice, and the community’s values and preferences; 6) Implementing findings in public health practice and programs; 7) Evaluating results.
Goal: The best possible management of health and disease in individual patient(s)	Goal: The best possible management of health and disease and their determinants at the community level

Source: Jenicek, Milos and Sylvie Stachenko. 2003. Evidence-based public health, community medicine, preventive care. *Medical Science Monitor*: 9(2): p, SR2.

Why use a best-evidence approach?

Evidence-based practice is also referred to as “best evidence.” The terminology is important because it emphasizes that it is the quality of evidence that is of primary significance, not the quantity, that is, it is the “best” information that is sought on a particular topic of interest, not the “most” information. Using a best-evidence approach can be beneficial because it:

- helps in managing the amount of literature to review;
- helps ensure the retrieval of up-to-date and reliable information about what works and doesn’t work for a particular public health question;
- provides assurance that one’s time is being used most efficiently and productively in reviewing only the “best of the best” information available on the particular public health question; and
- provides assurance that decision making is based on the “best of the best” information available on the particular public health question.

Teaching Tip

Try to make the class more interactive by asking participants if there are other reasons they can offer about why to use a best evidence approach in public health practice.

When is it important to use a best-evidence approach?

A best-evidence approach can be used:

- when conducting literature reviews for grant proposals;
- when evaluating the effectiveness and cost benefits of health programs;
- when establishing new health programs;
- when policies are being implemented; and
- when it's important to have scientific evidence to support decision making.

Teaching Tip

Try to make the class more interactive by asking participants if there are ever disadvantages to using a best-evidence approach. For example, what if a public health department wants to be innovative in establishing new programs and wants to implement a particular program quickly to address a particular public health issue or concern before evaluative information is available on successful interventions?

Libraries have been identified as having a critical role in evidence-based practice (Sackett et al., pp. 29-30) because they provide resources for accessing the medical literature and because librarians and information professionals are trained in the skills and procedures needed for applying evidence-based principles, including information retrieval and evaluation of search strategies and results.

Source: Sackett, David et al. Evidence-Based Medicine: How to Practice and Teach EBM. 2nd edition. Edinburgh, Churchill Livingstone, 2000.

Key Concepts in Evidence-Based Public Health

Systematic Review: critical assessment and evaluation of research that attempts to address a focused question using methods designed to reduce the likelihood of bias.

Meta-Analysis: overview that incorporates a quantitative strategy for combining the results of several studies into a single pooled or summary estimate.

Risk Assessment: systematic approach to characterizing the risks posed to individuals and populations by environmental pollutants and other potentially adverse exposures.

Decision Analysis: systematic approach to decision making under conditions of uncertainty; involves identifying all available alternatives and estimating the probabilities

of potential outcomes associated with each alternative, valuing each outcome, and, on the basis of the probabilities and values, arriving at a quantitative estimate of the relative merit of the alternatives.

Economic Evaluation: comparative analysis of alternative courses of action in terms of both their costs and consequences.

Expert Panels: examination of research studies and their relevance to health conditions, diagnostic and therapeutic procedures, planning and health policy, and community interventions.

Practice Guidelines: systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances; may be developed by government agencies, institutions, or by the convening of expert panels.

Source: Brownson et al. 2003. Evidence-Based Public Health, p. 45+ and JAMA. (2002). Users' Guides to the Medical Literature, Glossary.

Key Concepts in Searching and Evaluating the Public Health Literature

User's Guide for Searching the Public Health Literature

- 1) Determine the public health problem and define the question;
- 2) Select information sources, including bibliographic databases;
- 3) Identify key concepts and terms;
- 4) Conduct the search and refine as needed;
- 5) Select and organize documents for review;
- 6) Abstract relevant/pertinent information from the documents;
- 7) Summarize and apply the literature review.

Source: Adapted from Brownson, Ross C., Elizabeth A. Baker, Terry L. Leet, and Kathleen N. Gillespie. 2003. Evidence-based public health. Oxford University Press, p. 128.

Teaching Tip

Prior to the date and time of the class, contact participants about specific projects or search topics of interest. Prepare search strategies in advance. Demonstrate searches and ask for feedback in evaluating the results. You may also want to inquire about whether participants have had PubMed/MEDLINE training. If not, consider offering a PubMed class prior to the Best Evidence/Evidence-Based Public Health class.

User's Guide for Evaluating Quality, Methodology, and Public Health Research Results

What are the results?

- Were the results similar from study to study?
- What are the overall results of the review?
- How precise were the results?
- Can a causal association be inferred from the available data?

Are the results valid?

- Did the review explicitly address the public health question?
- Was the search for relevant studies detailed and exhaustive? Is it likely that important, relevant studies were missed?
- Were the primary studies of high methodological quality?
- Were assessments of studies reproducible?

How can the results be applied to public health practice and interventions?

- How can the results be interpreted and applied to public health?
- Were all important public health outcomes considered?
- Are the benefits worth the costs and potential risks?

Source: Brownson, Ross C., Elizabeth A. Baker, Terry L. Leet, and Kathleen N. Gillespie. 2003. Evidence-based public health. Oxford University Press, p. 47 and JAMA. (2002). Users' Guides to the Medical Literature, p.159.

Hierarchy of Research Designs

- Category I: Evidence from at least one properly randomized controlled trial.
- Category II-1: Evidence from well-designed controlled trials without randomization.
- Category II-2: Evidence from well-designed cohort or case-control analytic studies, preferably from more than one center or research group.
- Category II-3: Evidence from multiple times series with or without intervention or dramatic results in uncontrolled experiments such as the results of the introduction of penicillin treatment in the 1940s.
- Category III: Opinions of respected authorities, based on clinical experience, descriptive studies and case reports, or reports of expert committees.

Source: Harris, R.P. et al. (2001). Current methods of the U.S. Preventive Services Task Force: a review of the process. American Journal of Preventive Medicine. April 20 (3 Supplement): 21-35.

Selected Evidence-Based Public Health Internet Resources

Bandolier: Evidence Based Thinking about Health Care: Glossary Index

<<http://www.jr2.ox.ac.uk/bandolier/glossary.html>>

Cancer.gov (National Cancer Institute)

<<http://www.cancer.gov/>>

Centre for Evidence-Based Medicine (University Health Network)

<<http://www.cebm.utoronto.ca/>>

The Centre for Evidence Based Social Services

<<http://www.ex.ac.uk/cebss/index.html>>

“The Centre for Evidence-Based Social Services was established in 1997 and is a partnership between The Department of Health, a consortium of Social Services Departments in the South West of England and the University of Exeter (Peninsula Medical School). Our main aim is to ensure that decisions taken at all levels in Social Services are informed by trends from good-quality research.”

Centre for Health Evidence: Users' Guides to Evidence-Based Practice

<<http://www.cche.net/usersguides/main.asp>>

CINAHL (Cumulative Index to Nursing & Allied Health)

<<http://www.cinahl.com/>>

NOTE: subscription is required for database access.

From CINAHL Information Systems, this database features over 1200 nursing, allied health, consumer health, biomedicine, and health sciences librarianship journals from 1982 to present. Additional citations for selected books, dissertations, and conference proceedings are included.

Cochrane Library

< <http://www.cochrane.org/reviews/clibintro.htm>>

NOTE: subscription is required for full-text access.

From the Cochrane Collaboration, this online library is a collection of evidence-based medicine databases including Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews and Effectiveness (DARE), Cochrane Controlled Trials Register (CCTR), NHS (National Health Service-UK) Economic Evaluation Database, Health Technology Assessment Database, and Cochrane Database of Methodology Reviews (CDMR). While the review abstracts are searchable free of charge, full-text is only available by subscription.

Community Toolbox: Bringing Solutions to Light

<<http://ctb.ku.edu/>>

Dal Libraries: Kellogg Library: Best Evidence Resources for Effective Health Care

<<http://www.library.dal.ca/kellogg/bestevidence/evidence.htm>>

Sponsored by Dalhousie University, Halifax, Nova Scotia, this Web site features best evidence databases, clinical guidelines, clinical trials, Web sites, and an evidence-based glossary, calculator, and sources for handheld computing devices.

Edward G. Miner Library: Nesbit Guide to Evidence Based Resources

<http://www.urmc.rochester.edu/hslt/miner/digital_library/evidence_based_resources.cfm>

A well-organized list of evidence-based resources maintained by the health sciences library of the University of Rochester Medical Center. Links are categorized by major

sites, organizations, guides and tutorials, search filters, systematic reviews, and practice guidelines.

Effective Public Health Practice Project (Hamilton, Canada)

<<http://www.city.hamilton.on.ca/PHCS/EPHPP/AboutEPHPP.asp>>

“Evidence is essential to fostering evidence-based practice and decision-making in all health care sectors and professions. The products from the EPHPP are a resource for evidence-based decision-making in public health in Ontario and Canada. EPHPP conducts [systematic reviews](#) on the effectiveness of public health interventions, and summarizes recent, high quality reviews produced by others. Although EPHPP reviews focus on public health interventions, review methodology and results are frequently of interest to a broader audience of service and research professionals. The range of review topics is broad. Approximately 4 new reviews and at least 4 new summary statements are completed annually.”

ERIC (Educational Resources Information Center)

<<http://www.eric.ed.gov/>>

“ERIC is a national information system funded by the U.S. Department of Education’s Institute of Education Sciences to provide access to education literature and resources.”

The European Observatory on Health Systems and Policies

<<http://www.euro.who.int/observatory/toppage>>

“The European Observatory on Health Systems and Policies supports and promotes evidence-based health policy-making through comprehensive and rigorous analysis of the dynamics of health care systems in Europe. The Observatory is a partnership between WHO Regional Office for Europe, the Governments of Finland, Greece, Norway, Spain and Sweden, the European Investment Bank, Open Society Institute, World Bank, London School of Economics and London School of Hygiene & Tropical Medicine.”

Evidence-based Practice Centers (Agency for Healthcare Research and Quality): Synthesizing scientific evidence to improve quality and effectiveness in health care

<<http://healthlinks.washington.edu/ebp>>

Evidence Network: The Focus Point for Evidence Based Policy and Practice Research in the UK (United Kingdom)

<<http://www.evidencenetwork.org/home.asp>>

GrayLIT Network

<<http://www.osti.gov/graylit/>>

This Web site is a portal to grey literature resources from the federal government, including the Department of Defense, the Department of Energy, the Environmental Protection Agency, and NASA.

Grey Literature Producing Organizations

<<http://www.nyam.org/library/graylitorgs.shtml>>

This Web site features the New York Academy of Medicine’s list of links to agencies and organizations publishing grey literature resources, including non-profit organizations and government agencies and clearinghouses.

Grey Literature Report

<<http://www.nyam.org/library/grey.shtml>>

This report is published quarterly by The New York Academy of Medicine to identify new grey literature resources as they are added to the academy's collection.

Guide to Community Preventive Services: Systematic Reviews and Evidence Based Recommendations

<<http://www.thecommunityguide.org/>>

HealthLinks (University of Washington): Evidence-Based Practice

<<http://healthlinks.washington.edu/ebp>>

Health Policy Guide: Evidence-Based Policies to Improve the Public's Health

<<http://www.healthpolicycoach.org/default.asp>>

"Health Policy Guide provides evidence-based, peer-reviewed policy guidance and resources to support advocacy and decision-making at the state and local levels. Search or browse over 150 policy topics."

HealthWeb: Evidence Based Health Care

< <http://www.healthweb.org/browse.cfm?subjectid=39>>

A collaborative project comprised of health sciences libraries in the Greater Midwest Region of the National Network of Libraries of Medicine and of libraries in the Committee for Institutional Cooperation. Evidence based health care resources are chosen selectively by librarians, and links include a variety of Web sites categorized by associations, databases, electronic journals, practice guidelines, guides to Internet resources, guides to searching the literature, and tutorials.

HP2010 Information Access Project (Partners in Information Access for the Public Health Workforce)

<<http://phpartners.org/hp/>>

"The purpose of this site is to make information and evidence-based strategies related to the Healthy People 2010 objectives easier to find. The National Library of Medicine and the Public Health Foundation staff have worked together to develop pre-formulated search strategies for selected Healthy People 2010 objectives."

The Lamar Soutter Library: University of Massachusetts Medical School: Evidence-Based Practice for Public Health Project

<<http://library.umassmed.edu/ebpph/>>

A unique Web site provided by the Lamar Soutter Library at the University of Massachusetts Medical School, this project focuses specifically on public health best evidence resources with an aim toward examining evidence-based medicine models and assessing their effectiveness to public health. Links are provided to the top 25 public health journals by impact factor, to public health databases, to the public health knowledge domains, and to evidence-based resources in public health practice.

The Lamar Soutter Library: University of Massachusetts Medical School: Evidence-Based Practice for Public Health Project: Public Health Bibliographic Databases

<<http://library.umassmed.edu/ebpph/>>

The project Web site features a comprehensive list of public health databases.

MAPP: Mobilizing for Action through Planning and Partnerships [NACCHO (National Association of County and City Health Officials)]

<http://mapp.naccho.org/mapp_introduction.asp>

“Mobilizing for Action through Planning and Partnerships (MAPP) is a community-wide strategic planning tool for improving community health. Facilitated by public health leadership, this tool helps communities prioritize public health issues and identify resources for addressing them.”

MLANET: Evidence-Based Health Care: Resources on the Internet

<<http://mlanet.org/education/telecon/ebhc/resource.html>>

Morbidity and Mortality Weekly Report (MMWR)

<<http://www.cdc.gov/mmwr/>>

From the Centers for Disease Control and Prevention (CDC), this Web site provides full-text access to the MMWR, and it links to state health departments and public health organizations from around the world. Also includes disease trends and continuing education opportunities.

NACCHO (National Association of County and City Health Officials): Public Health Advocacy: Resolution 00-12: Resolution on Evidence-Based Public Health

<<http://www.naccho.org/resolution91.cfm>>

National Center for Mental Health and Juvenile Justice: Evidence Based Practices

<<http://www.ncmhjj.com/EBP/default.asp>>

National Guidelines Clearinghouse

<<http://www.guideline.gov/>>

Sponsored by the Agency for Healthcare Research and Quality (AHRQ), this Web site provides clinical practice guidelines of systematically developed statements with recommendations, strategies, and other information that assists health care providers in making appropriate health care decisions. The guidelines are produced by a formally recognized society, organization, or agency and have been developed, reviewed or revised within the last five years. (See “Criteria for Inclusion.”)

National Information Center on Health Services Research & Health Care Technology (NICHSR)

<<http://www.nlm.nih.gov/nichsr/nichsr.html>>

From: the National Library of Medicine (NLM), this site covers health services research, clinical practice guidelines, and health care technology and assessment. Specific resources that are accessible include the Health Services Research (HSR) databases—HSRProj (Health Services Research Project in Progress), HSTAT (Health Services/Technology Assessment Text), and DIRLINE (Directory of Information Resources Online).

National Library of Medicine (NLM) Gateway

<<http://gateway.nlm.nih.gov/>>

From the National Library of Medicine, this site provides multiple database coverage: MEDLINE/PubMed (journal articles), LOCATORplus (books, journals, and audiovisual material), MedlinePlus (consumer health), *ClinicalTrial.gov*, DIRLINE (directories of health organizations), Meeting Abstracts, HSRProj (Health Services Research Projects in Progress), OMIM (Online Mendelian Inheritance in Man), and HSDB (Hazardous Substances Data Bank). The NLM Gateway facilitates subject searching of multiple NLM databases at one time.

Nettingthevidence: A ScHARR Introduction to Evidence Based Practice on the Internet: Library

<<http://www.sheffield.ac.uk/~scharr/ir/netting/>>

This site is one of the most extensive resources of evidence based practice. It is maintained by Andrew Booth of the School of Health and Related Research (ScHARR) of the University of Sheffield and includes user guides to the medical literature, resources for understanding systematic reviews, meta-analyses, controlled trials, and how to read a paper.

**NHS (National Health Service):
National Library for Public Health**

<<http://www.library.nhs.uk/publichealth/>>

The National Library for Public Health, a specialist library of the NHS National Library for Health, is being developed to provide high quality evidence e-based information on all aspects of public health. It is designed for those working in the field of public health by providing a single source of access to web based evidence on public health.

Partners in Information Access for the Public Health Workforce: Literature and Guidelines

<<http://phpartners.org/guide.html>>

A frequently cited resource in Ross C. Brownson's Evidence Based Public Health (2003), the Partners project is a collaboration of government agencies, public health organizations, and health sciences libraries. The Web site provides links to public health literature and guidelines, including journal articles, journals, newsletters, reports and other publications.

PubMed/MEDLINE

<<http://pubmed.gov>> or <<http://www.ncbi.nih.gov/entrez/query.fcgi>>

From the National Library of Medicine (NLM), PubMed provides coverage of over 14 million records from 4,600 biomedical journals. PubMed offers many features for searching the biomedical literature, including search limits and filters relevant to searching for best evidence resources.

**SAMHSA'S (Substance Abuse and Mental Health Services Administration)
National Mental Health Information Center: Center for Mental Health Services:
Evidence-Based Practices: Shaping Mental Health Services Toward Recovery**
<<http://www.mentalhealth.samhsa.gov/cmhs/communitysupport/toolkits/>>

TOXNET

<<http://toxnet.nlm.nih.gov/>>

This Web site provides access to a suite of databases on toxicology, hazardous chemicals, risk information systems, chemical synonyms and structures, and toxic release information.

TRIP Database

<<http://www.tripdatabase.com>>

NOTE: subscription is required for full-text access.

Developed by Jon Brassey in 1997, this database assembles a variety of Internet evidence-based health care resources. A basic version can be searched free of charge. The enhanced database, TRIP Plus, includes peer-reviewed journals, e-textbooks, medical images, and patient information leaflets, and it requires a subscription to access. TRIP Plus is updated monthly.

University of Illinois at Chicago: Library of the Health Sciences

<<http://www.uic.edu/depts/lib/lhsc/temp/ebm/ebmclass.shtml>>

This library offers 1 and 2 day workshops on evidence-based medicine for librarians.

World Health Organization: Regional Office for Europe: Evidence (Access to WHO's Evidence-Based Information and Policy

<http://www.euro.who.int/InformationSources/Evidence/20010827_1>

Teaching Tip

Allow time for participants to explore Web-based resources discussed in class. Working in small groups, ask participants to select one Web site of interest to examine in depth, then take turns reporting to the larger group and commenting on features and resources of the particular sites that are beneficial for evidence-based public health research and practice. Inquire if there are additional Web sites that participants would recommend adding to the list of evidence-based public health resources.

Case Study

Estelle Wilcox is Assistant Director of the Division of Personal Health at a mid-sized health department in a mid-sized town in the Midwest. She’s concerned about overweight children in the local school district and wants to start a weight management program. Before Estelle asks her boss for funding for her idea, she’d like to find out if there are proven approaches to addressing obesity in children and the elements for designing successful programs.

Using our seven-step guide to searching the public health literature, we can begin the process of addressing Estelle’s question.

1) Determine the public health problem and define the question.

The problem can be defined as obesity in children, and the question can be stated as “What are effective programs for reducing obesity in school-age children?”

2) Select information sources, including bibliographic databases.

Initial databases that might be consulted are PubMed, the Partners Healthy People 2010 Information Access Project, and ERIC (see links to Web addresses for these resources under **Selected Evidence-Based Public Health Internet Resources**).

3) Identify key concepts and terms.

There are three primary concepts for this question. See the table below for suggested terms that might be used in the search.

<i>Obesity</i>		<i>Children</i>		<i>Effective Programs</i>
Obesity/prevention & control		Child		Program Effectiveness
		Children		Program Evaluation

Discuss other terms that could be included to expand the search such as overnutrition, adolescents, youth, best practice analysis, etc.

4) Conduct the search and refine as needed.

Sample PubMed search strategy: obesity AND children AND program evaluation

5) Select and organize documents for review.

Select the following retrieved article for review:

Health Promotion International 2003 Dec;18(4):287-96.

Evaluation of a pilot school programme aimed at the prevention of obesity in children.

Warren JM, Henry CJ, Lightowler HJ, Bradshaw SM, Perwaiz S.

Nutrition and Food Science Group, School of Biological and Molecular Sciences, Oxford Brookes University, Oxford, UK. jmwarren@brookes.ac.uk

6) Abstract relevant/pertinent information from the documents.

Examine the abstract:

This paper describes the development, implementation and evaluation of a school- and family-based intervention to prevent obesity in children aged 5-7 years. In addition, the efficacy of three different intervention programmes was compared. Children aged 5-7 years (n=213) were recruited from three primary schools in Oxford and randomly allocated to a control group or one of three intervention groups: nutrition group, physical activity group, and combined nutrition and physical activity group. The setting for the interventions was lunchtime clubs, where an interactive and age-appropriate nutrition and/or physical activity curriculum was delivered. The intervention lasted for 20 weeks over four school terms (approximately 14 months). Children's growth, nutrition knowledge, diet and physical activity were assessed at baseline and at the end of the intervention. Significant improvements in nutrition knowledge were seen in all children ($p < 0.01$) between baseline and post-intervention, and results were highly significant in the nutrition and combined group ($p < 0.001$). Overall, fruit and vegetable intake increased significantly ($p < 0.01$ and < 0.05 , respectively), with changes seen in fruit consumption in the nutrition group ($p < 0.05$) and the control group ($p < 0.05$) in particular. No significant changes in the rates of overweight and obesity were seen as a result of the intervention. Gender differences were not detected in the majority of assessments and there was no clear effect of programme type per se. This pilot study has demonstrated that school may be a suitable setting for the promotion of healthy lifestyles in children, but requires replication in other social settings. Future initiatives should be long-lasting, multi-faceted and sustainable, involving all children in a school, and should target the whole environment and be behaviourally focused. The ultimate goal of any such programme is to lead to positive behaviour change which will have a beneficial effect on long-term health. Successful targeting of the family remains a challenge to such interventions.

7) Summarize and apply the literature review.

Summarize the findings of the study. Determine the type of study: randomized controlled trial. How does PubMed identify the type of study? (Answer: in the MEDLINE citation display PT = publication type.) What does the type of study, i.e. randomized controlled trial, mean in terms of the categories of evidence for evaluating research? (See **Hierarchy of Research Designs** above.)

Refer to the Evidence Pyramid at <Guide to Research Methods: The Evidence Pyramid: <http://servers.medlib.hscbklyn.edu/ebm/2100.htm>> and discuss the different levels and types of studies. How does research in public health differ from research in medicine?



Teaching Tip

Inquire about library resources available to participants in their respective public health departments and agencies. Do they have a resource library? If not, promote awareness of NLM and NN/LM Web sites, resources, and services. Share handouts and other publications.

Additional References

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<<http://www.nphp.gov.au/publications/phpractice/schemaV4.pdf>>