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POSITION PAPER

Why Health Educators Need Epidemiology

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ABSTRACT *The aim of health education is to encourage health behaviors that promote a better quality of life and longer life expectancy. In the late 1960s, universities in the US began offering degree programs in health education. Most programs today require that at least one class be taken in epidemiology, where epidemiology involves the study of the distribution and determinants of disease frequency in human populations. In recent years, several competency areas have been set forth for health educators by the US National Commission for Health Education Credentialing. This paper specifically describes how training in epidemiology provides health educators with the ability to satisfy, in large part, these competency areas. The intent of this paper is to clarify to students and advisors of health education the rationale for requiring course work in epidemiology, as well as to emphasize that epidemiology is the cornerstone to all health education, whether conducted by physicians, nurses, or formally trained health educators.*

KEYWORDS *Behavior change, evidence-based, disease prevention, health promotion*

Introduction

Epidemiology is the foundation of public health. It involves the study of the distribution and determinants of disease and health-related conditions in human populations, with application of this study for preventing health problems (Last, 1995). Most epidemiologic study involves identifying associations between one type of event or characteristic and a disease or health-related outcome. Where relations exist, biologic and other information (i.e. temporal sequence, dose-response relations, consistency of evidence) is combined for

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making judgments about causality. Modern epidemiology covers both communicable and noncommunicable infectious diseases, injuries, birth defects, maternal–child health, occupational health, environmental health, behaviors related to health, and more.

An epidemiologic foundation that identifies the distribution and determinants of disease and health-related conditions in specified populations sets the stage for health education interventions. For example, epidemiologic research identified that infection with hepatitis B virus (HBV) was the primary cause of liver cancer and disabling chronic liver disease in large parts of the developing world, including Africa, Asia, and the Pacific Basin (Cohet, 2001). Nearly the entire population in these regions of the world has been exposed to HBV and 5–30% are chronic carriers. With the causal influence of HBV established and the extent of the public health problem identified, an effective vaccine against hepatitis B was then developed.

The high prevalence of HBV in many developing countries was established through epidemiologic survey data. Since 1986, the International Agency for Research on Cancer (IARC) has conducted a collaborative intervention study in the Gambia on the efficacy of vaccination of newborn infants against HBV (Cohet, 2001). Long-term surveillance is being conducted of 60,000 vaccinated children compared to a similar group of children not vaccinated to identify the efficacy of the vaccination at decreasing risk of liver cancer and chronic liver disease. Thus far, vaccinated children are 95% less likely to be infected by HBV, and long-term surveillance will determine whether they are less likely to develop liver cancer.

Setting the Stage for Health Education

Epidemiologic studies have already identified numerous causes of major diseases and health-related conditions throughout the world. The encouraging news is that the majority of these conditions involve modifiable causes (risk factors) that can be avoided through lifestyle and environmental change. For example, reducing the majority of cancer would require not smoking, eating a healthy diet, not drinking too much alcohol, not becoming overweight, protecting oneself against extreme sun exposure, avoiding exposure to known carcinogens, observing health and safety regulations, avoiding unprotected sexual intercourse, and participating in vaccination programs. Thus, health education interventions that effectively promote these types of behavior changes and improve health status are of great importance.

In the midst of a global smoking epidemic, this modifiable risk behavior has received the attention of researchers and health officials throughout the world. In 1950, Wynder and Grahm were among the first to employ an epidemiologic case-control study design to show a relation between smoking and bronchiogenic carcinoma (Wynder & Grahm, 1950). Although prior case reports had

suggested a link between smoking and cancer, the case-control study design employed a scientific approach that provided convincing support of a causal relation. Since then, large-scale case-control and cohort studies, along with biologic and other supporting information, have established a causal link between smoking and cancers of the lung and bronchus, as well as numerous other forms of illness and death (English *et al*., 1995; Fox *et al*., 1995; Shultz *et al*., 1991). More common conditions linked to smoking include cancer (lip and oropharyngeal, esophageal, stomach, anal, pancreatic, laryngeal, lung and bronchus, bladder, renal, and cervical), ischemic heart disease, stroke, arterial disease, pneumonia and influenza, chronic obstructive pulmonary disease, and ulcers. Unfortunately, smoking prevalence is rapidly increasing in many developing countries, reaching staggering proportions in places like China, where as many as 70% of middle aged men smoke (Cohet, 2001). If current smoking trends continue, deaths from tobacco-related diseases is expected to increase from 3.0 million deaths in 1990 to 8.4 million deaths in 2020 (Murray & Lopez, 1997).

Complexities of Health Education

Physicians and nurses have historically played a central role in providing health education to their patients and to the community. Contributions of formally trained health educators are a more recent phenomenon. Health education's intellectual roots can be traced to Kurt Lewin's pioneering work in group process and his developmental field theory during the 1930s and 1940s. In 1968, Ball State in Muncie, Indiana (USA) became the first university to offer an actual degree in health education. Since then, most universities in the US have adopted such programs, and graduates have taken positions in a variety of settings to motivate behavior change and improved health status.

Many successes in health education may be attributed to rapidly improving knowledge of modifiable risk factors and clearer identification of high-risk populations, as reflected through advances in epidemiologic research. Epidemiology has dramatically improved the health message of physicians, nurses, and formally trained health educators. Yet, even an understanding of important risk factors and at-risk populations does not necessarily mean health education efforts will be effective at influencing behavior change and improving health. Promoting such change is often complex and requires an interdisciplinary approach, as reflected in the curriculum of modern health education programs. In particular, along with an epidemiologic foundation, effective health education practice often requires working through proper administrative channels and possibly changing policy, being sensitive to cultural norms and resource constraints, and tailoring health messages that frequently require application of theories such as stages of change, group process dynamics, and social marketing.

Entry-Level Competency Areas of Health Education

Eight entry-level competency areas for health educators have been set forth by the US National Commission for Health Education Credentialing (NCHEC, 1996). We thought it important to identify how epidemiology supports these competency areas. The eight competency areas are listed below, along with discussion of how epidemiology might be reflected.

1. Assessing Individual and Community Needs for Health Education
Epidemiology allows us to understand the natural history of disease, from a given event or characteristic to a disease or health-related outcome. It is often only after an event or characteristic has been identified as causing a disease and the extent of that event or characteristic determined that needs assessment can be effectively formulated and a prevention program developed and critically evaluated. For example, epidemiologic study identified that human papillomavirus (HPV) explains almost all cancer of the uterine cervix. HPV has also been identified as an important cause of anal, vulva, and penis cancers, and to a lesser extent a cause of oropharynx and skin cancers. The primary mode of transmission of HPV is sexual intercourse, especially at a young age and with multiple sexual partners. Health educators should focus their interventions of abstention or safe-sex practices on populations where descriptive epidemiology identifies high levels of HPV or cancers related to the virus.

2. Establishing Programs with Appropriate Priorities
Establishing priorities in health education presupposes that we know our target audience. Are people not practicing safe sex because they are not aware of the associated risks or because of other reasons? What are those reasons? Descriptive epidemiologic methods such as cross-sectional survey data are often useful for providing answers to such questions.

3. Goals and Objectives for Satisfying those Needs
An epidemiologic description of patterns and trends of specific risk factors and disease outcomes is an effective approach for establishing relevant and realistic goals and objectives. This is the approach taken in several key health documents in the United States. For example, on the basis of descriptions of patterns and trends of risk factor and disease data, *Healthy People 2000* proposed 332 specific objectives for improving health status. *Healthy People 2010* proposed 467 objectives organized into 28 focus areas for improving health status.

4. Carrying Out the Program
Carrying out health interventions requires proper clearances from institutional review boards (IRB) and often other organizations and agencies. These groups, along with potential funding sources, often mandate a scientific approach with

quantifiable justification of needs and likelihood of success. Epidemiologic methods provide the scientific approach.

5. Evaluating the Effectiveness of that Program

The scientific approach taken in epidemiology is often unambiguous and convincing. For example, an intervention study design, such as used in determining the efficacy of a vaccination against HBV, may minimize potential biases by employing a large sample size and using randomization and blinding procedures. Otherwise, even well intentioned researchers may promote interventions that are ineffective and possibly damaging. In addition, once the effectiveness of a health intervention has been established, use of epidemiologic surveillance is often useful. For instance, monitoring HBV over time through a series of cross-sectional assessments of the population will allow us to determine the level of adoption of the vaccine and where breakdowns in the vaccination program may occur.

6. Playing a Role in Coordinating Program Provision

There are several aspects of effective program coordination that are unrelated to epidemiology. However, it is unlikely that a program coordinator who has not played an active role in competency areas 1 through 5, along with their epidemiologic aspects, would be as effective a coordinator as one who has.

7. Being a Resource Person

A resource person should have a good understanding of the health problem as it relates to the individual and community; the rationale and justification for intervention, with its corresponding goals and objectives; and be able to communicate in a clear and concise manner. Without a basic knowledge of epidemiology, it is unlikely the resource person will understand the natural history of the disease and the study design used, with its strengths and weaknesses; be able to accurately describe the extent of the public health problem, and fully understand the basis for the proposed goals and objectives of the intervention.

8. Communicating to Individuals and the Community Health Education Needs and Resources

Health educators should have an ability to communicate technical information clearly, concisely, and accurately. If a health educator does not understand epidemiologic measures commonly used for describing disease and health-related conditions (e.g. age-adjusted incidence rates, prevalence proportions, risk ratios) or potential limitations in the very studies supporting the need for intervention (e.g. small sample size, bias, and confounding), then effective communication is unlikely. On the other hand, familiarity with epidemiologic methods will allow the health educator to effectively describe and justify, in a clear and concise way, health needs and program effectiveness.

Advanced-Level Competency Areas of Health Education

Advanced-level competencies specified for graduate training in health education include applying appropriate research principles and methods in health education, administering health education programs, and advancing health education programs (NCHEC, 1999). Numerous research principles and methods have been developed in the area of health education for changing the capacity of individuals, social networks, and communities such that behavior and health status improvements may occur. Yet, as emphasized, the scientific foundation upon which these principles and methods are based and the means for evaluating their effectiveness is epidemiology.

Conclusion

While physicians and nurses have historically been the primary source of health education to their patients and the community, today formally trained health educators also play an important role in providing health education to the public. In order to promote good health, health education programs aim to train health educators with the skills to, among other things, effectively identify individual and community health needs, develop health programs with appropriate priorities, establish appropriate goals and objectives that satisfy health needs, carry out the program and evaluate its effectiveness, and effectively communicate to individuals and the community health education needs and resources. As theory and methods in the area of health education continue to advance, students and advisors cannot lose sight of the epidemiologic foundation upon which the discipline is based. Health educators who do not obtain an adequate understanding of epidemiology threaten to undermine the discipline by promoting messages that are potentially misleading, misdirected, and damaging. There are too many examples of failed health education programs. There are also many examples of successful health education programs and the important role of epidemiology in these successes should be appreciated among health educators.

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