Prevention: implications for nursing research

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AN UNDERLYING construct of nursing practice is prevention. For decades, the nursing process has primarily emphasized the maintenance and restorative aspects of professional nursing practice. Nurse theorists have developed conceptual schemes or paradigms identifying activities and skills that nurses should utilize in assessing, implementing, and evaluating patient care. The best developed conceptualizations are concerned with the restorative aspects.

Certainly, the restorative aspects of patient care constitute a major function of nursing practice, but what about the preventive functions? Does nursing have evidence of strategies of preventive practice? Can this evidence be articulated to students as interventions that have been tested and are certain to work? Has nursing really been accountable for developing and contributing knowledge toward primary preventive care? Nurses need to systematically demonstrate to themselves, employers, patients, families, and commu-

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nities that the scope and quality of nursing practice has improved health outcomes.

During the past 20 years, medical expert groups, public administrators, and national leaders have repeatedly advised Americans to pursue more healthful life styles, to modify major risk factors for preventive purposes. Nursing has advocated an orientation of not only prevention, but a holistic basis of prevention for individuals, families, and communities.[1,2] A holistic approach is not just the sum of the psychological, social, and physiological factors, but rather an approach to health that recognizes patterns involved in a dynamic exchange between person and environment. This approach is oriented to understanding the person, not just the disease or symptom.

Alignment to the concepts of health has been well documented in the growing nursing literature. However, pursuit of empirical investigations concerning nursing's prevention orientation, particularly primary prevention and especially regarding family and community, reveals a dearth of information. "Nursing care" still usually means care of the sick, not promotion of the well.

Prevention has been clearly identified as the number one priority for present and future health care systems.[3-5] A substantial number of investigations have been conducted to determine disease etiologies and treatment modalities. However, scientific verification of procedures for preventing major disease is limited due to lack of knowledge and tested approaches to modification of individuals' behaviors and attitudes.

Cigarette smoking has been established as a major causal agent in lung cancer and coronary heart disease, yet more than 50 million Americans, or approximately one-third of the adult population, continue to smoke.[6] Hypertension can now be alleviated by ongoing medication(s) and/or weight reduction, but how can individuals be motivated to take these drugs at prescribed times and lose weight, especially when no overt symptoms are evident? In spite of today's scientific and technological knowledge level, implementation of successful methods for the specific prevention of most cases of heart disease, cancer, and stroke is lacking.[3(p247)]

PREVENTION IN NURSING PRACTICE

Florence Nightingale conceptualized illness as nature's way of making the body become aware, thus prompting action to diminish the factors that interfer with health.[7] She believed that nursing's role was to help minimize or reduce those factors that inferfere with health. The first nursing textbook in America, written by Clara Weeks Shaw in 1885, stressed maintenance and promotion of health and prevention of disease.[7,8] Lillian Wald, through her knowledge of principles of prevention and health promotion, established visiting nursing programs during 1893-1895, maternity home care for mothers and new babies; school nursing in 1902; and the National Organization of Public Health Nursing in 1912.[9] The American Public Health Association expected visiting nursing to deliberately plan "that every family in the land shall have instruction in the laws and practice of health."[8(p269)] Thus, the concept of prevention was firmly

grounded in the earliest history of nursing practice.

Several contemporary nurse educators have defined nursing as primarily assisting the individual to identify those practices or strategies contributing to health and/or recovery from illness.[7,10-12] Neuman's perspective of nursing attends directly to the concept of primary prevention:[1(p124)]

> Intervention can begin at any point at which a stressor is either suspected or identified. One would carry out the intervention of primary prevention since a reaction had not yet occurred, though the degree of risk or hazard was known or present.

Three levels of prevention have been identified in the nursing literature: primary, secondary, and tertiary.[1,13] Since the 1950s, operational definitions of the various levels have multiplied but conceptual clarity has decreased.[13(p104)]

Shamansky and Clausen, clarifying the constructs of prevention, reviewed 15 community/public health nursing texts, 9 of which failed to even mention prevention. Of those that did, examples of each level of prevention were designated as inconsistent or inaccurate.[13(p105)] These two authors have perhaps depicted most clearly and comprehensively the three levels of prevention as follows:[13(p106)]

> Primary prevention is prevention in the true sense of the word; it precedes disease or dysfunction and is applied to a generally healthy population. The targets are those individuals considered physically or emotionally healthy, exhibiting normal or maximum functioning.

Primary prevention does not consist of symptom identification and the use of therapeutic skills. This level of prevention is conceptualized as promoting optimal health through client education and providing the necessary emotional support, information, and attitudinal analysis for decision making about a given health condition.[13(p106)]

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Secondary prevention begins once pathology has been identified. Emphasis here is on early diagnosis and prompt intervention to halt the pathological process. The primary objective is to help the individual to regain normal function at the earliest possible point. Thus, secondary prevention would incorporate a comprehensive nursing assessment, including necessary screening procedures.

Tertiary prevention is centered around rehabilitation and restoration of an individual with a defect or disability that is fixed, stabilized, or irreversible. Congruent nursing activities, for example, would stress the importance of education on care of the extremities, exercise, and diet for the diabetic patient.

Nursing, with accessibility to ill clients, their families, and the community, has a unique opportunity and responsibility for the development of theory and techniques for preventive health care. This is critical with the most prevalent diseases, where early intervention could retard or minimize certain factors inherent in the disease process. The levels of prevention should

dictate the specific components of nursing intervention strategy to be tested. Nursing activities will change depending on which level of prevention is indicated.

For example, a nursing intervention strategy designed for primary prevention might include assessing, educating, informing, and providing emotional support. Secondary prevention may need to incorporate appropriate medical evaluation and screening, and tertiary intervention would require rehabilitation and convalescent care within the intervention strategy. A unified theoretical basis should guide nursing research in the effort to prevent disease and to maintain and promote health. The various levels of prevention need clarification as a first step in development of preventive theory.

EPIDEMIOLOGIC THEORY: ANTECEDENT TO PREVENTION

Much of the nursing research thus far has not obtained information on intraindividual patterns or health trends.[14] The majority of studies have not examined descriptors of health over time. They have usually been too small to make inferences regarding frequency and distribution of patterns in populations.

Development of theory for preventive practice that describes, explains, and predicts these patterns requires methods compatible with the dynamic nature of the phenomena and the complexity of nursing practice. Nursing researchers themselves should be dynamic, changing their emphasis as problem situations fluctuate or shift into new areas. In the area of planning preventive strategies and evaluating the effectiveness of existing strategies, the data and techniques of epidemiology can be used to good advantage.

Epidemiology has struggled with the problems of investigating and identifying dynamic patterns in health and illness. Although historically rooted in the elucidation of disease, the methods and logic of this approach center around the identification of patterns in man's relationship to the environment. Epidemiological investigations have focused on a central axiom: Health and illness do not distribute randomly in human populations.

As a first corollary of this axiom, nonrandom aggregations of health and illness are manifested along axes of time, space, individual personal characteristics, and certain community characteristics. The second corollary states that variations in the patterns of health and illness occur in response to variations in the intensity of exposure to certain precipitating agents or to variations in the susceptibility of individuals to the operation of those precipitators.[15] Understanding health-illness patterns as they affect masses of people requires epidemiologic data to describe the community and examine community-wide factors such as knowledge of the people, their health problems, their protective resources, the local environment, personal habits, past history, and individual traits.

Research in nursing for preventive purposes can benefit from epidemiology in many ways. Available data on the distribution of health status in terms of age, sex, race, biological, socioeconomic, geographic, and life style characteristics can facilitate the groupings or classes to be investigated. The establishment of preventive theory in any discipline must be based

on inferences where the association represents more than random phenomena. Such inferences cannot be made from isolated observations of individual events.

According to Newman, the majority of the designs in nursing thus far have been one-shot comparisons of a particular characteristic in different age groups.[14(p71)] The data are reported in group averages, and in the case of cross-sectional designs, the assumption is made that the age groups are from the same population, knowing that there are generational differences.[14(p71)] An essential step in the development of preventive research and theory is the grouping of characteristics or events into classes for analysis to establish inferences about populations at risk, and therefore needing preventive health care.

The distribution patterns of health and illness can significantly contribute to an understanding of the type of nursing activities necessary for promotion of health and prevention of disease. For example, we are currently testing a nursing intervention designed to modify high-risk behaviors for coronary artery disease. Epidemiological studies have identified hypertension, hypercholesterolemia, cigarette smoking, and certain personality traits as risk factors that are strongly associated with the onset and advancement of coronary artery disease (CAD). People with certain combinations of these factors or patterns, with their complex interactions and synergistic effects, are potentially at greater risk for developing CAD.

We recognize, for example, that people with Type A personalities who lead a tense, compulsive, hurried life style are perhaps more apt to smoke, may have poor diets, and are highly susceptible to CAD. A pattern of life style behaviors may include the interaction of diet, high blood pressure, smoking, and stress. To aim the intervention at only smoking rather than the entire pattern of risk factors would be ineffective. An effective approach presently being designed addresses not only each of the individual factors but also the particular configuration of factors for given individuals and families. The specific nursing activities included are assessment of health history (two and three generations of family history), assessment of health beliefs and demographic data, education on CAD risk, and the provision of an emotionally supportive interaction style.

Epidemiological information has provided operational direction on the main educational thrust and risk factor analysis for the intervention strategy. It revealed that first-degree relatives (parents, siblings, and children) of victims of sudden coronary death are at particularly high risk for CAD.

Information and direction regarding familial aggregation patterns identified the population that would potentially benefit the most from nursing intervention. The intervention takes place at both the primary and secondary levels. Epidemiological data from prevention trials indicated the success of changing dietary habits in older people and pointed out an association between cancer and diets low in saturated fats.[16] This information is significant in determining how to operationalize interventions, at what level of prevention, and for what age groups.

The information obtained from epidemiological studies in the past century has identified numerous preventive health care

measures. Epidemiological studies—without help from the laboratory—can provide immediate, practical methods for preventing disease. For example, biochemistry still has not told us *how* cigarette smoke increases the probability of lung cancer, yet epidemiology has already confirmed that cancer and smoking are connected, and that not smoking markedly reduces the risk. No less firmly established is the epidemiological connection between poverty and disease, for example, malnutrition and alcoholism, that has curtailed the lives of many in ethnic minority groups.[17]

When several genetic factors are involved, as may be the case with diabetes, atherosclerosis, and schizophrenia, the risk factors are harder to identify, but there seems no reason why these cannot be found.[17(p497)] Epidemiological studies have suggested genetic explanations for hypertension and hypercholesterolemia.[18] These data and careful inquiry about the environmental factors interacting with genetic predispositions will help provide a more complete understanding of the CAD occurrence pattern in high-risk families.

How some environmental factors are implicated in certain illnesses is already known; a lot more needs to be discovered. There is still conjecture, for example, why of two identical twins, possessing the same inherited constitution, one becomes schizophrenic and the other does not—as occurs in more than half of such cases.[17(p497)] Here epidemiological studies can provide an invaluable tool, indicating how the environment of those who maintain health differs from those who become ill.

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THE PREVENTIVE APPROACH

Once the natural history of health and illness trends or a particular disease in a particular population has been established, the nurse researcher should design measures of prevention or control and evaluate their efficacy in practice. Successful health maintenance, achieved by modifying essential predisposing and/or precipitating factors, is the ultimate test of the preventive approach. A credible series of such successes can establish nursing as a necessary and accountable science in preventive health.

Range of investigative methods

Nursing can use research techniques ranging from observation of coincident illness and circumstances for formulating preventive measures to the experimental testing of intervention strategies touching the lives and health of human beings. The initial stimulus of preventive research can often come from a clinician's insight matching a coincidental life style or social characteristic with the onset or dissipation of a unique illness or health pattern. Another stimulus might come from reviewing vital statistics for either an

excessive or an unusually low health characteristic in a particular population group.

Comparison and correlation

The first step in the process of prevention is a comparison of certain characteristics in subgroups of human populations. This implies the observation of such groups over a period of time, noting the rate of onset of the defined characteristics among people differing in environmental circumstance and/or life style habits or patterns. The comparison, in practice, must often be restricted to the prevalence of the characteristic in particular groups or to the number of subjects existing in the population at one point in time.

The aim, whatever the method, is identical: to determine whether the risk of becoming ill or maintaining health is greater among groups of individuals with some characteristic in common than in others not exposed to that particular factor. In the same way, modifying risks for illness can be related to the experience of other similar groups living in different places, at different times, and under different circumstances. Incidence rates can be correlated with the other indicators of present or past behaviors and environments.

From observation to verification

Extensive observation is designed to provide clues that can be followed by more intensive investigation. The process of investigation can be demonstrated by examining the psychological problems encountered by air gunners, pilots, and navigators during World War I. Aviators exhibited symptoms of cardiovascular and psychic dysfunction frequently described as "flying stress"—an illness believed to affect the central nervous system after bombardment by physical stresses such as cold, noise, and lack of oxygen. However, examination revealed that these aviators lacked a prolonged history of those physical stresses. Clinical histories strongly suggested an association with psychological factors, the anxiety and fear produced by terrifying experience in action, particularly in men predisposed to neuroses.

To ensure the health of the aviators and plan preventive measures, it was important to know whether (1) the risk of illness was related to the intensity of such environmental stresses; (2) the majority of the subjects emerged because certain individuals became neurotic under relatively minor combat stresses; or (3) there was evidence of cumulative "fatigue," due to prolonged exposure to the physical and emotional stresses involved in combat operational flying. If the first two of these hypotheses provided the whole of the explanation, health control could come from different air crew selection, and the manner of selection would have to be investigated; if the last, curtailment of the tour of operational service would be of paramount importance. Finally, the personal characteristics were brought into focus with the discovery of a higher incidence of neuroses among air gunners. They had more arduous and exacting duties and were less strictly selected than pilots and navigators. Analysis at this stage suggested that the immediate effects of operational stress on men temporarily predisposed to neuroses accounted for more cases than

did cumulative "fatigue." Screening out susceptible individuals appeared to give a better prospect of control than did giving the gunners shorter combat tours.[19]

Traditionally, the most fundamental criterion of a cause and effect relationship is that the possible agent and the disease should always be found together; conversely, if the agent is absent, so is the illness. If, for example, neurosis in aviators was precipitated by severe psychological stress, the illness should occur at times when severe stress is present or at a consistent interval thereafter; without stress there would be no illness. This proposition must be qualified by knowing that no other factors likely to be relevant to the onset of the illness are present at the same time. More simply, comparisons between stressful and nonstressful situations are valid only when all the other factors are held constant. Further, it is necessary to require that the incidence of the specific illness should vary in the same manner as the intensity of the supposed etiological factor. Here the incidence of illness varied with the stresses implied in the casualty rates that these gunner crews had to face.

The simple framework thus outlined is more appropriate in the investigation of highly susceptible communities, where a single precipitating factor usually has an overwhelming effect. The introduction in 1951 of measles into the previously unexposed, unvaccinated people of Greenland resulted in over 97% of the population developing the disease. As another example, the recent studies of women with confirmed toxic shock syndrome have established the predisposing role of staphylococcus aureus and the precipitating role of tampons in its etiology.[20] Most afflictions needing preventive measures consist of both predisposing characteristics of the individual and precipitating effects of the immediate environment. Assessment of their separate influence, or the interaction between them that determines health or illness, often requires more sophisticated conceptual models. Conceptual models that interrelate such natural aspects as genetic makeup, developmental patterns, environmental contaminants, social support, and coping mechanisms are necessary for discerning patterns in health and illness. The constraints of investigating and integrating these multiple interacting forces are problematic but not impossible. The analysis of data from naturally occurring events is inevitably complex and usually demands the use of sophisiticated statistical techniques, such as multiple regression analysis.

Whether the conceptual model dictates a multidisciplinary or specific discipline approach, extensive observation must be a first step, followed by intensive study. Rigorous study may take the form of an experiment testing a certain primary prevention nursing intervention approach or comparing incidence rates in population groups similar in all but one vital respect, starting with the sick and comparing with a nonsick control group. If, for example, one wishes to test the relevance of frightening experience or family history of mental illness as precipitating or predisposing factors in the neurotic breakdown of pilots, one would compare their past histories with those of a group of their colleagues matched by age and operational experience.

Planned observation and experiment both need to ensure that the two groups being compared are similar in all respects of subsequent importance. Epidemiological data can provide significant information and direction for matching groups, as well as providing information on already tested preventive measures.

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