

The Health Belief Model and Health Behavior

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INTRODUCTION

Since the 1950s, the health belief model (HBM) has been one of the most widely used conceptual frameworks in the health behavior field. The HBM has been used to explain change and maintenance of health-related behaviors, as a guiding framework for health behavior interventions, and as a guide in evaluating intervention programs. The HBM has been expanded, broken down into components, compared to other frameworks, and analyzed using a wide array of multivariate analytical techniques. It is likely that the HBM has been *misused* in the health behavior area more than most other conceptual frameworks have been used. This overuse is due in part

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to the lack of specification of the relationships among the content, importance, and measurement of health beliefs (Ronis, 1992; Weinstein, 1993). The HBM has become to some extent a projective test that users interpret in ways that best match their concept of health behavior change. With broad concepts set into only roughly specified relationships, it is not surprising to see so many interpretations of the HBM.

Since the 1970s, however, more research has been conducted to specify measures of health beliefs and relationships among those beliefs. In addition, other models of health-related behaviors have received increasing attention; there are now new perspectives for explaining, predicting, and intervening in health-related behaviors. These new models have provided new insight into more dynamic relationships among health beliefs.

This chapter reviews the ideas embodied in the HBM that remain vital. It also examines other psychosocial constructs that further explain relationships within the HBM. It is not another review of HBM research findings, such as those that have been done in the two previous decades (Becker, 1974a; Janz & Becker, 1984). Even mid-1990s research continues to look at individual

health beliefs, placing them in multivariate analyses and looking at their predictive qualities. This type of analysis adds little to the specificity of measurement or the relationships among health beliefs. Instead, this chapter focuses on three aspects of the HBM: measurement of HBM constructs, the relationships among HBM constructs, and how to use the HBM for real problems in field situations.

The chapter begins by describing the origins of the HBM and its place in psychosocial theory. It then discusses in some detail issues related to the measurement of and relationships among HBM constructs, areas that have received only minimal attention. The chapter then discusses how the HBM can be used to explain and intervene in AIDS-related behavior and in addictive behaviors. These examples are used because they represent two very different, behaviorally based public health problems in our society. Finally, the chapter offers recommendations for researchers and journal reviewers.

ORIGINS OF THE HEALTH BELIEF MODEL

The health belief model was initially developed in the 1950s by a group of social psychologists in the U.S. Public Health Service in an effort to explain the widespread failure of people to participate in programs to prevent or to detect disease (Hochbaum, 1958; Rosenstock, 1966). Later, the model was extended to apply to people's responses to symptoms (Kirscht, 1974) and to their behavior in response to diagnosed illness, particularly compliance with medical regimens (Becker, 1974b). Although the model evolved gradually in response to very practical programmatic concerns to be described below, its basis in psychological theory is provided as an aid to understanding its rationale as well as its strengths and weaknesses.

During the early 1950s, academic social psychology was engaged in developing an approach to understanding behavior that grew out of a

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confluence of learning theories derived from two major sources: stimulus-response (S-R) theory (Hull, 1943; Thorndike, 1898; Watson, 1925) and cognitive theory (Kohler, 1925; Lewin, 1935, 1936, 1951; Lewin, Dembo, Festinger, & Sears, 1944; Tolman, 1932). S-R theory itself represents a marriage of classic conditioning theory (Pavlov, 1927) and instrumental conditioning theory (Thorndike, 1898).

In simple terms, S-R theorists believe that learning results from events (termed *reinforcers*) that reduce physiological drives that activate behavior. In the case of punishment, behavior that avoids punishment is learned because it reduces the tension set up by the punishment. The concept of drive reduction, however, is not necessary to S-R theory. Skinner (1938) formulated the widely accepted hypothesis that the frequency of a behavior is determined by its consequences (or reinforcements). For Skinner, the mere temporal association between a behavior and an immediately following reward is sufficient to increase the probability that the behavior will be repeated. Such behaviors are termed *operants*; they operate on the environment to bring about changes that result in reward or reinforcement. In this view, no mentalistic concepts such as "reasoning" or "thinking" are required to explain behavior.

Cognitive theorists emphasize the role of subjective hypotheses or expectations held by the subject (e.g., Lewin et al., 1944). In this perspective, behavior is a function of the subjective *value* of an outcome and of the subjective probability, or *expectation*, that a particular action will achieve that outcome. Such formulations are generally termed *value-expectancy* theories. Mental processes such as thinking, reasoning, hypothesizing, and expecting are critical components of all cognitive theories. Cognitive theorists, along with behaviorists, believe that reinforcements, or consequences of behavior, are important. For cognitive theorists, however, reinforcements operate by influencing expectations (or hypotheses) regarding the situation, rather than by influencing behavior directly (Bandura, 1977).

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The HBM is a value-expectancy theory. When value-expectancy concepts were gradually reformulated in the context of health-related behavior, the translations were as follows: (1) the desire to avoid illness or to get well (value) and (2) the belief that a specific health action available to a person would prevent (or ameliorate) illness (expectation). The expectancy was further delineated in terms of the individual's estimate of personal susceptibility to and severity of an illness and of the likelihood of being able to reduce that threat through personal action.

The development of the HBM grew out of real concerns with the limited success of various programs of the Public Health Service in the 1950s. One such early example was the failure of large numbers of eligible adults to participate in tuberculosis screening programs provided at no charge and in mobile X-ray units conveniently located in various neighborhoods. The program operators were concerned with identifying those factors that were facilitating or inhibiting participation.

Beginning in 1952, Hochbaum (1958) studied probability samples of more than 1200 adults in three cities that had conducted recent TB screening programs in mobile X-ray units. He assessed their "readiness" to obtain X-rays, which included their beliefs that they were susceptible to TB and their beliefs in the personal benefits of early detection. Perceived susceptibility to TB itself comprised two elements: (1) the respondents' beliefs about whether contracting TB was a realistic (not merely a mathematical) possibility for them personally and (2) the extent to which they accepted the fact that one might have TB in the absence of any symptoms.

The measure of perceived personal benefits of early detection also included two elements: whether respondents believed that X-rays could detect tuberculosis prior to the appearance of symptoms and whether they believed that early detection and treatment would improve the prognosis. For the group of persons that exhibited both beliefs, i.e., belief in their own susceptibility to TB and the belief that overall benefits

would accrue from early detection, 82% had had at least one voluntary chest X-ray during a specified period preceding the interview. Of the group exhibiting neither of these beliefs, only 21% had obtained a voluntary X-ray during the criterion period. In short, 4 of 5 people who exhibited both beliefs (susceptibility and benefits) took the predicted action, while 4 of 5 people who accepted neither of the beliefs had not taken the action. Hochbaum thus demonstrated with considerable precision that a particular action to screen for a disease was strongly associated with the two interacting variables—perceived susceptibility and perceived benefits.

Hochbaum also thought that the readiness to take action (perceived susceptibility and perceived benefits) could be potentiated only by other factors, particularly by "cues" to instigate action, such as bodily events, or by environmental events, such as media publicity. He did not, however, study the role of cues empirically. Indeed, while the concept of cues as a trigger mechanism is appealing, it has been most difficult to study in explanatory surveys; a cue can be as fleeting as a sneeze or the barely conscious perception of a poster.

COMPONENTS OF THE HEALTH BELIEF MODEL

Over the years since Hochbaum's survey, many investigations have helped to expand and clarify the health belief model and to extend it beyond screening behaviors to include all preventive actions to illness behaviors and to sick role behavior (see the summaries in Becker, 1974b; Janz & Becker, 1984; Kirscht, 1974). In general, it is now believed that individuals will take action to ward off, to screen for, or to control ill-health conditions if they regard themselves as susceptible to the condition, if they believe it to have potentially serious consequences, if they believe that a course of action available to them would be beneficial in reducing either their susceptibility to or the severity of the condition, and

if they believe that the anticipated barriers to (or costs of) taking the action are outweighed by its benefits. The definitions and commentary that follow specify the key variables in greater detail.

Perceived Susceptibility. This dimension refers to one's subjective perception of the risk of contracting an illness. In the case of medically established illness, the dimension has been reformulated to include acceptance of the diagnosis, personal estimates of resusceptibility, and susceptibility to illness in general.

Perceived Severity. Feelings concerning the seriousness of contracting an illness or of leaving it untreated include evaluations of both medical and clinical consequences (e.g., death, disability, and pain) and possible social consequences (such as effects of the conditions on work, family life, and social relations). The combination of perceived susceptibility and severity has come to be labeled *perceived threat*.

Perceived Benefits. While acceptance of personal susceptibility to a condition that is also believed to be serious (perceived threat) produces a force leading to behavior, the particular course of action taken depends upon beliefs regarding the effectiveness of the various available actions in reducing the disease threat, termed the *perceived benefits* of taking health action. Other factors include non-health-related benefits (e.g., quitting smoking to save money, getting a mammogram to please a family member). Thus, an individual who exhibits an optimal (high) level of beliefs in susceptibility and severity would not be expected to accept any recommended health action unless that action was perceived as potentially efficacious.

Perceived Barriers. The potential negative aspects of a particular health action, or the perceived barriers, may act as impediments to undertaking the recommended behavior. A non-conscious cost-benefit analysis occurs wherein

the individual weighs the expected effectiveness of the action against perceptions that it may be expensive, dangerous (having negative side effects or iatrogenic outcomes), unpleasant (painful, difficult, upsetting), inconvenient, time-consuming, and so forth. Thus, in the words of Rosenstock (1974, p. 332), "The combined levels of susceptibility and severity provided the energy or force to act and the perception of benefits (less barriers) provided a preferred path of action."

Cues to Action. In various early formulations of the HBM, the concept of cues that trigger action were discussed. These cues may ultimately prove to be important, but they have not been systematically studied.

Other Variables. Diverse demographic, sociopsychological, and structural variables may affect the individual's perceptions and thus indirectly influence health-related behavior. Specifically, sociodemographic factors, particularly educational attainment, are believed to have an indirect effect on behavior by influencing the perception of susceptibility, severity, benefits, and barriers.

Self-Efficacy. In 1977, Bandura introduced the concept of self-efficacy, or efficacy expectation, as distinct from outcome expectation (Bandura, 1977, 1986), which must be added to the HBM in order to increase its explanatory power (Rosenstock, Strecher, & Becker, 1988). Outcome expectation, defined as a person's estimate that a given behavior will lead to certain outcomes, is quite similar to the HBM concept of perceived benefits. Self-efficacy is defined as "the conviction that one can successfully execute the behavior required to produce the outcomes" (Bandura, 1977, p. 79). Lack of efficacy is viewed as a perceived barrier to taking a recommended health action.

It is not difficult to see why self-efficacy was never explicitly incorporated into early formulations of the HBM. The original focus of the early

model was on circumscribed preventive actions, usually of a one-shot nature, such as accepting a screening test or an immunization — actions that generally were simple behaviors for most people to perform. Since it is likely that most prospective members of target groups for those programs had adequate self-efficacy for performing those simple behaviors, that dimension was not even recognized.

The situation is vastly different, however, in working with lifestyle behaviors requiring long-term changes. The problems involved in modifying lifelong habits concerning eating, drinking, exercising, smoking, and sexual practices are obviously far more difficult to surmount than are those for accepting a one-time immunization or a screening test. One must have a good deal of confidence that one can alter such behaviors before one can successfully change them. Thus, for behavior change to succeed, people must (as the original HBM theorizes) feel threatened by their current behavioral patterns (perceived susceptibility and severity) and believe that change of a specific kind will be beneficial by resulting in a valued outcome at acceptable cost, but they must also feel themselves competent (self-efficacious) to overcome perceived barriers to taking action. A growing body of literature supports the importance of self-efficacy in helping to account for initiation and maintenance of behavioral change (Bandura, 1986; Strecher, DeVellis, Becker, & Rosenstock, 1986).

The original HBM focused on cognitive variables. Efforts to change cognitions about health matters, however, have often involved attempts to arouse fear through threatening messages (Leventhal, 1970). According to protection motivation theory (Rogers, 1975), the most persuasive communications are those that arouse fear while enhancing perceptions, central to the HBM, of the severity of an event, the likelihood of exposure to that event, and the efficacy of responses to that threat. More recently, Rogers (1983) incorporated self-efficacy into his theory. This view of the joint role of fear and reassurance

in persuasive communications is generally accepted.

Summary. As a convenient way of summarizing the HBM components, the key variables are subsumed under three categories, which are summarized in Figure 1.

EVIDENCE FOR AND AGAINST THE HEALTH BELIEF MODEL

In 1974, *Health Education Monographs* devoted an entire issue to "The Health Belief Model and Personal Health Behavior" (Becker, 1974a). That monograph summarized findings from research on the HBM to understand why individuals did or did not engage in a wide variety of health-related actions. The monograph provided considerable support for the model in explaining behavior pertinent to prevention and behavior in response to symptoms or to diagnosed disease. During the decade following publication of the monograph, the HBM continued to be a major organizing framework for explaining and predicting acceptance of health and medical care recommendations. Accordingly, an updated critical review was made of HBM studies conducted between 1974 and 1984, which also combined the new results with earlier findings to permit an overall assessment of the model's performance (Janz & Becker, 1984). Space limitations do not permit more than a brief summary of the findings of the detailed reviews of 1974 and 1984; the interested reader should consult those sources for details.

Included in the 1984 review were such preventive health and screening behaviors as influenza inoculations, practice of breast self-examination, and attendance at screening programs for Tay-Sachs carrier status, high blood pressure, seat belt use, exercise, nutrition, smoking, visits to physicians for checkups, and fear of being apprehended while under the influence of alcohol. Sick role behaviors included compliance with

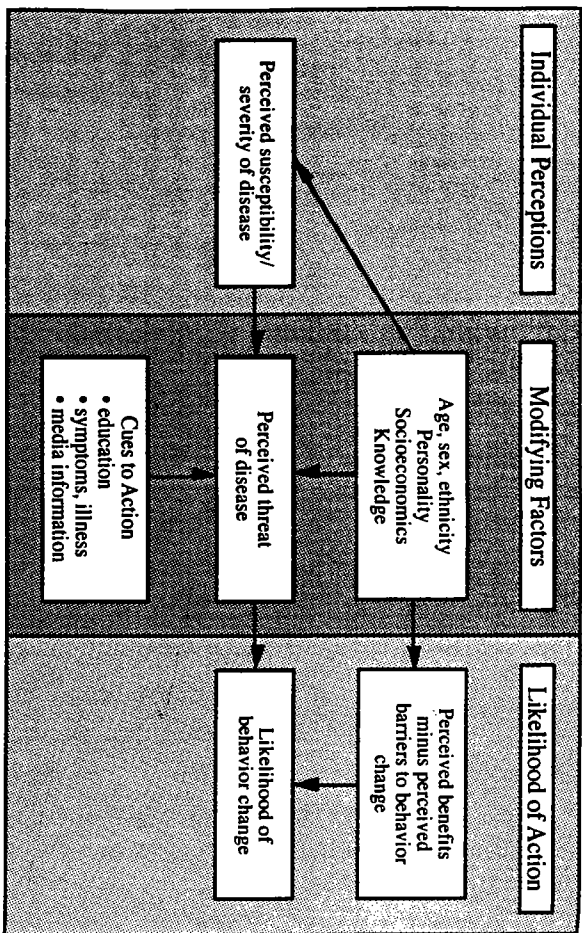


Figure 1. Summary of the key variables in the health belief model.

antihypertensive regimens, diabetic regimens, end-stage renal disease regimens, medication regimens for parents to give their children with otitis media, weight loss regimens, and medication regimens for parents to give to asthmatic children.

Summary results provided substantial empirical support for the HBM, with findings from prospective studies at least as favorable as those obtained from retrospective research. Perceived barriers was the most powerful single predictor of the HBM dimensions across all studies and behaviors. While both perceived susceptibility and perceived benefits were important overall, perceived susceptibility was a stronger predictor of preventative health behavior than sick role behavior, while the reverse was true for perceived benefits. Overall, perceived severity was the least powerful predictor; however, this dimension was strongly related to sick role behavior. Researchers have frequently attempted to

operationalize concepts related to the HBM. Although measures have been developed for specific studies, researchers have not always adequately addressed validity and reliability issues. In addition, many researchers have worked in isolation with few attempts to build on previous work. Given the futility of exploring a theory without simultaneously addressing measurement issues, the following section discusses some of the major attempts to conceptualize and operationalize HBM concepts. Issues related to measurement of the HBM are addressed, as well as suggestions for future studies.

FACTOR ANALYSES AND DEFINITIONS

The development of measures for health belief model concepts has spanned several decades. One of the early attempts was published by

Maiman, Becker, Kirscht, Haeflner, and Drachman (1977), who specified constructs such as general health motivation, perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. In this report, the general health concern index included a mother's concerns about her child's general health, her health behavior practices related to the health of the child, and her concern about her own health. Perceived susceptibility was defined as the mother's sense of the probability of a child's developing acute or chronic conditions. Perceived seriousness ratings referred to the same acute or chronic conditions. Perceived benefits included faith in the ability of the medical care system to cure conditions and the perceived benefits of weight loss (a dependent variable). Barriers consisted of likelihood of diet-related problems and perceived safety of diet. Reliability findings using consistency coefficients were reported for separate scales and for overall health concern, threat, and diet benefits. Regression analyses yielded results supporting the significance of general health concern, susceptibility, seriousness, and benefits in predicting weight loss. The authors of this study are to be applauded for their attempt to develop indices to measure HBM concepts; however, their measures require greater specificity and direction. For instance, perceived susceptibility and severity do not relate to a specific disease. Benefits are not behavior-specific and barriers refer only to diet-related problems.

A more comprehensive attempt at HBM construct validation was conducted by Cummings, Jette, and Rosenstock (1978). In this study, a multitrait, multimethod design was used to measure concepts of health interest, control, susceptibility, severity, benefits, and barriers. Although health interest and health locus of control related to general health matters, susceptibility, severity, benefits, and barriers were specific to influenza vaccination. Each construct was measured by fixed alternative multiple-choice scale, vignette, and Likert scale. The multimatrix, multimethod correlation matrix supported multiple choice and Likert formats, whereas measurement by vi-

genetic resulted in significantly lower correlations. In addition, discriminant validity was indicated by perceptions of benefits and barriers that differed substantially from those that pertained to susceptibility or severity. Because a convenience sample of 85 graduate students was used, however, generalization is limited. Nonetheless, these initial attempts at construct validation were important forerunners of later studies.

An important contribution to concept measurement of scales was added by Jette, Cummings, Brock, Phelps, and Naessens (1981), who questioned the lack of attention given to validity and reliability of measures. Three important questions were addressed by these investigators: distinctions among concepts, reliability of indices of concepts, and stability across samples. In this study, questionnaires were developed with items measuring susceptibility, seriousness, general health motivation, general health concerns, barriers to taking prescribed medication, health locus of control, trust in physicians, and health status. Questions were borrowed from previous studies in an appropriate attempt to build on samples were used, and factor analysis supported the structural similarity of some health belief measures across two independent samples. Reliability coefficients ranged from 0.31 to 0.72. Interpretable factors that emerged from both samples included general health threat, perceived barriers to taking medication, perceived severity, perceived susceptibility, health locus of control, trust in physician, and concern about general health. Caution was recommended in interpreting findings, since general and specific questionnaire items were mixed in the same index.

Another factor analysis was used to test the validity of HBM variables in 1987 (Cockburn, Fahney, & Sanson-Fisher, 1987). In this study, the HBM was used as the conceptual base for data collection, and the initial pool of items was drawn from literature, previous scales, and structured interview. Principal components analysis with varimax rotation was used to analyze the data. Results compared the a priori theoretical

