

Analytical Evaluation of the Health Belief Model and the Vulnerable Populations Conceptual Model Applied to a Medically Underserved, Rural Population

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Abstract

This paper describes the application of the health belief model (HBM) and the vulnerable populations conceptual model (VPCM) to a rural, underserved community. The focus population is affected by a lack of community resources, increased risk factors and poor health outcomes. The health belief model focuses on the individual's perceptions and likelihood of taking action. Resource availability, relative risk and health status are the focus of the VPCM. Both frameworks are systematically evaluated by established criterion. The VPCM is considered a better fit to explore the hypothesis that there is a relationship among access to healthcare, use of health promotion services and disease states in susceptible populations.

Federally qualified health centers (FQHC) are community-based entities that provide a variety of health services regardless of a person's ability to pay. The West Cecil Health Center (WCHC) began operating as a Federally Qualified Health Center in January 2008, in Conowingo, Maryland to serve communities in Northeastern Harford County and Northwestern Cecil County. The WCHC service area is located in a shortage area designated as a medically underserved area and a health profession shortage area. Approximately 80% of the population resides in rural areas as defined by the U.S. Census Bureau. Access to primary medical care is limited for the population under consideration. With the exception of the staff at the WCHC, the majority of available doctors within the service area do not accept new Medicaid patients, have no sliding fee scale, offer no discount, and do not handle obstetrics, gynecology, or pediatrics, causing the residents to travel 20 miles or more to the nearest hospitals in Elkton or Havre de Grace and require 36 minutes of travel time (Rajkowski, 2010).

The people of Conowingo meet the criteria for vulnerable populations, defined as a social ensemble with an increased risk or disposition to unfavorable health outcomes (Flaskerud & Winslow, 1998). The health disparity between residents of Conowingo, MD and the general population is demonstrated by the fact that there are 3,103 people for every one physician in the service area. The providers at West Cecil Health Center are included in this number. There is a shortage of primary health care providers as well as shortages of mental and dental health providers in the service area. There were 5,877 individuals living below 200% of poverty in 2000 (19.43% of total) and the obesity rate among adults in Cecil County is extremely high at 30% compared to the Maryland rate of 26.3%. County Health Rankings place Cecil County 20th among 24 counties in Maryland for health behaviors and 23rd for physical environment which includes air-pollution, access to healthy foods and liquor store density (Rajkowski, 2010).

The vulnerability of the population served by West Cecil Health Center in Conowingo makes it vital for persons to maintain routine appointments to receive the care they need to achieve optimal health. The purpose of this paper is to explore the problems of access to care, use of health promotion services and health outcomes in rural, underserved populations as the context to compare and contrast the health belief model (Becker, 1977) and the vulnerable populations conceptual model (Flaskerud & Winslow, 1998). The essence of the health belief model (HBM) is that individual beliefs affect the actions a person takes relating to their health. The HBM was developed over fifty years ago by social psychologist trying to understand lack of participation by individuals in a free tuberculosis screening program. Currently, the HBM is the most frequently used theory in health education, health promotion and disease prevention (Jones & Bartlett, 2010).

The HBM has been modified in various ways over time but the original model contains four psychological variables. The concept of perceived susceptibility is a person's own belief of the likelihood of getting a condition. Perceived severity is the individual's opinion of the graveness of the condition and its sequelae. One's thoughts concerning the effectiveness of the recommended action to actually avoid or reduce the seriousness of the condition are termed perceived benefits. Perceived barriers are the negative aspects of a specific health action (Bartholomew, Parcel, Kok, & Gottlieb, 2006). Additionally, a cue to action serves as the catalyst for the decision making process.

Examples of cues to action include a symptom of illness or health education from health care providers (Bartholomew et al., 2006). The health belief model can be applied to communities but most often focuses on personal health behaviors. In summary, the HBM deems health behavior as being established by a person's appreciation of a potentially harmful health concern and understanding that adverse affects can be avoided or minimized (Weld, Padden, Ramsey, & Bibb, 2008). Another middle range theory that can be applied to rural, underserved communities is the vulnerable populations conceptual model (VPCM). Social factions with a greater relative risk or tendency toward poor health outcomes are deemed vulnerable populations. Examples of at risk groups include senior citizens, women and children, racial and cultural minorities, the homeless and rural populations. The vulnerable populations conceptual model describes relationships between the concepts of resource availability, relative risk, and health status. In addition, the framework addresses propositions for nursing research and practice along with ethical and health policy concerns (Nyamathi, 1998).

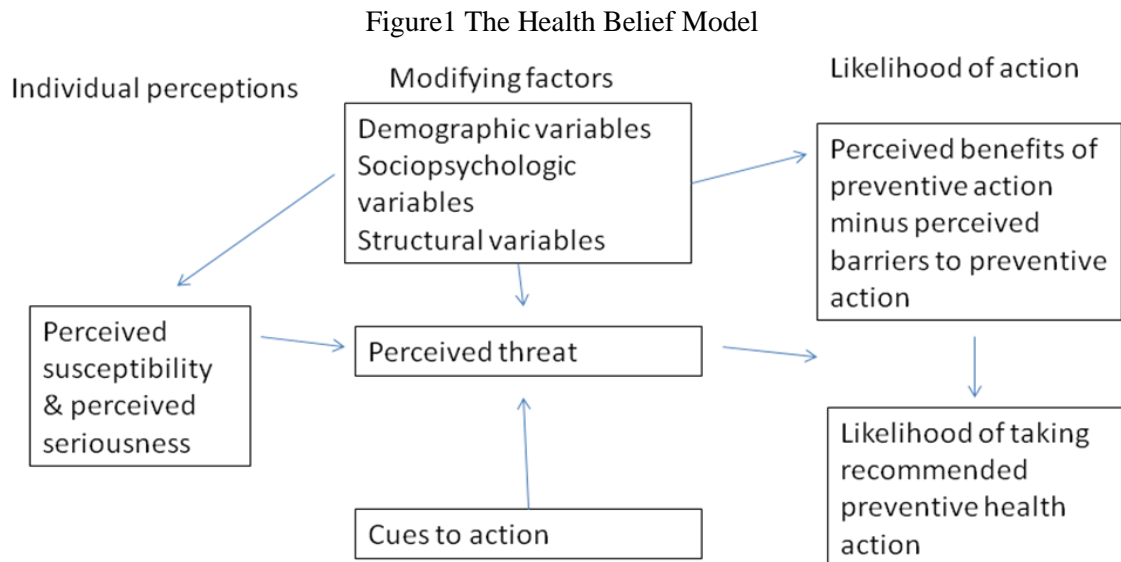
Resource availability is defined as the accessibility of environmental and socioeconomic resources. Relative risk can be thought of as exposure to risk factors. The VPCM postulates that shortages in socioeconomic and environmental capital are linked to greater risk factors within disenfranchised groups. Examples of risk factors include smoking, obesity, violence and crime. Higher morbidity and premature mortality rates are seen in populations with increased risk factors. Inversely, increased risk factors can lead to greater morbidity and mortality rates. Health status is measured by morbidity and mortality rates specific to age and gender. The VPCM utilizes a community focus instead of an individual focus for research to maximize the framework's impact. Suggestions for future research include community intervention programs and measuring health outcomes. One identified weakness of the model is the high number of interceding variables that can influence health outcomes in any population (Flaskerud & Winslow, 1998).

Smith and Lier's (2008) evaluation criteria for middle range theory can be used to analyze the substantive foundations, structural integrity and functional adequacy of the health belief model and the vulnerable populations conceptual model. The HBM is within the scope of nursing as evidenced by a core beliefs in nursing are health promotion and disease prevention. The essential idea in the HBM is geared toward reducing or avoiding a disease condition and aims to explain and predict health behaviors (Jones & Bartlett, 2010). The HBM contributes nursing knowledge that can be applied to the human-environment health relationship and as well as health and healing processes. The main assumption in the HBM is that individuals will act if they feel their personal health is threatened and they perceive the benefit of the health promoting activity outweighs the detriment of following through with the behavior. The assumption is congruent with the model's focus of health promotion and disease prevention (Pender, Murdaugh, & Parsons, 2011).

The concepts named in the theory remain stable when applied to many different research and practice settings. The HBM provides a description of practical importance for the middle range level of discussion by looking at a person's likelihood to embrace a health action. The person's likelihood to act is determined by the person's awareness of personal susceptibility to and the seriousness of affliction from a particular condition versus perceived benefits and barriers (Bartholomew et al., 2006). The foundations of the health belief model are well-established in practice and research. The idea for the HBM came from direct clinical observation of lack of participation in a tuberculosis screening program. The concepts are used to explain a non-participation phenomenon noted by social psychologists. The paucity of the research arm in the HBM points to a lack of consistency and guides future action. Previously, researchers have articulated concerns about the ability to consistently measure perceived susceptibility, perceived severity and perceived benefits. Questions are posed over the relationships between the HBM constructs because their relationships are seen as ambiguous and it is difficult to confirm construct validity due to this vagueness (Weld et al., 2008).

The structural integrity of the health belief model is assessed by looking closer at the model's concepts. Definitions are provided by the authors for concepts identified by the model. Perceived susceptibility is a person's own opinion of the chances of being afflicted by a condition. Perceived severity is one's attitude about the seriousness of the affliction and its consequences. Perceived benefits are the beliefs about the effectiveness of the recommended action to reduce risk or impairment. Additional modifying factors have been added to the HBM as it has evolved. Cues to action are coined as plans to activate readiness and may be contained in health education from a formal health provider or may come as advice from a neighbor or family member. Self-efficacy within the expanded HBM is the faith in one's own aptitude to take action (Pender et al., 2011). A problem arises when trying to articulate the operational definitions of concepts within the HBM. It is difficult to link health motivation and other behaviors to concrete situations because these health variables are difficult to measure consistently. Various studies that utilize the HBM ask a wide range of different questions within each study to determine the presence or absence of a person's health beliefs. Creation of a standard measurement tool would increase validity of the results (Davidhizar, 1983).

In contrast, standardizing the measurement may decrease the scope of the health belief model to apply across the social sciences and in a multitude of practice settings. The relationships among the HBM concepts are easy to understand and easy to relate to practice. The HBM conceptual pictogram (Figure 1) delineates the visual relationship between concepts. The perceived susceptibility to being affected by a condition and the perceived seriousness of the condition are both the most vital factors in a person's determination of the perceived threat of a condition (Kwong, Pang, Choi, & Wong, 2010).



From: Becker et al. (1977) in Berman, Snyder, Kozier & Erb (2008). Health belief models. In M. Connor, K. Trakalo, J. A. Oliveros, & T. Zak (Eds.), *Fundamentals of nursing* (pp. 303). New Jersey: Pearson.

The structural level of integrity is enhanced within the HBM because concepts are middle range. Practice examples highlight middle range application of the concepts. With perceived susceptibility, family history of a specific disease process may make the person feel at high risk. Perceived seriousness is demonstrated with the apprehension about spread of AIDS in the population's perception of the gravity of the disease. Perceived threat is a combination of the total threat to a disease specific to the person. If a community member senses that there are a large number of individuals within their community with AIDS, the person may not perceive a threat because the person is not a drug addict or homosexual (Berman et al., 2008). It is the person's perception that creates their reality. The person's own assumption may be true or false in the context of health information but always valid to the patient because it is their experience.

The HBM was extrapolated from the more abstract theory of Kurt Lewin, recognized as the founder of social psychology. Lewin's theory of goal setting has the individual existing in a life space composed of regions. The regions have positive, negative, and neutral values. Diseases are regions of negative valence. Lewin poses that the value placed in a specific outcome by a person and the individual's estimation of the likelihood that a specific action will provide that outcome will influence behavior (Davidhizar, 1983). The core theoretical concepts are presented clearly and are unique within the HBM. There is no overlap of ideas within the terms. The concepts come together to account for a person's readiness to act. Through evolution of the theory newer concepts, cues to action and self-efficacy, have been added for breadth and depth of the model across a variety of practice settings (University of Twente, 2010). The concepts and the relationships described within the HBM work synergistically to create a greater understanding of the phenomenon of interest, reducing or avoiding a disease condition and an aim to explain and predict health behaviors (Jones & Bartlett, 2010).

The functional adequacy of the Health Belief Model is easily evaluated due to the length of time since the model's inception in the 1950's. A recent CINAHL query regarding the health belief model resulted in 173 documents, including articles and critiques of the original theory. Examples of the diverse populations and environments in which HBM guides practice include health literacy in populations with universal access to health care (Weld et al., 2008), the decreasing oral health trend of Australian dental patients (Buglar, White, & Robinson, 2010), influenza vaccine choice and use among older adults (Kwong et al., 2010), and reducing pesticide exposure risk in children of farmers (Lucas & Allen, 2009). Due to the age of the HBM, empirical indicators have been identified in research for decades. The HBM originally developed the theory from the descriptions and stories of participants in a tuberculosis screening program. Questionnaires and interviews are used to obtain perceived susceptibility, severity and benefits.

Buglar, White, & Robinson (2010) used Likert scales to assess HBM concepts, including self-efficacy, within their study of dental patient's brushing and flossing. A weakness in empirical adequacy within the HBM is the inconsistent measurement and subjective nature of the model's concepts. Weld, Padden, Ramsey, & Bibb (2008) point out that factors other than health beliefs can influence health behavior. There is a plethora of historical and contemporary published research using the health belief model as guiding framework. The HBM continues to evolve. Initially, the health belief model was intended for one-time actions such as immunizations. As the model is applied to more complex activities such as smoking and unsafe sexual practices the concepts of individual perceptions or self-efficacy are needed. Self-efficacy is related to a person's willingness to engage in preventative activities for the long-term. Further work is required to examine the HBM's actual effectiveness in elucidating preventive behaviors (Pender et al, 2011). The health belief model framework provides a means for contribution and ongoing development of nursing knowledge. A community of scholars from a variety of disciplines continue to use the model to expand knowledge about preventative health behaviors. The potential for new knowledge and ideas is evident in recent CINAHL searches and research. The HBM maintains the same original core concepts today to provide researchers and clinicians a means for systematic evaluation, although the subjective natures of the measurements are a noted weakness of the theory.

Smith & Liehr's (2008) criterion for middle range theories is also used to evaluate the vulnerable populations conceptual model (VPCM). The conceptual model is within the framework of nursing as it relates obtainable resources and comparative risk to health status. Resources, health risks and health status are contained in the metaparadigm of nursing. Both the authors of the VPCM are doctorally prepared Registered Nurses. The VPCM is linked to the interactive-integrative paradigm in nursing as multiple factors acting simultaneously affect resource ability and relative risk. The assumption that communities are accountable for the well-being of its members is consistent with the focus of communities offering resources and opportunities to attain and preserve health. The framework presumes a relationship exists between resource availability, relative risk and health status. The VPCM posits that populations defined as vulnerable are at increased risk for adverse health outcomes. The poor outcomes are evidenced by increased morbidity and mortality and diminished quality of life (Flaskerud & Winslow, 1998).

An implied assumption is that vulnerable communities deserve the same basic access to healthcare to achieve an optimum quality of life as is extended to groups not designated as at risk. There are no parent theories or models identified by the authors. The VPCM is consistent in applying foundational assumptions. The concepts and their relationships is stable. For example; resource availability, health status, relative risk discussed by Flaskerud & Winslow's (1998) have the same meanings through practice examples and when used by other researchers. The VPCM describes the phenomenon of at-risk groups having an increased susceptibility to poor health outcomes. The phenomenon has direct application to nursing practice in a variety of settings and fits with middle range nursing theory. Although the origins of the theory are not explicitly described by the authors it is implied that health disparities within communities prompted the formulation of the framework. Future development of both practice and research related to the VPCM are needed to strengthen the framework.

The structural integrity of middle range theory is important for evaluation of the theory. The concepts and their relationships are clearly defined. Resource availability is the accessibility of socioeconomic and environmental resources. Relative risk is seen as exposure to risk factors. Health status is morbidity and mortality particular to age and gender. The relationships within the VPCM are clearly stated. It is proposed that relative risk is greater when resources are lacking. Increased exposure to risk factors guides the way for a populace to have higher morbidity and mortality. Inversely, the model depicts that morbidity and mortality can lead to increased exposure to risk factors. The concepts within the VPCM are at the middle range level and can be observed in practice and with a variety of people groups. Clear descriptions of empirical indicators are provided by the authors and will be discussed later. The concepts and ideas of the conceptual model are simple and easy to understand. Continued development of the theory is needed to explore research, practice, and ethical and policy analysis which are all identified as having an effect on the concepts of the theory (Flaskerud & Winslow, 1998).

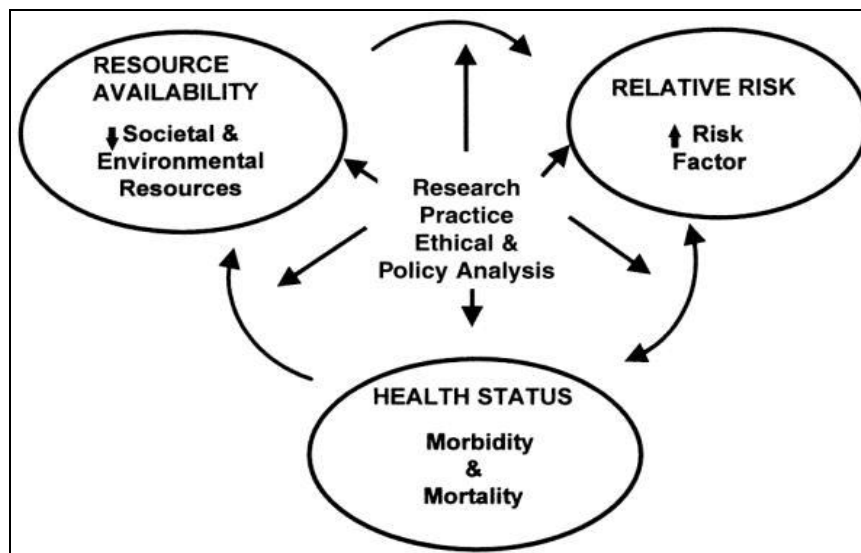


FIGURE 2. Vulnerable Populations Conceptual Model for research and practice. From: Flaskerud, J. & Winslow, B. (1998). Conceptualizing vulnerable populations health-related research. *Nursing Research*, 47(2), 70. Retrieved from https://blackboard.umaryland.edu/webapps/portal/frameset.jsp?tab_group_id=2_1&url=%2.

A pictogram (Figure 2) is provided by the authors clarifies concepts and their relationships is straightforward. The concepts of resource availability, health status and relative risk work together in balance to describe the overarching phenomenon of communities needing to provide the resources needed for its members to attain and maintain health. Decreased resources lead to increased risks and increased morbidity and mortality. Higher morbidity and mortality in a population result in decreased resources and increased risk factors (Flaskerud & Winslow, 1998).

The functional adequacy of the vulnerable populations conceptual model is excellent and has been developed from the observation of underserved and at risk communities. While preserving the theme of relating resource availability and relative risk to health status, the VPCM provides guidance for multiple populations and practice settings consistent with middle range theory. Vulnerable populations encompass groups that are impoverished, subject to prejudice and stigma and those who are politically marginalized, disenfranchised, and shorn of human rights (Flaskerud & Winslow, 1998). Specific groups at risk are women and children, persons of color, persons with same sex preferences, migrants, homeless persons, HIV-infected persons, the elderly and persons who are chemically dependent (Leight, 2003).

The empirical indicators for the VPCM are clearly stated. Within resource availability, the terms human capital, social connectedness and social status are used as measurements. Income, jobs, education and housing are examples of human capital. Empirical indicators for resource availability are unemployment rate, level of education, and homelessness. Social connectedness is more difficult to measure but points to measuring female-headed households without a partner present. Environmental resources include access to quality health care while measurable environmental constraints include violence and crime (Flaskerud & Winslow, 1998).

Relative risk is another component of the theory. The most widespread evaluation of risk factors looks at lifestyle, behavior and choices. Utilization of screening procedures, programs for vaccines, health promotion services and traumatic events like abuse and violence are measured to gauge relative risk. The Centers for Disease Control report exposure to risk factors through cigarette use, unintended pregnancy, infectious disease and lead levels to name a few (Flaskerud & Winslow, 1998).

There are published examples of the vulnerable populations conceptual model used as a framework for research. Darcy Copeland (2007) uses the framework to conceptualize caregivers of the violently mental ill as vulnerable populations. The study identifies family caregivers as a vulnerable population with increased risks according to the VPCM framework. Bay, Kreulen, Shavers and Currier (2006) use the VPCM to guide research and practice for individuals with traumatic brain injury. In working with rural health populations, Leight (2003) uses the VPCM to guide current research and practice. She suggests the framework for future nursing practice and research. Since its inception, the VPCM has not changed its concepts or their relationships. The lack of evolution may be due to the 1998 publication date, considered recent for nursing theory.

There is a lack of current scholarly inquiry with the most recent research article using the framework being published in 2007. During a recent CINAHL query using ‘Vulnerable Populations Conceptual Model’ as the search terms resulted in eight documents. Two documents were studies using the model. Five documents were proceedings from a nursing research conference that took place in 2004 and the last document was an unpublished 2004 doctoral dissertation. The authors of the model provide implications for the future in their original article. After analyzing the community using the VPCM, the next step is to ponder clinical practice interventions involving vulnerable populations. Ultimately, community programs should give authority to the at risk population to react positively to their own obstructions to health (Flaskerud & Winslow, 1998).

The vulnerable populations conceptual model best allows for study of the underserved community of Conowingo, Maryland and the health disparities that exist in the surrounding community. Persons served by West Cecil Health Center are a vulnerable population due to increased susceptibility to adverse health outcomes. In 2010, Cecil County ranked 19 out of 24 counties in Maryland for increase morbidity such a poor physical health, poor health days, poor mental health days and low birth weight and mortality (Rajkowski, 2010). Morbidity and mortality are specific indicators of health status in the VPCM. Being a nurse practitioner in the Conowingo community allows direct observation of resource availability, relative risk and health status along with their relationships. There is limited information on the status of vulnerable communities such as Conowingo because persons within the community lack the affluence and power needed to attract legislators and other change agents. Consistent with the model’s direction for the future community interventions can be formulated by community members to empower persons within the community. Understanding the Conowingo community will contribute to existing nursing knowledge about vulnerable populations in general and stimulate research across a multitude of disciplines including nursing, social sciences and eventually the effect on economic and business indicators within the community.

The VPCM is an appropriate middle-range nursing theory to guide research questions related to health disparities and underserved populations. The hypothesis related to the nursing problem in Conowingo is that access to healthcare (resource availability) will affect the preventable diseases (relative risk) and will affect morbidity and mortality (health status) in the community. The phenomenon is observed through practice, can be investigated through research and changed through ethical and policy analysis. The following pictogram (Figure 3) adapted from Flaskerud & Winslow (1998) depicts the VPCM scheme specific to the Conowingo, Maryland community.

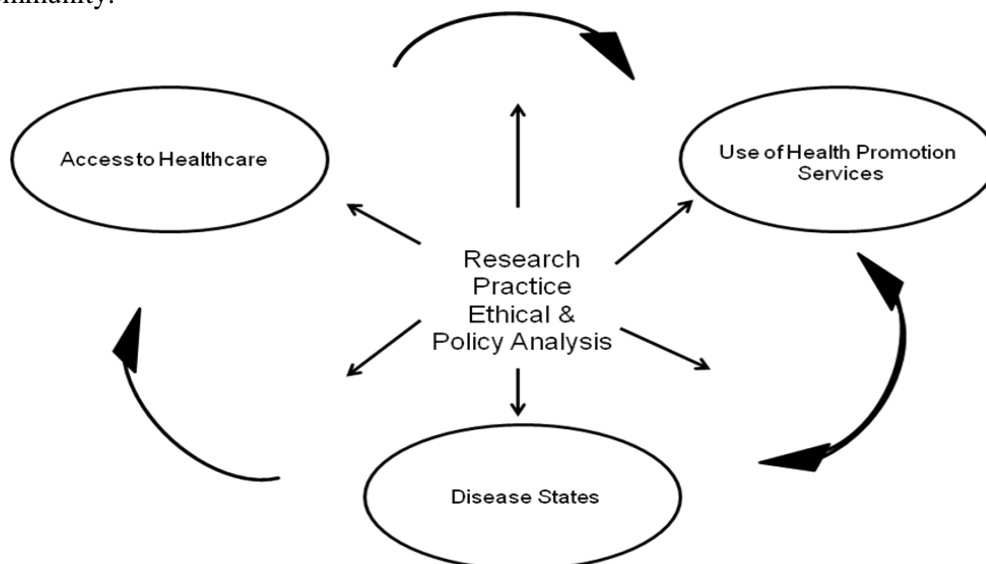


FIGURE 3. Vulnerable Populations Conceptual Model for West Cecil Health Center Adapted from: Flaskerud, J. & Winslow, B. (1998). Conceptualizing vulnerable populations health-related research. *Nursing Research*, 47(2), 70. Retrieved from https://blackboard.umaryland.edu/webapps/portal/frameset.jsp?tab_group_id=2_1&url=%2.

In concluding the analysis of two middle range theories and applying the theories to a nursing problem both the health belief model and the vulnerable populations conceptual model provide valuable frameworks. The nursing problem is directly observed in clinical practice and involves access to healthcare, use of health promotion services and disease states in underserved, at-risk populations. Both the health belief model and the vulnerable populations conceptual model can serve as the framework for investigating questions regarding health disparities.

The VPCM was demonstrated to be superior for specific questions regarding access, health promotion services and disease states. The model leads a path for future research and practice as well as ethical and policy analysis. Through the VPCM one can formulate the hypothesis that there is a relationship between access to healthcare, use of health promotion services and disease states in vulnerable populations.

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