Health education for a breast and cervical cancer screening program: using the ecological model to assess local initiatives
Debra J. Holden, Karen Strazza Moore¹ and Joseph L. Holliday¹

Abstract

This study investigates the development and implementation of health education strategies at the local level for a statewide breast and cervical cancer control program. Baseline data on these initiatives were collected from 88 local screening programs in North Carolina. Using the ecological model as a framework, health education initiatives were assessed and analyzed to determine the level of activity occurring at the local level and the comprehensiveness of programs. Types and levels of interventions used are described and initial analysis is provided of the impact these strategies are having on recruiting women from target populations into these screening programs. Specific examples illustrating the variety of interventions used at the individual, network, organizational and community levels, and the impact of certain variables, such as the use of local health education staff, on the comprehensiveness of interventions utilized, are provided. The importance to practitioners of establishing process indicators in assessing local initiatives and challenges to conducting evaluations of these strategies are also discussed.

Introduction

Scientifically proven screening procedures can detect breast and cervical cancers in the early, more treatable stages. Nevertheless, in North Carolina, an estimated 4800 women were diagnosed with breast cancer and nearly 1100 died of the disease in 1995 (ACS, 1996). In addition, it is estimated that 360 new invasive cervical cancer diagnoses were made in North Carolina during 1995 and 110 women died from this disease (ACS, 1996). Although the mortality rates from these diseases have remained relatively stable over the past several years, the incidence rates, particularly for breast cancer, have been increasing, in part because of the availability and use of effective screening procedures, such as mammograms in older women and Pap smears (MMWR, 1992). However, studies show that even when screening services are made available, not all people at risk obtain the tests at the recommended time intervals (Rimer et al., 1992).

One mechanism for increasing utilization is at the policy level by instituting funding programs for providing screening services. One such program was passed by the US Congress as the Breast and Cervical Cancer Mortality Prevention Act of 1990 and provides funding for breast and cervical screening procedures for women at or below 200% of the poverty level in an effort to address the need for accessibility to these screening procedures. The funding for this program, entitled the National Breast and Cervical Cancer Early Detection Program (BCCCP), is managed by the Centers for Disease Control and Prevention (CDC), that in turn develops cooperative agreements with state health departments to implement and monitor the
Program within each state. North Carolina was the 12th state to receive funding for the BCCCP and initiated its statewide program in January 1993. This study focuses upon health education activities performed at the local level to recruit women into this screening program.

**Background**

A number of international studies have shown that screening programs that include mammography, such as the BCCCP, can reduce mortality due to breast cancer by as much as 40% among women age 50 and older (NCI, 1991). However, subgroups of women continue to underutilize this screening procedure, as well as the Pap smear for cervical cancer screening (Rimer, 1994). A number of knowledge and belief barriers to breast and cervical cancer screening have been reported for various groups of women. These include such barriers as never having heard of mammograms, not knowing mammograms are needed and believing mammograms are not needed in the absence of symptoms (Rimer et al., 1992). Similar barriers have been reported for cervical cancer screening. Even though cost can often be a barrier and the BCCCP eliminates that problem for many women, the evidence suggests that unless other steps are taken to increase use, the removal of the cost barrier alone will not be sufficient to increase the use of mammography among certain groups of women (Rimer et al., 1992), particularly older and/or minority women who are at an increased risk of dying from these diseases.

The North Carolina BCCCP has focused a great deal of effort on development of local level expertise to educate and recruit women for participation in these screening programs. Local level staff have been trained on using a variety of strategies to encourage women to obtain screenings. These strategies have been instructed using the ecological perspective as a conceptual framework because it directs attention to both behavior and its individual and environmental determinants (McLeroy et al., 1988). In this ecological model, patterned behavior is the outcome of interest and is viewed as being determined by the factors or groups in Table I (McLeroy et al., 1988).

Consequently, interventions addressing these multiple factors, which take into account environmental causes of behavior, are more likely to have an effect on behavior change than those interventions that place sole responsibility for health on the individual (McLeroy et al., 1988). These factors translate into interventions targeted at multiple points of intervention including the individual, network, organizational, community and policy levels.

An example of an intervention targeted at the individual or intrapersonal level could be a health care provider teaching a woman about the importance of mammograms at a workshop focusing on increasing knowledge and skills about breast cancer. A network or interpersonal level intervention might address family and friends, and their influence on the screening behavior of the individual. For instance, a friend might provide instrumental support by navigating the system for someone to get a mammogram. Interventions at the organizational or institutional level might involve work sites in changing the work environment by providing time off from work to obtain screening. Community level interventions could involve the networking and relationships among various community organizations by integrating breast and cervical cancer control information within organizational activities such as a special event conducted through an alliance of churches. Other activities at the community level might include raising money for mammograms or treatment through such mediating structures as sororities. Policy level interventions for breast and cervical cancer could include, for instance, increasing coverage under US Public law from 200 to 300% poverty level or legislating for insurance coverage of mammograms for women 50 years or older. Levels at which interventions are implemented can also differ from the target of the intervention conducted. For example, individuals can be targeted by interventions at the organizational level by providing health risk appraisals and education strategies to employees on their lunch hour and
Assessment using the ecological model

<table>
<thead>
<tr>
<th>Type of factor</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Intrapersonal</td>
<td>Characteristics of the individual including knowledge, attitudes and behavior</td>
</tr>
<tr>
<td>Interpersonal</td>
<td>Social support systems in which an individual cohabits</td>
</tr>
<tr>
<td>Institutional</td>
<td>Social institutions in which an individual belongs</td>
</tr>
<tr>
<td>Community</td>
<td>Social environment characteristics such as relationships among community organizations</td>
</tr>
<tr>
<td>Public policy</td>
<td>Local, state, and national laws on an individual’s environment</td>
</tr>
</tbody>
</table>

breaks. Organizations themselves can also be the targets of change where organizational policies can be created to encourage screening behavior (i.e. group insurance coverage or time off for accessing care).

Using this model as a conceptual framework, a study was conducted of the activities and interventions being conducted by local North Carolina BCCCP programs. The purpose of the study was to collect baseline data for assessing health education activities at the local level, and to obtain detailed information on the levels of interventions being provided and the staffing involved in this process. The results include specific examples that illustrate the variety of interventions used at the individual, network, organizations and community levels. The data were also analyzed to assess the impact of certain components of the local programs, such as the availability of local health education staff to work on the program, on the comprehensiveness of interventions utilized. The assumption is that staff who are more highly trained on health education strategies and the use of activities at different levels will be more likely to utilize a more comprehensive approach in developing interventions, thereby impacting the success of the program for recruiting women for screening.

**Methods**

**Study population**

In North Carolina, the BCCCP is delivered primarily through local health departments. This Program is administered by the Division of Community Health, of the North Carolina Department of Health and Human Services (DHHS). Contracts have been established with local health departments and other agencies across the state to provide these screening services and certain follow-up procedures to women in each county. As of March 1995, all 100 North Carolina counties have contracts with BCCCP. North Carolina also contracts with the Cherokee Health Delivery System to provide services to women from the Eastern Band of the Cherokee tribe. Contracts have also been obtained with a community health center and a rural hospital, so that services are available within all 100 counties in the state. The target number of each county was derived from population-based data, including the number of older women and the mortality rates for each of the counties. Women who are 50 years or older and from minority groups are considered to be priority populations. These local BCCCP contractors receive funding based on the total number of women they are to screen.

Once an agency has contracted with BCCCP, the organizational structure and process they use to deliver the services are decided at the local level. This discretion was allowed primarily because it was realized that each community would know their own needs and the local agency could best design a program to meet those needs. This design has resulted in a great deal of local ownership of the program through such entities as local coalitions, work groups of medical professionals and networking among agencies. It is, therefore, the decision at the local level which outreach strategies, if any, to use to recruit women into the program. A primary goal of this study was to obtain data early in the development of the Program on stra-
egies being used and detailed information on the different levels of interventions implemented to recruit women.

**Instrument**

To study the impact of employing multi-level health education interventions on reaching the target population, a survey of local BCCCP coordinators was conducted. Respondents were asked to indicate all the strategies used in their local program to recruit women for BCCCP during the fiscal year of July 1993–June 1994. These strategies were then classified according to the level of interventions outlined in the ecological model. The following questions were used to inform the evaluation:

- What types of health education strategies are being used at the local level?
- To what extent do local BCCCPs employ comprehensive, multi-level interventions?
- To what extent are local health educators involved in health education activities for the BCCCP?

In June 1994, a written questionnaire incorporating these evaluation questions was developed and mailed to each local BCCCP coordinator. At the time of the study, there were 88 contractors participating in the program, including 87 counties and the Cherokee Health Delivery System. Local BCCCP coordinators were asked to complete the questionnaire and return it by mail to the state BCCCP office.

**Findings**

Of the 88 contractors surveyed, 77 health departments and one community health center, representing a total of 84 counties, and the Cherokee Health Delivery System, returned the mail survey for a response rate of 79 (88.8%). Those health departments not responding were primarily counties that had begun contracting with the BCCCP within the last 6 months and had not yet initiated services as of the date of the survey.

**Staffing**

Respondents were asked to specify what types of staff and the percentage of time each staff was devoting to the BCCCP. Types of staff were defined as clinical, data entry, administrative or health education. All of the programs reported having at least one nurse working with the program, but the percent of time devoted to this work varied. The mean percent of time for clinical staff on the program was 43.5%. Of the 88 respondents, 36 (45.6%) reported that they have no health educators working with the BCCCP at the local level. Another 36 (45.6%) reported that one health educator works part-time on the BCCCP and seven health departments reported having two or more local health educators working on health education initiatives for the BCCCP. For those with a health educator working for some time in the program, the mean percent of time spent was 7.0% of their weekly work schedule.

**Types of interventions reported**

Responses indicated that local BCCCP contractors rely most upon interventions targeted to individuals or networks. The respondents were asked to indicate the strategies that had been used from a list of 19 possible strategies that was provided on the survey. This list included such responses as 'organizing public education activities (i.e. health fairs, community education programs)' or 'working with health care providers'. Several of the listed strategies could correspond to one intervention level of the ecological model but the respondent was unaware of these rankings and simply noted those that had been completed. Upon receipt of the completed surveys, responses were then coded and categorized by the level of intervention. This method provided standardized, mutually exclusive groupings for all of the strategies that were reported. Results indicate that about three-fourths of the health departments reported using interventions at the individual (79%) and network (76%) levels, while over half (67%) used organizational level strategies. Slightly over half (57%) reported using strategies at the community level.

Further analysis of these responses assessed the level of comprehensiveness. This was defined as the extent to which health departments were using more than one intervention level to recruit women.
Assessment using the ecological model

Findings from Table III indicate that having health educators working with the local programs is strongly associated with the comprehensiveness or number of intervention levels used in recruiting women. This association was highly significant at $P < 0.01$, even when controlling for county size and staff time devoted to the program.

### Discussion

These data were collected to serve as baseline data for the levels and types of health education interventions utilized at the local level. A repeat of the survey will be conducted in 1996 to obtain updated information and examine the extent to which these strategies ultimately impact screening rates. Results show that the level of interventions utilized varied across counties and depended upon the presence of a health educator working with the program. These results emphasize the importance of involving staff trained in health education principles in the implementation of similar screening programs. These staff can utilize their expertise to develop comprehensive health education activities, thereby impacting the success of the program in recruiting clientele.

Evaluation of health education initiatives in this setting is challenging for several reasons. First, decentralized, local control of public health programs has meant each county has had the freedom to design the BCCCP in their county to meet local needs. Secondly, breast and cervical cancer screening services for the BCCCP are typically delivered using the clinical model for implementation, and are often structured differently, impacting the mechanism for delivering services. As a result, outreach efforts implemented in some counties are solely dependent upon the nurse coordinator's knowledge, experience and training in health education, lending to a heavier concentration on more traditional health education approaches. This study emphasized the benefits of utilizing staff who are trained on developing more comprehensive, non-traditional strategies of recruitment. However, this is not to suggest that by developing strategies at every level, a health department or

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### Table II. Number and percentage of local BCCCPs using zero to four intervention levels

<table>
<thead>
<tr>
<th>Number of levels</th>
<th>Number of local BCCCPs</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>11</td>
<td>13.9</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>19.0</td>
</tr>
<tr>
<td>3</td>
<td>17</td>
<td>21.5</td>
</tr>
<tr>
<td>4</td>
<td>34</td>
<td>43.1</td>
</tr>
<tr>
<td>Total</td>
<td>79</td>
<td>100</td>
</tr>
</tbody>
</table>

### Table III. Number and percentage of local BCCCPs using zero to four intervention levels by type of staff

<table>
<thead>
<tr>
<th>Number of levels</th>
<th>Health educators</th>
<th>Non-health educators</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–2</td>
<td>9 (19%)</td>
<td>20 (56%)</td>
</tr>
<tr>
<td>3–4</td>
<td>34 (81%)</td>
<td>16 (44%)</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>36</td>
</tr>
</tbody>
</table>

* $P < 0.01$ controlling for county size and staff time.
community agency is necessarily more successful at recruiting women into the program. It should not then be assumed that multi-level interventions are the most effective approach. The reality may be that the problem lies in one particular need of the community, and may require the implementation of a strategy for only one level and target. For example, a barrier to screening for many women can be obtaining time off from work. In a community with a large number of factory workers, the most effective and efficient strategy may be an organizational level intervention to change policy related to time off for seeking health care. Needs assessments which focus on multiple factors affecting health behavior and utilize the ecological model are necessary so that appropriate strategies of change can be employed. Without this training, the value systems of the individual developing the intervention can greatly impact how it is delivered and to whom (Guttman, 1988). It is often the case that even though there are indications of the need for strategies at other levels, the focus of attention is on the individual and the decisions they make, and, therefore, on how to change the individual’s behavior. Making health educators and other health care professionals to receive adequate training in conducting assessments based on an ecological framework to ensure the appropriateness of interventions. Without this training, the value systems of the individual developing the intervention can greatly impact how it is delivered and to whom (Guttman, 1988). It is often the case that even though there are indications of the need for strategies at other levels, the focus of attention is on the individual and the decisions they make, and, therefore, on how to change the individual’s behavior. 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education initiatives lies in bridging these two steps to effectively impact the practice of health education.

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