

# Diabetes Patient Education Research: An Integrative Literature Review

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## PURPOSE

**T**he purpose of this study is to summarize the accumulated state of knowledge in the area of diabetes patient education research and highlight important issues that research has left unanswered.

## METHODS

An integrative literature review was conducted on the topic of diabetes patient education between the years 1985 and 1998. Keywords used in the computerized search were diabetes mellitus, patient education, health education, research, and behavior change. The databases searched were MEDLINE, CINAHL, HealthSTAR, EMBASE, and CHID-HE. A total of 78 papers were reviewed.

## RESULTS

Most studies lacked a theoretical framework and the majority of studies were conducted in an outpatient setting. HbA<sub>1c</sub> was the most frequently employed outcome measure, with little, if any, description of the interventions.

## CONCLUSIONS

Much has been learned in terms of the effectiveness of diabetes education on improving knowledge. However, other topic areas and outcomes need further exploration.

Diabetes education is an essential component of managing diabetes. A multidisciplinary team of diabetes healthcare providers (eg, physicians, nurses, dietitians, pharmacists, and psychologists) offers the best combination of resources for shaping the delivery of diabetes care and education. As the managed-care system continues to grow, healthcare providers are being asked to do more with less. Although a widely held view by many healthcare providers is that diabetes education makes a difference, the research to date is not convincing. The purpose of this paper is to present an integrative literature review of diabetes patient education research. The purpose of conducting an integrative review varies among researchers. Some researchers are interested in evaluating new methodological developments, other researchers are interested in verifying existing theories or developing new ones, and yet others are primarily interested in summarizing the accumulated state of knowledge within an area of interest, highlighting important issues that research has left unanswered.<sup>1,2</sup> This later purpose was the impetus behind conducting an extensive literature search to provide background information for the speakers at the 1999 Diabetes Educational and Behavioral Research Summit, which was held in Chicago on May 21 to 22, 1999. The paper is organized according to (1) techniques for information retrieval, (2) overview of theoretical frameworks, (3) issues of substance in terms of design and methodologies, and (4) recommendations for future research.

#### TECHNIQUES FOR INFORMATION RETRIEVAL

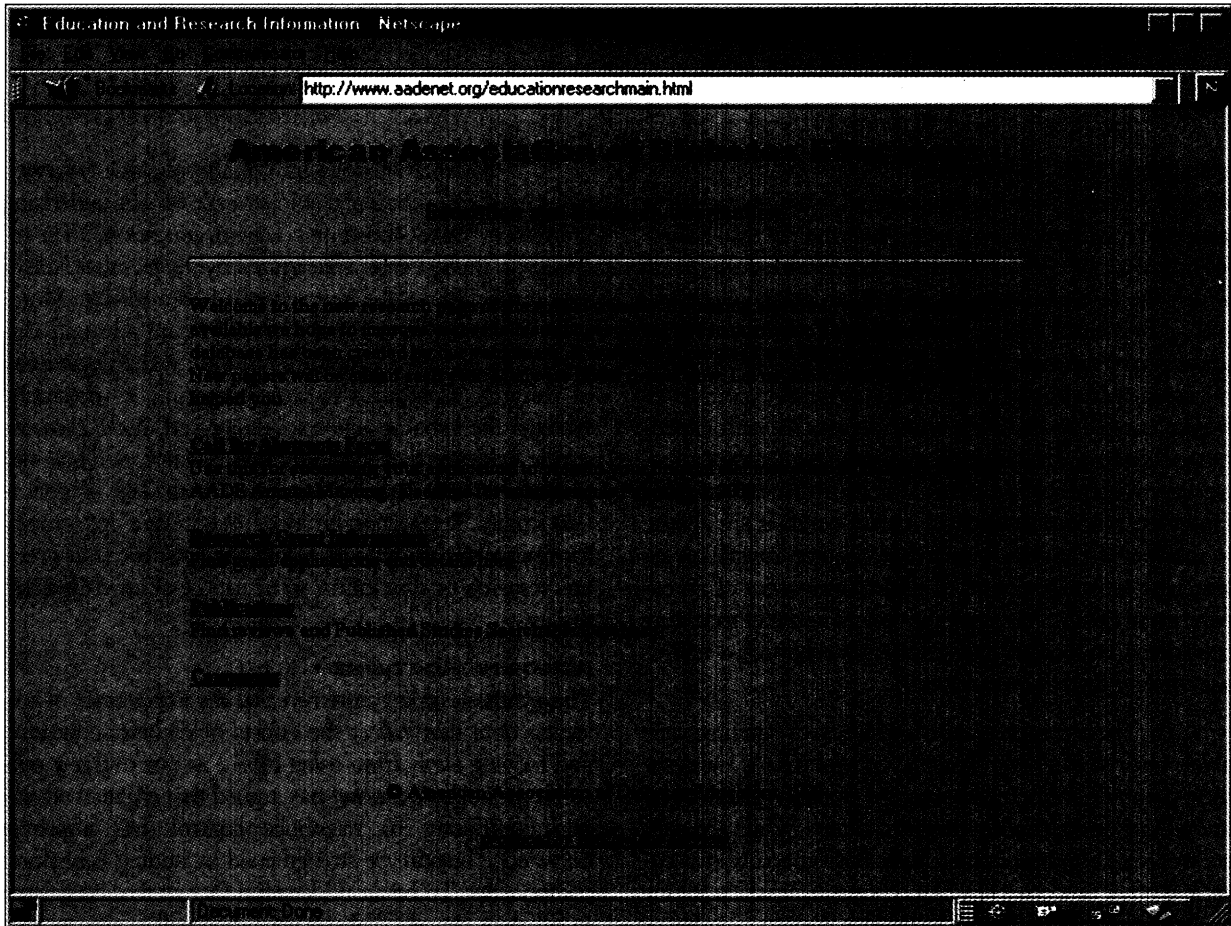
Potential research studies to be included in the integrative review were initially selected by members of the Research Summit Planning Committee. Members of the committee conducted an extensive search of published literature on the topic of diabetes patient education. Several databases and multiple text-word combinations were used to identify relevant studies. Keywords included *diabetes mellitus*, *patient education*, *health education*, *research*, and *behavior change*.

Major healthcare databases that were used in conducting the search were MEDLINE, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), and HealthSTAR. MEDLINE database is widely recognized as the premier source for bibliographic and abstract

coverage of biomedical literature. Although MEDLINE includes a nursing index, CINAHL is recognized as being more comprehensive for nursing. The CINAHL database provides coverage of the literature related to nursing and the allied health disciplines. HealthSTAR indexes published literature on health services, technology, administration, and research, focusing on both the clinical and nonclinical aspects of healthcare delivery. Information in HealthSTAR is derived from MEDLINE, the Hospital Literature Index published by the American Hospital Association, and selected journals.

Other relevant databases used in the literature search were EMBASE and Biological Abstracts. EMBASE features comprehensive information about drugs and toxicology, clinical medicine, basic biological sciences, and health affairs. Select topic areas in nursing, dentistry, veterinary medicine, and normal psychology are also covered. EMBASE was considered after searching MEDLINE and CINAHL. Finally, the Combined Health Information Database (CHID) developed by the Centers for Disease Control also was used. The files in this database could not be printed, only viewed on the screen. CHID has six searchable components. The Health Promotion and Education (HE) file was searched and included several papers that had already been identified by other databases.

Searching all computerized databases yielded over 200 papers. In addition to retrieving information from computerized databases, members of the Research Summit Planning Committee obtained information by tracking research cited in research papers that had been already obtained. Cooper<sup>3</sup> refers to this method as the ancestry approach. Most members of the committee were aware of several research papers on the topic of diabetes patient education before they formally began the literature search. These papers provided reference lists that cited earlier related research, which was reviewed and yielded an additional five papers. Finally, a manual search was also conducted by browsing through the tables of contents of journals most likely to publish diabetes patient education research (eg, *Diabetes Care*, *Diabetes Spectrum*, *Diabetic Medicine*, and *The Diabetes Educator*), yielding only two more papers.



*Welcome to the new research page of the AADE Web site.*

Research papers had to meet several criteria before being included in the review. As a committee, a conscious decision was made to include only intervention studies, adults with type 1 or type 2 diabetes, and studies that had been published between 1985 and 1998. Of the 200 or so papers that were reviewed, 78 met the established criteria and were included in the review. No attempt was made to find unpublished papers or include doctoral dissertations. These latter types of papers contain valuable information and will need to be accessed in the future. In addition, several technical review articles were not included in the review. The database, along with the technical reviews, can be accessed on the internet at the American Association of Diabetes Educators (AADE) Web site at <http://www.aadenet.org/educationresearchmain.html> (see the Figure).

#### **THEORETICAL FRAMEWORKS**

The type of theoretical perspective used in each paper was noted as part of this integrative review. A theoretical perspective is important because it provides a sense of structure to support what researchers are trying to conceptualize.

This structure is a set of concepts that is integrated into a meaningful configuration. As studies were assessed for theoretical orientation, two problems were noted. Five of the studies (6%) employed a theoretical/conceptual framework, of which only one provided a succinct articulation of Bandura's Social Cognitive Theory and the proposed concepts under review. It is important for the framework to be clearly identified early in the paper so that direction is given for a relevant literature review and concept selection. If the theoretical perspective is disjointed, unclear, or nonexistent, a disconnection occurs between the problem being studied and a meaningful frame of reference. This lack of agreement between the theoretical framework and the concepts identified was evident in the remaining four studies that included a theoretical framework. Finally, the majority of papers failed to include a theoretical perspective. Whatever the problem being investigated, useful knowledge will not be developed unless concepts are clearly defined and flow logically from the theoretical perspective being tested.

### DESIGNS AND METHODS

All research designs were experimental, which is consistent with the type of studies that were reviewed. Of the 78 studies reviewed, 38 (48%) were true experimental designs in which the research assigned subjects to either an experimental or control (comparison) group. True experimental designs have the most precision, rigor, and control. The remaining studies were a combination of quasi-experimental and/or one-group pretest/posttest design. As with experimental designs, a quasi-experimental design dictates manipulation of the independent variable (treatment variable). However, random assignment and/or controls are absent. In many of the studies reviewed, it was not feasible for researchers to implement all of the characteristics of an experimental design. Although the designs and methods were considered reasonable and sufficiently reported, a few issues deserve further consideration.

The first issue concerns selection of outcome variables. Overwhelmingly, glycemic control ( $HbA_{1c}$ ) was the most commonly employed outcome measure, followed by knowledge and attitudes toward diabetes. While glycemic control is an important physiologic outcome, cardiovascular and other outcomes (eg, blood pressure, lipids, smoking status, percent of calories/fat in the diet, weight, number of missed days from school or work, number of emergency room visits, etc) need further exploration. Secondly, many studies collect baseline data, administer the intervention, and then measure outcomes within 3 months. More longitudinal designs that examine changes and sustain improvements over an extended period of time are warranted. Because longitudinal designs are expensive and require repeated measures over time, researchers need to be familiar with how variables are measured and provide clear rationales for given points in time that are selected for measurement. Loss of subjects (mortality) can be high, given the long-term commitment. Thus, power analyses need to be calculated based on the number of subjects expected to complete the study, not the number recruited initially. Strategies need to be developed to keep patients motivated to continue their participation in research studies.

Another obvious gap in the research reviewed concerns the specific diabetes interventions. The underlying question is "What constitutes diabetes education?" The response to this question was limited by the fact that little, if any, description of the interventions was available. Moreover, replication is not possible without an adequate discussion of the intervention. *Replication* is the duplication of research procedures in a second study to determine whether the initial results can be repeated. Beck<sup>4</sup> provides strong evidence that implementing research findings into practice has been seriously hampered by the lack of replication studies. Replication provides an excellent opportunity for researchers to discover results that conflict with previous research or disconfirm some aspect of an established theory.

### RECOMMENDATIONS

This synthesis of literature revealed the importance of collecting data that reflect the efforts of diabetes education and moving away from using  $HbA_{1c}$  as one of a few outcome variables. Glasgow<sup>5</sup> has argued that diabetes education contributes to metabolic control and improves knowledge but can be strengthened by adding behavioral components. To better understand factors that contribute to behavior change, diabetes education will require an emphasis on behavioral strategies. It will be important to examine several behavioral strategies because some behaviors may be more or less responsive to change than others.

Review of several meta-analyses that combined the results from a number of studies indicated that diabetes education improves knowledge, self-management, and glycemic control.<sup>6-9</sup> In addition, several studies demonstrated the importance of variables such as self-efficacy, depression, anxiety, well-being, and psychosocial functioning.<sup>10-12</sup> The major question is not if diabetes education impacts knowledge or self-management, but rather when, how much, by whom, and what critical core of knowledge/behavior is needed to make a difference.

another recommendation is that efforts be intensified to describe in more detail the interventions reported in the literature. Specific diabetes interventions (eg, one-on-one versus group education, diet and exercise instruction, relaxation and coping skills training, behavioral strategies, etc) have not been described in sufficient detail to allow for replication. Likewise, longitudinal designs with repeated measures should be examined more closely.

In conclusion, great strides have been made in examining the effectiveness of diabetes education. There is, however, much to be learned. Hopefully, all who are interested in diabetes education can take the advice of Florence

Downs in her editorial on the essence of nursing research: "To understand research we have to get close to it. You need to talk to the patient, examine what the patient says and think about the condition."<sup>13</sup> By conducting this integrative literature review and participating in the Diabetes Educational and Behavioral Research Summit, we all have become stimulated to think about the issues concerning diabetes education and rededicate ourselves to talking with patients, examining what they say to better understand their viewpoint, thereby further developing our knowledge.

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