DIABETES EDUCATION IN ANOTHER PERSPECTIVE

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ABSTRACT

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The challenge of educating people with diabetes has been facing diabetic educators for some time. Educational strategies for people with diabetes have ranged from programmed instruction, books, video-tapes, audio-tapes, lectures, large and small group discussions, as well as skill sessions. Only recently has education been widely available on the Internet. People who have diabetes can now access multiple resources for diabetes education on the Internet. Given the exponential growth of Internet subscribers, a world wide web page is and will continue to be an alternative for diabetes education. Internet education can incorporate text, animation, audio, and visual components in its presentation. Interactive education that includes these characteristics may change the way health education is presented.

ACKNOWLEDGMENTS

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Appreciation is given to my project committee of Mary Jo Arndt, Gabriele Kende and Joan Predko. Their time, commitment, honesty and patience have truly made this endeavor enjoyable. This is especially true of Mary Jo Arndt. Her willingness to direct me in this project is greatly valued. Her insight and encouragement have helped guide me in this long and arduous project. With joy and pleasure, I thank you.

Finally, to my strongest supporter and encourager, my wife. When times were slow and the urge to procrastinate was at its strongest, she continued to challenge me to accomplish this project. It would have been difficult going through this task without her.

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INTRODUCTION

Diabetes is one of the most prevalent diseases in the United States today. The cost of treating and caring for people with diabetes in the United States is estimated to be $98 billion per year (Centers for Disease Control and Prevention, 1997, On-line). These costs are accumulated through hospitalizations, medications, physician visits, missed work days, mortality and morbidity. The most effective way to lessen the financial burden and human suffering due to diabetes is to prevent or delay the complications. Hentzen (1997) believes that the keys to prevention are implementing preventive health care, healthy eating habits, regular exercise, and maintaining a desirable body weight. The Advanced Practice Nurse (APN) is in a pivotal position to teach people with diabetes more about their disease and how to take control of it.

There are many ways to educate people. The APN can use lectures, one-on-one counseling or even write informative brochures, texts or newsletters. Another way to supply people with information about their disease is through the fastest growing form of communication, the Internet. The Internet is a fairly new form of technology that is being

used daily by millions of people. APNs are educators who can utilize this form of communication to help address the needs of their clients.

BACKGROUND AND SIGNIFICANCE

The prevalence of diabetes has been well documented. It is estimated that over 16 million Americans, diagnosed and undiagnosed, have diabetes. There are 798,000 new cases diagnosed each year. Diabetes alone kills more people than auto immune deficiency syndrome or breast cancer - 178,000 people in the year 1996 alone. Based on death certificate data, diabetes contributed to the deaths of more than 187,000 people in 1995. "It is well known that death certificate data under-represent deaths due to diabetes" (United States Department of Health and Human Services Publications, 1995, p.5). According to the National Center for Health Statistics, diabetes was the seventh leading cause of death listed on U.S. death certificates in 1993. The majority (80%-90%) of people with diabetes are adults with type 2 diabetes. The complications of diabetes include: heart disease, stroke, hypertension, blindness, kidney, dental and nervous system disease as well as limb amputations. Complications of pregnancy can also occur for women with diabetes.

Issues facing diabetes educators are more challenging than ever before. Current trends in health care might suggest that nursing educators will need to do more for the client with less time and money. Patient education via

computers is a form of teaching that is rarely used (Funnell, Donnelly, Anderson, Johnson & Oh, 1992, p. 143). At times it may appear that people are more challenged by the technology of computers due to the cost and the frustration of learning to become proficient users, however this technology is cost effective and time efficient (Lewis, 1996). APNs and people with diabetes could benefit greatly from the utilization of computer-based patient education (CPE). Computers are currently a source for teaching about health and disease. Benefits of the computer include self-paced instruction, learning mastery and immediate feedback and/or reinforcement.

Despite the present problems and prevalence of diabetes, many of the secondary complications can be minimized or prevented through promotion of a therapeutic self-care regimen. The concept of self-care was defined by Dorothea Orem as "the practice of activities that individuals initiate and perform on their own behalf in maintaining life, health, and well being" (Orem, 1991, p.117). People with diabetes can often very effectively control their disease through regular blood glucose monitoring, regular physical activity, meal planning, and attention to relevant medical and psycho-social factors.

Therefore, APNs are challenged to provide educational opportunities that give clients and their families self-care abilities that promote positive health outcomes (Lewis, 1996, p.141). Problems of diversification in the APN's

client population, decreased amount of resources allocated to education and the vast amount of new information to be learned could all be minimized through the utilization of CPE. Therefore, utilization of the Internet and its educational resources can be used to meet the challenges of diversification, diminished resources, and increasing amounts of new information.

PROJECT GOALS

The product of this project is a world wide web page specifically for people with diabetes who live in Western Michigan. The main goal of this project is to promote stronger self-care behavior for people with diabetes. These self-care behaviors of clients include finding educational information about diet and exercise. Awareness of local resources for diabetes education is also a self-care behavior that is promoted. Education can be obtained through utilization of the referrals for information as well as contacting one of the local diabetic resources that are listed. Optimally, this project will encourage people to implement positive self-care behaviors which will subsequently delay or prevent the physiological complications that are secondary to diabetes.

DEFINITION OF TERMS

Diabetes is a disease in which the body cannot produce insulin or use the insulin properly. Insulin is a hormone produced by the pancreas that helps the body utilize glucose. Diabetes is characterized by high blood glucose

levels. Prolonged elevation of blood glucose levels can lead to many long term complications which were previously listed.

There are three types of diabetes, type 1 or insulin dependent diabetes mellitus (IDDM), type 2 or non-insulin dependent diabetes mellitus (NIDDM), and gestational diabetes. *IDDM* is a form of diabetes that tends to develop before age 30, but may occur at any age. It may be caused by an immune system attack on the insulin-producing beta cells of the pancreas. Insulin production eventually stops and people who have this type of diabetes must take insulin to survive. Treatment requires a strict regimen that typically includes a carefully calculated diet, planned physical activity, home blood glucose testing several times a day, and multiple daily insulin injections.

NIDDM usually occurs in people over 40 years of age but may develop in younger people. African Americans, Mexican Americans, Asian Americans and American Indians all have a higher prevalence for NIDDM when compared to white Americans. In NIDDM, the body may produce insulin, but it either does not make enough or cannot use the insulin it makes. Sugar enters most cells by a carrier-mediated mechanism. Insulin acts on this transport process. In people with NIDDM, there is a problem with this process. As a result, little or no sugar gets into the cells even though insulin is present. Because the sugar cannot get into the cells, it builds up in the blood. Essentially the body will

over-produce insulin due to this insulin resistance. Treatment typically includes diet control, exercise, home blood glucose testing, and in some cases, oral medication and/or insulin. Approximately 40% of people with NIDDM require insulin injections.

Gestational diabetes may occur during pregnancy and is usually resolved postpartum. However, gestational diabetes puts clients at risk for developing diabetes later in life. It can also have physiological affects on the developing fetus.

The *World Wide Web* is a large collection of "home pages" containing information that may be presented in text, video, or sound form. The web is a very popular multimedia portion of the Internet. The web links millions of computers globally providing instant access to universities, libraries, government agencies, corporations and even individuals who have created their own web pages.

The *Internet,* also known as the Net, is a network of computers, linked to one another through different types of connections that permit the transmission of data, voice, and video from one computer to another.

CONCEPTUAL FRAMEWORK

The nursing theorist Dorothea Orem developed the Self-Care Deficit Theory of Nursing. This theory was created by Orem to help identify the boundaries as well as the domains of nursing. Orem defined the concept of self-care as "the practice of activities that individuals initiate and perform

on their own behalf in maintaining life, health, and well being" (Orem, 1991, p.117). Orem's theory has applicability and relevance to this project. People who have assessed and implemented Internet information into their self-care behaviors have initiated activities that may help them maintain life, health and well being. An example would be if someone learns about exercise on the Internet and then initiates an exercise regimen, then they have taken actions to maintain life, health and well being. Orem's definition of self-care provides an excellent basis for the development of an educational web page that people with diabetes can utilize as a resource. Refer to Figure 1 to apply a model to the conceptual framework as depicted by Fitzpatrick and Whall (1996, p.122).

SELF-CARE DEFICIT NURSING THEORY

In order to link Orem's Self-Care Deficit Theory of Nursing to this scholarly project, one should have an understanding of Orem's theory. There are three interrelated theories in the general theory of Self-Care Deficit Theory of Nursing. The theory of self-care is central to the other two interrelated theories. The remaining two are the theory of self-care deficit and the theory of nursing system.

Orem's model has six major concepts and one peripheral concept. The six major concepts include: self-care, therapeutic self-care demand, self-care agency, self-care

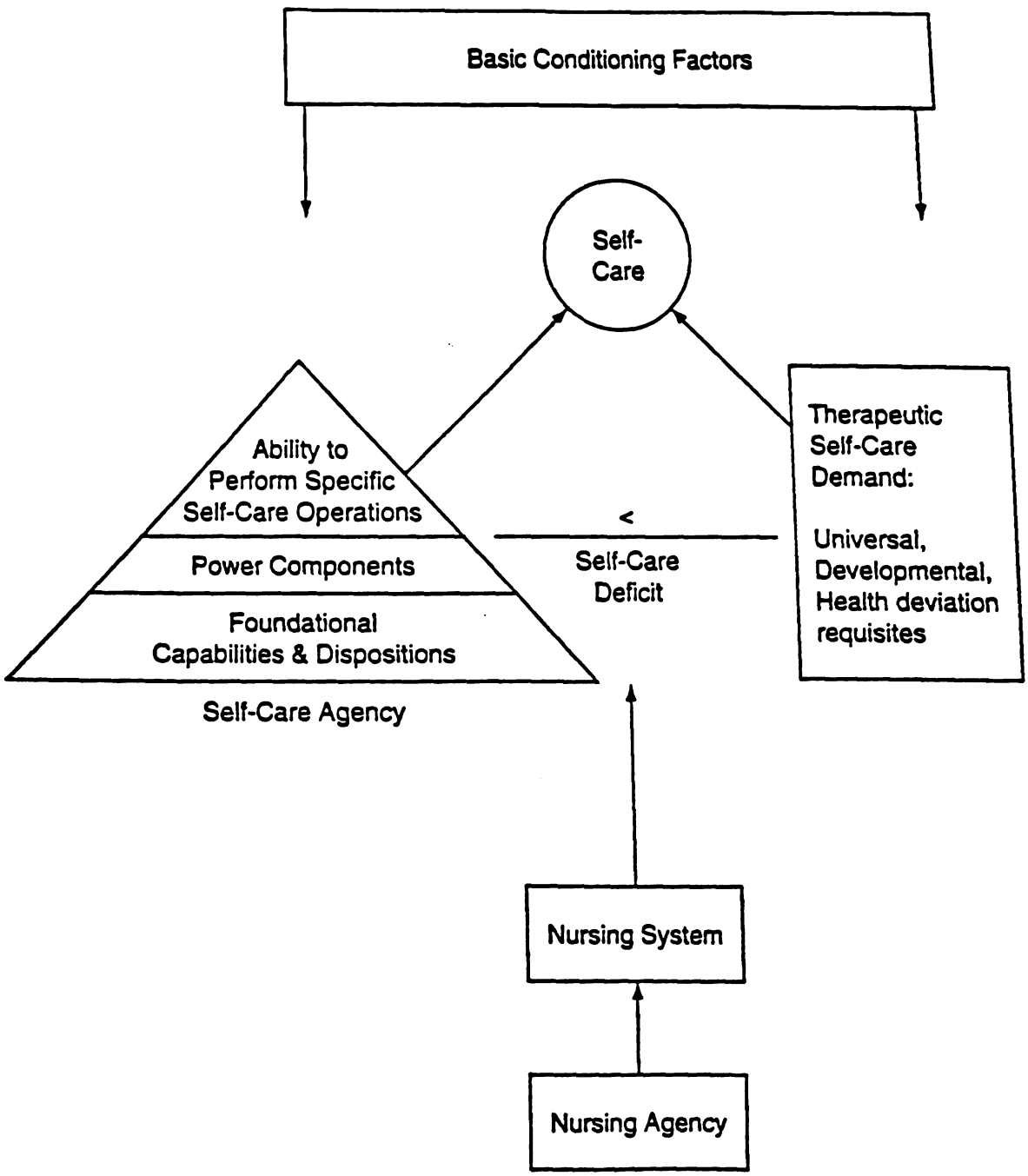

FIGURE 1. Model of Self-Care Deficit Theory

deficit, nursing agency and nursing system. The peripheral concept is the basic conditioning factors. Peripheral concepts are "aspects of the person and the environment that influence self-care agency and self-care demand" (Fitzpatrick, 1996, p.123).

Each of the concepts are linked to one of the three interrelated theories. The concepts of self-care, therapeutic self-care demand, self-care agency and basic conditioning factors are all part of the central theory of self-care. The theory of self-care deficit is explained within one concept, self-care deficit. The final theory, nursing system, is explained within the two concepts of nursing agency and nursing system.

The first concept, self-care, has three basic assumptions. First of all, Orem believed that the activity of self-care was ego-processed. Orem suggests that the activities performed are formulated from within one's conscience and are learned through one's communications and interpersonal relations.

Another basic assumption about self-care is that, at times, one may need assistance in order to achieve self-care. Assistance may be given by the APN in order to help achieve specific health related goals. Supplying the client with information would be a way that the APN could promote these goals. The third assumption is that every person has the right and responsibility to perform self-care not only for themselves but also for others. A client who

effectively utilizes positive self-care behaviors such as an appropriate diet and exercise, will optimally lead a healthier lifestyle. The APNs role and responsibility is being an educator and an advocate of the clients well-being.

The second major concept of Orem's theory is therapeutic self-care demand. Self-care demand represents a "specification of the kinds and number of one measures that are known or presumed to be regulatory of an individual's human functioning and development within the same time frame"(Orem, 1995, p.187). A self-care demand can be viewed in a physical sense as something that demands an action from the body. Having poorly managed diabetes can create a self-care demand. To aid in drawing a link from Orem's Self-Care Deficit Theory of Nursing to this scholarly project, see Figure 2.

Another major concept of Orem's theory is self-care agency. Orem (1995) defined self-care agency as "the complex acquired capability to meet one's continuing requirements for care of self that regulates life processes, maintains or promotes integrity of human structure and functioning and human development, and promotes well being" (p. 212). The concept consists of three parts which build on each other. The base of the concept is foundational capabilities and dispositions, followed by power components. The ability to perform specific self-care operations is the final component of self-care agency.

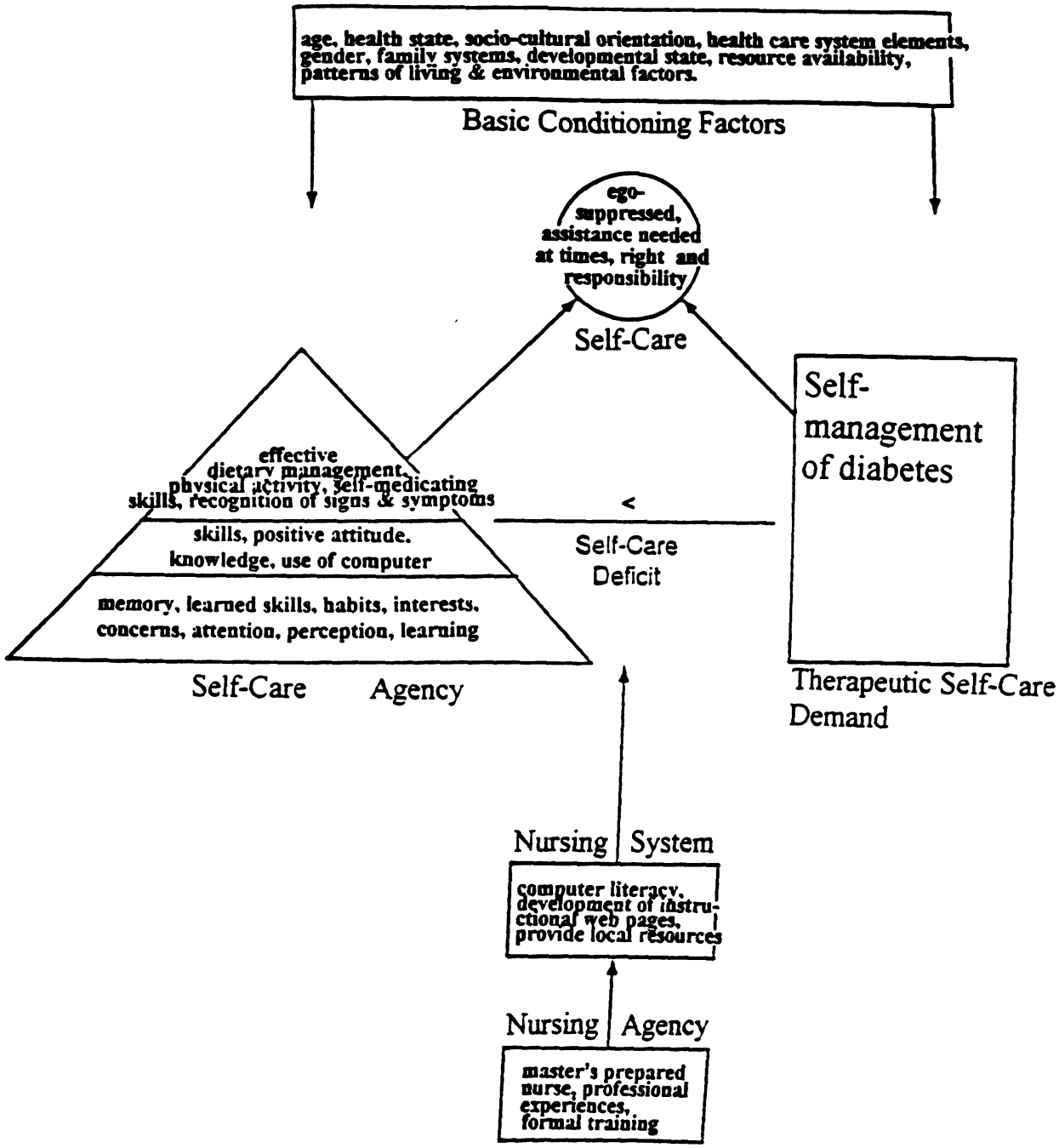

FIGURE 2. Orem's Self-Care Deficit Theory with adaptations for this scholarly project.

Examples of foundational capabilities and dispositions for people with diabetes would include: memory, learned skills, habits, interests, concerns, attention, perception, learning, and the ability to manage one's own activities of daily living. Power components are basically skills, attitudes and knowledge that make up the capabilities for self-care. Power components include the persons ability to use a computer, their positive attitude and a strong knowledge base about diabetes. Specific self-care operations would include effective dietary management, physical activity, ability to self-medicate and the recognition of signs and symptoms of complications.

The fourth concept in Orem's theory is basic conditioning factors. The ten conditioning factors that Orem identified are: age, health state, socio-cultural orientation, health care system elements, gender, family systems, developmental state, resource availability, patterns of living and environmental factors. Hartweg (1991) stated "these factors, which are interrelated, actively influence both the quality and the quantity of self-care agency, therapeutic self-care demand, and nursing agency at instances in time" (p.30). Other basic conditioning factors might include the clients level of computer literacy, lack of Internet access, as well as physical disabilities such as blindness. It may be difficult to account for all of these conditioning factors when developing educational programs for a specific

population. However, they should be considered when developing an educational plan.

Self-care deficit is another important concept within Orem's theory. Self-care deficit is one of the three interrelated theories. A self-care deficit exists when there is an imbalance between the self-care demand and the self-care agency. For example, if a person's demand is greater than their agency, then a self-care deficit exists. Simply having diabetes and attempting to manage it effectively can be a self-care demand. If the person's agency is limited with few abilities and resources, then a self-care deficit exists. Conversely, a demand can be less than the agency, in which case the client has the capability for specific self-care operations.

It is also important to note that a deficit can be further described as being partial or complete. A complete deficit means that there is no capability to meet a therapeutic self-care demand. A partial deficit suggests that there are "some capabilities to meet part of the self-care demands but not all" (Hartweg, 1991, p.24).

Nursing agency and system are the two concepts within the theory of nursing system. Nursing agency is the complex set of learned and acquired abilities for the deliberate action of nursing (Orem, 1995, p.246-291, 329). Education in the discipline of nursing represents a specific ability of the nurse as an agency. An APN has additional education that gives him or her the skills to act as an educator,

researcher and advocate for their clients health. It is important to note that certain factors may influence the nursing agency, such as the individual nurse's experience as well as their level of education. In relation to this scholarly project the nursing agency is represented by a masters prepared nurse creating an alternative to diabetes education. Simply having advanced education gives the APN qualities to act as a nursing agency. Orem (1995) believed strongly that the client's "acquired abilities would help meet one's continuing requirements for care of self" (p.212). Acquired abilities are not only inherent but also learned. The APN has the ability to perform the roles of the nursing agency in order to promote a client agency.

The nursing system represents the deliberate actions performed by the APN in order to strengthen the client's self-care agency. Therefore, improving the self-care agency may lessen if not eliminate the self-care deficit. Specific skills of a nursing system includes supplying information and resources that people with self-care deficits can utilize. The nursing system is therefore promoted through the development of a world wide web page.

In summary, the goal to promote self-care behaviors will be done through the APNs utilization of a nursing system and agency. Development of a world wide web page for diabetes education is a unique way to improve a clients self-care agency. A person who has the motivation, interest and capability to seek out information about their disease

has the foundational capabilities and disposition to strengthen their self-care agency. The APN as an agency is supplying the inquirer with information and resources that he or she will need to carry out specific self-care operations. If the client knows what diet he or she should plan, how to exercise, and who to contact in the local area, then he or she must be motivated to initiate these lifestyle changes. Motivating the client to carry out self-care operations is another power component that the APN can promote. When all of these interventions are performed and collaboration between the client and the APN is established, a self-care deficit can be eliminated.

LITERATURE REVIEW

One might ask, why the Internet to educate about diabetes? First, rationale for use of the Internet as an educational tool will be reviewed. Secondly, computer-based patient education (CPE) and its advantages will be presented.

The Internet is the fastest growing communication medium of all time, growing at "warp speed" in comparison to its predecessors television, radio, telephone and fax. It took 38 years before 50 million Americans were listening to radio. Television picked up the pace by reaching that many in only 14 years. However the Internet had 50 million users in just four years (Clerkin, 1997, On-line).

Maddux (1996) stated that 101 million people will be using the Internet within the next four years and a minimum

of 24 million people in North America had accessed the Internet in the first three months of 1996. The online figure now stands at 122 million people and Internet commerce sites have seen their most optimistic forecasts surpassed. As many as 70 million people may be online by next year in the United States (Clerkin, 1997, On-line).

Izenberg and Lieberman (1998) wrote, "the most common Net pursuit, according to Nua Internet Surveys, is research: 82% of those who use the Net look for information. Education ranks second, at 75%" (p.277). Furthermore, "a random telephone survey of 1,000 Internet users age 16 and older revealed that 42.4% used the medium to retrieve health information. Of those, about 64% gathered information about their own health needs" (Izenberg & Lieberman, 1998, p. 277).

Given the fact that "the number of people with diabetes is increasing by about 6% per year" (Greene, 1991, p.473) and the population of Internet users is increasing exponentially, it appears that a world wide web site would be an appropriate and useful educational tool.

It has been established that large numbers of people are using the Internet regularly. It has also been established that people are looking for research and information about their own health needs. So why is the Internet so attractive? What does the Internet have that books, audio-tapes or small group discussions do not have?

One study proposed that there are three major limitations to current diabetes education. First of all, the lack of ongoing support and maintenance required for behavior changes. Secondly, the time and cost requirements for patients and professionals and thirdly, the lack of ability to reach people located in rural areas (McKay, Feil, Glasgow, & Brown, 1998, p. 174). Having an Internet web page can eliminate these limitations. Internet sites are available 24 hours a day, require low maintenance and people can access them from their own homes.

For some people, ownership of a computer is not possible. However Bader and Braude (1998) believe "the proliferation of public-access computers in libraries throughout the country is making accessing the Internet even more convenient than was accessing a pay telephone in the early days of the telephone industry" (p.409). A characteristic of the Internet is that people can gather information almost effortlessly from the hundreds of thousands of computer servers tied into its networks. In addition to the vast amount of information available, "the Web provides interactive information in a number of forms: text, image, animation, sound, and video" (Izenberg & Lieberman, 1998, p.277). These forms of interaction have never been combined into one source that is available 24 hours a day.

Lewis (1996) believes that the promotion of patient education should be an interactive process and therefore the

utilization of computers, which are a form of interactive education, can facilitate the efficiency of this process. There are numerous advantages that come from CPE. Advantages include, active participation in the learning process, immediate feedback, self-paced learning, immediate reinforcement and mastery of what is learned. Other less obvious advantages include, time-efficiency, cost-effectiveness, and instructional consistency. Estey, Meng and Mann (1990) also concluded these advantages in suggesting that reinforcement of learning and the individualized instruction that result from CPE help clients retain the information and promote knowledge transfer. One might add that CPE fosters active participation, motivates the learner, and gives people with diabetes the opportunity to complete the task without the fear of negative outcomes.

Negative outcomes of lectures might include the fear of not being able to understand or remember something that was told to them by an instructor. Having access to a web page is a self-paced style of learning. This would allow the inquirer as much time as they need to thoroughly understand the information.

APNs play a vital role in the promotion of self-care through the role of educator. "Diabetes self-management education is the process of providing the person with diabetes with the knowledge and skills needed to perform self-care, manage crises, and make lifestyle changes required to successfully manage this disease" (Clement,

1995, p.1204). Therefore, providing clients with the tools for effective self-management should be a motive for developing instructional web pages.

Unfortunately, there is a large number of people who have absolutely no knowledge base regarding diabetes. "76% (sic) of people with NIDDM reported having never attended a diabetes education class, course, or any other education program about diabetes" (Coonrod, Betschart and Harris, 1994, p.852-858). Providing an alternative form of diabetes education may help reach the high percentage of people not being educated. Takabayashi (1994) found that "CPE supported active participation in the learning process and reduced the time required for learning by as much as 40%." Furthermore, Horan and Yarborough (1990) suggested that CPE programs can reduce total learning time by 20% to 40% with the same or better results by the learners, as compared to traditional forms of education. One other study by Mazzuca (1982) found that "education promoting change in patient self-care was 150%-300% more efficacious than didactic education alone" (p.521-529). To strengthen the rationale for the use of CPE, Engvall and Mccarthy (1996) believed CPE's interactive nature promotes the clients option to individualize the learning, control the pace and manipulate the instructive strategies.

The use of computers and multimedia technology in the health care field could possibly follow the use of such technology in other fields. As costs decrease and more

programs are produced, more implementation should occur. Lewis (1996) believes that "Computers have the potential to enhance the effectiveness of diabetes patient education" (p.144). With little maintenance and low costs, a web page is an applicable alternative for the trends in technology.

As one can see this project provides an opportunity for the APN to promote self-care. APNs are challenged to provide the most current information and the web is one tool in the tool-box that should not be overlooked. Computers can be used effectively as an instructional tool. "Educational researchers have demonstrated that computers are also effective teaching and learning tools. A combination of CPE and traditional diabetes education is one approach for providing high-quality, cost-effective patient education" (Lewis, 1996, p.140). The APN is challenged to plan educational opportunities that provide clients and their families with self-care agencies that promote positive self-care behaviors. The Internet as a form of CPE, has endless potential to promote self-care.

METHOD

The goals of this scholarly project are achieved by developing a world wide web page. The web page is entitled "West Michigan Diabetes Resources". A printed copy of the web page is seen in Appendix A. The address to the web page is www.msu.edu/user/brinksjo/diabetes-2/.

Referrals to other Internet sites regarding the instruction of exercise and diet for people with diabetes is

available. The web page also contains referrals to a daily health care tip for managing diabetes. Included in this project is also an updated list of the most well known local diabetes resources in Western Michigan. These resources are comprised of local hospitals, diabetes educators and regional chains for state and national organizations. The times for classes are continually changing so inquirers are told to call the phone numbers listed for more information. A disclaimer is provided that encourages people to discuss the information with their primary care provider first.

The promotion of this web site will be done by advertising through local care givers, diabetes organizations, educators, universities and APNs. A formal letter describing the site and its purpose will be mailed to the local diabetic gatekeepers. Speaking to APN journal clubs and diabetic support groups would be another avenue for promoting the web page.

Development of this site was done with the aid of a web publishing program. Legitimate web pages will typically include four characteristics: well documented ownership of the site, the site authors credentials, clearly listed references and dates of site construction or revision. West Michigan Diabetes Resources includes these characteristics.

The web page uses hyperlinks for referrals. Hyperlinks are connections to other Internet sites. They allow you to click on the site address and go directly to the referred site. There are a number of different things

to consider when evaluating Internet sites. First of all, it is important to assess who put up the site and supplies the content. Many Internet sites are owned and operated by companies that have products to sell. This can lead to biased information on the site itself. Good medical sites will often have published peer reviews and mention whether or not other sites challenge or support their assertions. Having a way to contact the site is also critical. Regular site updates are important to assure that the site contains the newest information. Also, review credentials should be listed in order to prove that multiple sources were consulted regarding the sites development. Lastly, checking for sound editorial boards is a good measurement tool.

There may be some more obvious means of evaluating sites that can be a personal preference. For example, the site should be easy to navigate and the "read me" file should supply the authors name. One may watch to see if the multimedia items are extraneous or useful. Having to download large amounts of data prior to viewing the site can be a diversion. Most importantly, the use of common sense must go into evaluating Internet sites before using them as information resources.

This project used a total of six different hyperlinks. Although these six sites did not fulfill every evaluation criteria, they were found to be much more sound than other available sites. There are dozens of Internet sites that supply diet and exercise information for people with

diabetes. Of those available, the following were thoroughly evaluated for use with this project: www.lilly.com, www.MEDICONSULT.com, www.NIDDK.gov, www.diabetes.com, www.noah.cuny.edu, www.medscape.org, www.diabetesmonitor.com, www.aztec.asu.edu/medical/azse/exer.html, www.warrenclinic.com, www.shn.net, www.cdc.gov, www.joslin.org, and www.diabetes.org/ada/c40.html.

POPULATION

The population addressed in this project is specifically people with diabetes. Although the information may be more applicable to people with NIDDM, people with IDDM and gestational diabetes would still benefit from implementing the self-care behaviors of diet and exercise. There are many web sites for people with diabetes. Unfortunately there are no web sites that are specific to those who live in Western Michigan. The American Diabetes Association web page does have a chapter specific to the state of Michigan but its focus is on free foot screenings.

Constraints for this project may include people who do not have access to a computer or who are computer illiterate. Access and level of literacy can be improved through the clients utilization of local libraries. Fortunately, almost all local libraries in Western Michigan have access to the Internet. In rare occasions, physicians offices have access to the Internet. This was witnessed by

personal observation in two Western Michigan physician's offices.

EVALUATION

Evaluation of the web page is essential to understand the impact this project has had on people with diabetes. There will be two forms of evaluation for this project. One form will entail counting the number of hits the site receives. Hits is a term used for the number of times the site is accessed. Although this is not a specific form of feedback, it can give a general idea of the number of people who are searching for information regarding diabetes. However this form of evaluation can be somewhat inaccurate due to the number of people who unintentionally access the site.

The other form of feedback will be done with an evaluation form as seen in Appendix B. This is available on the web page. The person filling out the evaluation will be asked to identify themselves as a person with diabetes, educator or both. It will also ask some more specific questions regarding their impression of the web page and its effectiveness. The responders can also leave more personal information so that the site manager can contact them if they wish. This form of evaluation can yield quick feedback because the site manager will get the results immediately. "A questionnaire embedded in a WWW page is easier for a participant to complete. Responses to questions can be limited to predetermined options or free text entry"

(Lakeman, 1997, p.271). The people who access the site can also email the site manager if they have any questions or concerns.

IMPLICATIONS FOR ADVANCED NURSING PRACTICE IN PRIMARY CARE

Clearly there are implications for future research. Studies need to be done regarding the effectiveness of web-based information for the purpose of educating people with diabetes. Studies to help evaluate the reasons why CPE would not be effective for people with diabetes may also be helpful. Data could be generated to help identify the preferred tool of education for different age groups or people with different educational levels. One could even research the direct effects of CPE on blood glucose levels, hemoglobin A1C, and onset of diabetic complications.

Educating people about diabetes and its complications can be a life saving endeavor. People who have diabetes and practice healthy behaviors will feel a sense of independence in their own self-care. This in turn will enhance stronger beliefs about their level of control with their disease.

The role of the APN includes being an educator, researcher, advocate and change agent. As an educator, APNs will need to apply theories and selected learning methods to assist clients in meeting their health educational needs. The APN, as a researcher, will need to pursue the scientific investigation of clinical problems in order to advance nursing knowledge. Working to promote a transfer of

responsibility to the client with diabetes, through a climate of mutuality will strengthen the role of client advocacy. Lastly, utilizing a systematic approach to bring about positive alterations in a client's health behaviors is what APNs can do to be change agents. All of these roles could be fulfilled by implementing alternative forms of education for clients.

In the future, APNs may need to be comfortable with the Internet and its capabilities if they want to become diversified educators. As the APNs client population grows older, more clients will be using the Internet in their daily lives. We are in a technology driven era and APNs need to be at the fore-front in order to optimize their roles and responsibilities. Developing web sites for educational purposes will be one of the leading educational alternatives that APNs can utilize to promote self-care.

APPENDICES

APPENDIX A

APPENDIX A

WELCOME TO WEST MICHIGAN DIABETES RESOURCES (WMDR)

This site has been developed to inform people with diabetes about resources in West Michigan. It will supply you with phone numbers to area clinics and educators of diabetes. Most of the resources have one-on-one or small group classes that are available to people with any type of diabetes. Significant others and family members are often encouraged to attend the classes, at no additional charge. Class times are established by each resource based on need, therefore it is necessary to call for an appointment. The local resources help people with diabetes learn how to control their disease through awareness, diet and exercise education, and medication. Most of the programs are certified by Community Public Health Agency. Certification may play an important role in reimbursement, so check with your insurance company or Medicaid.

WMDR has also listed a few hyperlinks (other internet sites) that are wonderful educational resources for diet and exercise education. These hyperlinks have a moderate amount of information regarding diet and exercise that is directly related to people with diabetes. All you have to do is double click on the hyperlink and away you go.

Below you will find a disclaimer, a list of local diabetes resources as well as hyperlinks to diet and exercise web sites. You will also find a hyperlink to an organization that supplies "a tip for the day" for people with diabetes.

Thank you for visiting WMDR. I hope that you have found this useful and will return on a regular basis. Have fun browsing, and good luck!

Disclaimer

This diabetes information is for health care professionals, patients, and consumers in West Michigan only. If you have diabetes, this web site contains some basic information you may need. Ask your health care provider for more information. The West Michigan Diabetes Resources web page is for informative purposes only and is not providing medical or professional advice. The information provided in West Michigan Diabetes Resources should not be used for diagnosing or treating a health problem or disease. It is not a substitute for professional care. If you have or suspect you may have any health problem, you should consult your healthcare provider. If you have diabetes, any change of insulin or medications should be made cautiously and only under medical supervision.

Listing of Local Resources

These resources have individual or group classes that are arranged based on need. To register or get additional information, call the number listed.

American Diabetes Association, Grand Rapids
Regional office 458-9341
TENDON, Diabetes Outreach Network for ten counties in west Michigan.
Grand Rapids office 831-7250
Spectrum Health Downtown Campus, Grand Rapids
Diabetes Services 391-1699
Spectrum Health East Campus, Grand Rapids
Diabetes Services 774-7599
Saint Mary's Health Services, Grand Rapids
Center for Diabetes and Endocrinology 732-309
Metropolitan Hospital, Grand Rapids
Diabetes Education 831-4787
Untied Memorial Hospital, Greenville
Diabetes Education 754-4619
Mercy General Health Partners, Muskegon
Ambicare Homecare 733-4064
Hackley Hospital, Muskegon
Diabetes Education 728-4810
North Ottawa Community Hospital, Grand Haven
Diabetes Education 847-5332
Holland Community Hospital, Holland
Medical Nutrition Therapists 394-3148
Zeeland Community Hospital, Zeeland
Diabetes Education 669-0250
Pennock Hospital, Hastings
Diabetes Education 945-3451 ext.415
TIPDON, Diabetes Outreach Network for northern Michigan.
Petosky office 1-800-TIPDON5

Check out these sites for DIET education!

http://www.diabetes.com

http://www.niddk.nih.gov/health/diabetes/diabetes.htm

http://www.diabetes.org/ada/c40.html

Check out these sites for EXERCISE ideas!

http://www.noah.cuny.edu/diabetes/diabetes.html

http://www.lilly.com/diabetes/managing/exercise.html

http://www.joslin.org/education/library/exercise_health.html

Would you like a DAILY TIP on diabetes?

Try hitting this site:

http://www.diabetes.org/taketime/

A word about the author.

My name is Josh Brinks. I am a candidate for a Masters in the Science of Nursing at Michigan State University and will graduate in December of 1998. I currently practice as a BSN, RN in an emergency room as well as intensive care units. I intend to sit for the FNP examination, in February of 1999.

I have developed this web page as part of my graduate requirements from MSU. If you have any questions or concerns, please send mailto:brinksjo@pilot.msu.edu Thank you for your time.

Feedback

Would you please consider giving me feedback regarding this web site? It will only take a minute! Just click on this!

Congratulations, you are

the http://www.msu.edu/counter/counter.cgi person to visit

this site.

This page was last edited on 09/27/98.

APPENDIX B

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WEB PAGE FEEDBACK FORM

Tell me what you think about my web site, local resources, hyperlinks for diet and exercise and the "tip" of the day. I welcome all of your comments and suggestions.

1. Which best describes you?

Person with diabetes, Healthcare professional, Healthcare professional with diabetes, Student, Family member person with diabetes, Other.

2. How do you learn best?

Reading, Demonstration, Active participation, Computer aided instruction.

3. How would rate your overall experience with this web site?

Excellent, Very good, Good, Fair, Poor.

4. How would you rate the graphics and overall appearance of the site?

Excellent, Very good, Good, Fair, Poor.

5. How would you rate your ability to navigate and find information?

Excellent, Very good, Good, Fair, Poor.

6. How would you rate the "DIET" education hyperlinks?

Excellent, Very good, Good, Fair, Poor.

7. How would you rate the "EXERCISE" education hyperlinks?

Excellent, Very good, Good, Fair, Poor.

8. How would you rate the "TIP for the day" hyperlink?

Excellent, Very good, Good, Fair, Poor.

9. Would you recommend this web site to a friend, patient, or colleague?

Yes, No.

10. Did you find the list of "Local Resources" helpful?

Yes, No.

11. How would you rate the overall quality of online information?

Excellent, Very good, Good, Fair, Poor.

Enter your comments in the space provided below:

Tell me how to get in touch with you:

Name:

E-mail:

Tel:

Fax:

Check box if you want the site manager to contact you as soon as possible regarding this matter.

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