Occupational Therapy and the Person With Diabetes and Vision Impairment

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Diabetes affects 5.2% of the population; many of those persons experience loss of vision as one complication of the disease. Occupational therapists are treating these persons, often for other resulting complications (such as stroke or amputations), or are being asked to adapt techniques or equipment (such as insulin-injection devices) needed for diabetes management. Because no guidelines exist for occupational therapy with persons with diabetes or vision loss or both, occupational therapists may be unsure of appropriate treatment approaches. Among the approaches described in the occupational therapy literature, common ones include collaboration with other professionals and incorporation of one or more aspects of the diabetes regimen into the person’s life-style. When addressing persons who have both diabetes and vision loss, therapists consider their own knowledge base as well as the persons’ needs in managing their diabetes. Treatment ideas include enhancing the visual environment or incorporating tactile and auditory feedback with self-management tasks such as testing blood glucose levels. Collaboration with and referral to diabetes and low-vision professionals are adjuncts to therapy and ensure a comprehensive and ongoing diabetes management program.

The prevalence of diabetes and its potential complications (e.g., vision impairment) is well documented. As many as 13 million people, or 5.2% of the U.S. population, have diabetes. Incidence increases with advancing age; about half of all cases are found in people older than 55 years (Moy, 1993).

Nearly 300,000 Americans are blind as a complication of their diabetes (Hoover, 1985). Although most authors agree that diabetes is the leading cause of new cases of blindness in adults between the ages of 25 and 74 years (American Diabetes Association, 1993; Javitt, Aiello, Bassi, Chiang, & Canner, 1990; Pautler, 1992), the actual number of such new cases is debatable. Estimates range from 5000 to 12,000 each year (Bernbaum, Albert, Brusca, Drimmer, & Duckro, 1988; Pautler, 1992). Discrepancies in numbers may be due to differences in interpretation of the terms blindness and visual impairment.

The American Diabetes Association (Moy, 1993) further reported that by 5 years after the diagnosis of diabetes, retinopathy is present in 13% of persons with younger onset diabetes (before the age of 30 years) and in 40% of insulin-taking persons with older onset diabetes. The incidence increases with age and duration of diabetes.

Because other common complications secondary to diabetes include cardiac problems, stroke, amputations, kidney failure, and psychosocial adjustment issues, persons with diabetes and visual impairment are being treated by health care professionals (including occupational therapists) in a variety of settings. Bernbaum et al. (1988) stated that health care professionals “are often unresponsive to the rehabilitation needs of visually impaired patients with diabetes” (p. 54) and do not provide instruction in diabetes self-management tasks. Yet according to Baker (1993), “traditional diabetes self-management techniques require adequate vision to practice” and “are virtually impossible to perform” for those with vision loss and other potential complications “unless adaptations or modifications of both technique and equipment are implemented” (p. 349).

Occupational therapists typically address self-care needs of persons in rehabilitation and medical settings, putting them in a position to address appropriate diabetes management tasks. However, no standard of practice or set of guidelines currently exists for occupational therapy with persons with diabetes or visual impairment or both, leaving the issue of appropriate evaluation and treatment strategies for noted functional problems ambiguous. Yet occupational therapists are responsible for providing persons who have both diabetes and visual impairment with self-care education or for making referrals to appropriate sources, as implicitly mandated by the Americans with Disabilities Act of 1990 (Public Law 101-336) (American Association of Diabetes Educators, 1993).

The purpose of this article is to provide a treatment framework, guidelines, and resources to occupational therapists.
therapists who will provide services to persons with both diabetes and vision loss.

Literature Review

The person with diabetes and visual impairment faces many challenges in maintaining and attaining independence in performing activities of daily living. The challenges in self-management of diabetes include a variety of daily living skills, such as controlling pharmaceutical regimens, frequent blood glucose monitoring, meal planning and preparation, caring for the skin and nails, and appropriate exercise. Diligent adherence to daily routines in each of these areas is essential to decrease the occurrence of additional complications arising from diabetes (American Diabetes Association, 1993; Diabetes Control and Complications Trial Research Group, 1993). Most of these daily routines fall within the purview of services provided by occupational therapists, but are being addressed by other professionals (American Association of Diabetes Educators, 1993).

As reported in the literature, the scope of services provided by occupational therapists to persons with diabetes and vision impairment seems limited, without clearly defined roles: it uses treatment approaches, such as fabrication of adaptive devices, that address only a portion of this population's needs. For example, occupational therapists have often focused on assisting these persons in functioning more independently with their basic daily living skills (Ruben, 1990), on improving these persons' use of residual vision, or on trying out alternative techniques to compensate for a visual loss, such as using a needle threader tactually (Warren & Lampert, 1994). For acute care rehabilitation settings, authors have suggested that services for this population consist of incorporating low vision techniques into the person's total rehabilitation plan (Bennett, 1988; Maley, Ray, & Greene, 1991). Wheeler (197-) and Klinger (197-) offered specific guidelines and considerations for therapists in order to "deal effectively with the blind patient" (Wheeler, p. 4). Both Mach (1988) and Welch (1983) described the role of the occupational therapist in hospital-based diabetes treatment programs, but neither description encompassed the specific needs of the person with diabetes who also had a vision loss.

Among the adaptive devices designed or fabricated by occupational therapists to facilitate independence in diabetes self-management, two were designed to address not only vision loss in persons with diabetes, but also upper extremity sensory loss (Reardon, 1994) or motor incoordination (Knier, 1992). These adaptations, as well as one described by Boyer (1976), were of routinely prescribed devices that allowed the person to test blood glucose levels, draw insulin into a syringe, or perform injections independently.

The literature includes descriptions of three occupational therapy programs that specifically addressed the needs of persons with both diabetes and vision loss. In Baker's (1993) comprehensive program, the occupational therapist evaluated, coordinated, and monitored the diabetes services and provided and oversaw the person's performance of newly learned daily living techniques. In Dods's (1993) program, the occupational therapist discussed proper diet and regular exercise; evaluated persons' "understanding of their physiological condition, their psychological well-being, and their previous contact with...a diabetes educator" (p. 365); and provided training in the use of adaptive equipment, meal preparation, and various aspects of medical management, including blood glucose monitoring and nutrition. In Kraut's (1994) program, the occupational therapist educated and trained persons in the use of adaptive techniques, optical and nonoptical devices, and vision substitution skills in order to perform self-care, work, and avocational activities. Kraut submitted that these tasks may be assumed by other professionals (a nurse, ophthalmic assistant, rehabilitation teacher, or technician) but thought that occupational therapists offered the additional dimension of activity analysis and adaption.

The Role of the Occupational Therapist

The literature has suggested that occupational therapists are providing services to persons with diabetes and vision loss in various ways, but it does not present a framework from which therapists can determine appropriate roles and responsibilities. Perhaps this framework has not been offered because occupational therapists' involvement with persons with diabetes and vision loss can vary widely depending on the type of setting, conditions typically served, recognized roles of team members, and level of therapists' knowledge regarding diabetes and vision loss.

A general framework for therapists' roles and responsibilities is presented in Table 1 and is described here. Within this framework, the therapist may be involved with these persons on one of three levels, depending on variables within the treatment setting.

Level A

Occupational therapists in traditional occupational therapy practice arenas (e.g., rehabilitation, home health care, or psychosocial settings) may not address issues of diabetes and vision impairment directly (see Table 1, Level A). However, when a person in any of these settings presents secondary diagnoses of diabetes and vision impairment, therapists with even minimal knowledge of diabetes or visual impairment or both can and should take responsibility for (a) conducting an appropriate screening, (b) modifying the primary treatment program according to the presence and severity of complications, (c)
Table 1  
Roles, Responsibilities, and Needs of Occupational Therapists Providing Treatment to Persons With Diabetes and Vision Loss

<table>
<thead>
<tr>
<th>Level</th>
<th>Roles</th>
<th>Responsibilities</th>
<th>Needs</th>
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<tbody>
<tr>
<td>Level A</td>
<td>Therapist provides treatment to person with diabetes and vision loss; does not directly address issues of diabetes/visual impairment.</td>
<td>Screens for functional problems related to diabetes and visual impairment. Adapts treatment environment. Refers to appropriate professionals (including therapists in Level C).</td>
<td>Basic knowledge of diabetes, its complications and functional implications. Basic knowledge of professionals in field of diabetes and visual impairment.</td>
</tr>
<tr>
<td>Level B</td>
<td>Therapist provides treatment to person with diabetes/vision loss; directly addresses at least one area of diabetes management on a situational basis.</td>
<td>Addresses all responsibilities of Level A. Collaborates with other team members(s) or appropriate professional(s) providing primary treatment for diabetes/visual impairment.</td>
<td>More in-depth knowledge of diabetes/visual impairment; at least relative to area(s) being addressed through collaboration. Ongoing working relationship with collaborating professionals(s).</td>
</tr>
<tr>
<td>Level C</td>
<td>Therapist serves as team member in diabetes treatment program or program for persons with vision loss.</td>
<td>Addresses all responsibilities of Level A and B. Evaluates and addresses performance areas relative to diabetes management (in collaboration with appropriate professionals). Directly addresses adaptations needed due to vision loss.</td>
<td>Up-to-date, in-depth knowledge of all aspects of diabetes and diabetes management. Up-to-date, in-depth knowledge of techniques, adaptations, and equipment relative to vision loss in diabetes management. Ongoing working relationship with all other team members: ongoing working relationship with other appropriate professionals.</td>
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Adapting assessment and outcome measures, and (d) referring to other appropriate professionals in the fields of diabetes and vision loss (the last of these items is discussed later in this article).

A screening includes gathering information from the client record as well as from the client and family in the following areas: documented history of diabetes, including presence of and severity of secondary complications of diabetes and any treatment undergone thus far; measurement of visual acuity, as well as other measures of visual function, if available; involvement of other professionals and agencies specializing in treatment of diabetes or visual impairment; and noted current functional difficulties.

Modification of the primary occupational therapy treatment program is advised when the complications of the person's diabetes or visual impairment or both will not be addressed directly during the primary program. The therapist monitors the effects of complications of diabetes on the primary condition for which the person is being treated. For example, background retinopathy may be further complicating visual performance in a person with hemianopsia; fluctuations in blood glucose may be contributing to behavior changes noted in a person being treated for depression; difficulty maintaining balance during a food preparation session may be due to lower extremity neuropathy.

The therapist chooses the most suitable treatment tools, materials, and techniques, even when specific diabetes self-management tasks will not be addressed directly. Visual approaches may require modification and are dependent on the degree and type of vision loss. The person's ability to manipulate objects and materials may be hampered by upper extremity neuropathy and may necessitate adaptation of therapeutic tools.

Assessment and outcome measures may be adapted to reflect the person's true functional ability and extent of goal achievement. A paper-and-pencil test, for example, may not be feasible for a person with vision impairment or may require print enlargement, contrast enhancement, modified lighting, or an adapted writing instrument.

Level B

In some settings the occupational therapist can address a limited number of problems directly related to diabetes care and vision loss in addition to therapy goals related to the primary program (see Table 1, Level B). For example, a therapist treating the person for problems related to a stroke may incorporate into the treatment program an adapted technique for drawing insulin. In these cases, occupational therapists will first assume the responsibilities suggested at Level A; in addition, these occupational therapists will require enhanced knowledge of diabetes and its potential complications before addressing clients' self-management tasks. Likewise, they will need to expand the knowledge base of most occupational therapists before addressing ramifications of vision loss.

Level C

Occupational therapists in diabetes treatment programs or low vision and blindness programs (see Table 1, Level C) will address functional limitations related to diabetes and vision loss as the primary treatment goals. In addition...
Guidelines for Treatment

The following treatment guidelines may be helpful for addressing one or more aspects of diabetes self-care (see Table 1, Levels B and C):

- Note that diabetes can affect vision in many ways. Vision loss follows no predicted course, and vision can fluctuate daily and sometimes hourly, increasing frustration for the person. For example, a person might appear to be seeing well enough one day to maneuver through the environment and recognize people, but be unable to do either the following day.

- Incorporate the use of available adaptive equipment for the person who is visually impaired and has diabetes. Petzinger (1993) and Cleary and Hamilton (1993) provided a list of adaptive equipment to monitor blood glucose and to draw insulin. Some glucose meters are available with large, bold display screens; others can be used with a voice synthesizer or purchased with the speech incorporated within the meter. To assist with the measurement of insulin, syringes with bold, easy to read numbers might be substituted. Magnifiers are available to use with certain brands of syringes; devices for measuring insulin can be used to measure preset, different amounts, and mixed dosages. Petzinger (1993) stated that “there are pens that hold cartridges of insulin, and by dialing an amount or depressing a plunger, a measured amount of insulin can be injected . . . and . . . two of many needleless injectors have features that make them usable by persons who are blind” (p. 344). Therapists who lack an in-depth knowledge of diabetes care, particularly of monitoring blood glucose and drawing insulin, are encouraged to work in conjunction with the diabetes care team (which can include a nurse educator, dietitian, and physician) in the incorporation of adaptive equipment and techniques.

- Address limitations in activities of daily living, such as preparing meals, accessing recipes and food labels, weighing foods, and shopping for groceries. These tasks are important to maintain adequate dietary control needed for achieving targeted blood glucose levels.

- Evaluate the person’s need to maintain an exercise regimen and an adequate balance of leisure activities, because of the importance these two tasks play in diabetes management.

- Note that nephropathy (kidney disease, another diabetes complication) might be present, which would require the person to self-manage peritoneal dialysis procedures. Adapting self-management techniques and equipment might be appropriate.

Pay particular attention to upper and lower extremity sensory evaluation results reflecting sensory loss, another complication from diabetes called sensory neuropathy. Educate the person, and emphasize safety precautions. This education is critical for persons who are unable to feel and see wounds. Share results of the sensory evaluations with the diabetes care team to ensure further education and prevention of complications that can arise from sensory losses. Sensory loss also may contribute to difficulty in using communication and identification systems (braille, tactual markings, keyboard use, writing, and phone dialing).

Adapt the task of checking blood glucose, or the equipment itself, around the individual parts of the activity that are difficult for the person to complete. Examples of steps that may be interfering with the completion of the task include obtaining an adequate blood sample and knowing that an adequate blood sample has been obtained, locating the correct area to place the blood on the reagent strip, and checking the expiration date on the strips.

- Be equipped with blood glucose monitors during community outings to test glucose levels of persons who might exhibit symptoms of high or low blood glucose. Carry foods appropriate for the treatment of low blood sugar symptoms, as well as telephone numbers and names of persons to contact in case of emergencies.

- Adapt the task of drawing insulin, or the equipment itself, around the individual parts of the activity that are difficult for the person to complete. Examples of difficulties that may arise while drawing insulin, besides visually being unable to see the numbers on the syringe, include manipulating and stabilizing a syringe, the insulin vial, and an adaptive piece of equipment when drawing, and positioning the syringe on an insulin-measuring device.

Follow adequate precautions when incorporating an exercise program. Cleary (1994) identified three areas for special consideration: “(1) avoidance of activities that can aggravate proliferative retinopathy and other underlying eye pathology; (2) accommodations for special needs due to low vision or blindness; and (3) limitations and risks conferred by other concurrent diabetes complications such as cardiovascular disease and neuropathy” (p. 111). Specific recommendations and precautions for a person can be secured from the diabetes care team, because these vary depending on the degree of vision loss.

Acknowledgment and address any signs of depression and poor coping skills, first by using traditional psychosocial intervention strategies and then by referring to other professionals (such as diabetes care team members, counselors, or support groups) for long-term follow-up care. Numerous studies have documented the interpersonal psychosocial distress of the person with diabetes and visual impairment (Caditz, 1991; Cleary & Fathy, 1989;
Mazze, Lucido, & Shamoon, 1984; Wulsin, Jacobson, & Rand, 1993), as well as familial stress (Bernbaum, Albert, & Duckro, 1993). The person feels a loss of independence and self-esteem, caused by “the need to rely on significant others for physical and financial support” (p. 670), that may affect rehabilitation progress.

Consider that the person with diabetes will also be dealing with common problems shared by other persons with visual impairments. Other tasks that may need to be addressed are time telling, telephoning, caring for clothing (setting laundry appliances, identifying clothes, completing minor sewing repairs, ironing), grooming and hygiene (identifying personal care items, applying makeup, shaving, taking care of nails), housekeeping, eating tasks (selecting utensils, serving and seasoning foods, pouring liquids, cutting foods), financial management, community integration, and functional mobility. Familiarity with equipment and techniques available to address these problems is encouraged; if needed, the therapist can consult with rehabilitation teachers, orientation and mobility specialists, or specialists in rehabilitation of blind persons—professionals who have familiarity with the equipment. These professionals work within state agencies, rehabilitation facilities, and schools, and are devoted to addressing the vocational and daily living needs of persons who are blind or visually impaired.

Facilitate use of residual vision whenever possible. Use magnifiers and large print material as needed. These materials can include enlarged daily schedules, telephone numbers, and names. Information on use of remaining vision may be provided by a low vision specialist. Besides prescription of appropriate optical devices, this professional can assist with general considerations for lighting, size of print needed, and reduction of glare, or with determining when magnification will not be beneficial.

Manipulate light sources as needed. This can be accomplished by increasing, decreasing, or changing light sources, as well as by using filters to reduce glare. Increase contrast through the use of colored tape or paint in the environment (such as steps), and equipment (such as pots and utensils) to increase visibility.

Provide instructional materials and all types of information in an accessible medium when residual vision is not functional and when working with a person who is totally blind. Instruction in tactual methods of communication such as braille can be provided by rehabilitation teachers and other specialists working with persons who are totally blind.

Allow extra time when teaching the use of adaptive equipment. Detailed descriptive verbal directions as well as hands-on demonstrations are often required for the visually impaired person to assimilate the information. Organize the environment and keep it consistent.

Incorporate the use of other senses when appropriate, such as touch, proprioception, hearing, and smell. For example, use an insulin-drawing device that incorporates clicks that can be heard and felt, and represent one or two unit increments of insulin to be measured in the syringe.

Professional Development and Resources

Consultation with a variety of professionals may be of benefit to occupational therapists seeking additional information and assistance on diabetes and vision loss. Local hospital-sponsored diabetes education programs, which typically include a physician (who may be an endocrinologist or a diabetologist), diabetes nurse educator, dietitian, psychosocial professional, pharmacist, and exercise physiologist (some of whom may be certified diabetes educators), can consult with therapists on the impact of diabetes on functional performance for a given person. These education programs also generally incorporate support groups and counseling to facilitate the emotional adjustment to diabetes.

Information regarding low vision and blind rehabilitation services can be obtained by contacting comprehensive low vision services providers and the state agency designated to oversee rehabilitation of persons who are blind or visually impaired (sometimes under the umbrella of the state vocational rehabilitation services). Another source of information is occupational therapists who are included as primary team members in programs for persons with diabetes or visual impairment.

The Appendix contains a comprehensive list to assist the occupational therapist in locating aids, products, and essential information regarding diabetes and vision loss. Persons with diabetes and visual impairment can be directed to these resources as well.

Conclusion

As the population continues to age and as medical advances allow prolonged life spans of those with chronic illnesses, occupational therapists will see an increase in referrals of persons with diabetes and vision loss. This article has presented guidelines for providing occupational therapy services to persons with diabetes and visual impairment.

Appendix

Resources for Locating Aids, Products, and Essential Information Regarding Diabetes and Vision Loss

American Diabetes Association
1660 Duke Street
Alexandria, VA 22314
1-800-ADA-DISC
Information for both professionals and persons with diabetes such as publications, advocacy, continuing education, and supp-
Information can be accessed on the agency that certifies diabetes educators (including occupational therapists) and provides continuing education and publications in the field of diabetes education.

Guidelines were developed by the Visually Impaired Persons Specialty Practice Group (VIP-SPG) of the American Association of Diabetes Educators for adaptive diabetes education for visually impaired persons.

The ADEVIP Monitor

Editor: Ann S. Williams, MSN, RN, CDE
1901 East 101 Street
Cleveland, OH 44106
1-216-791-8118, extension 248
The newsletter of the VIP-SIP is published quarterly.

American Foundation for the Blind (AFB)
15 West 16th Street
New York, NY 10011
1-800 AFB-LIND

Information and resources (printed materials and publications) and equipment catalogs are available. Access to regional educational and employment consultants throughout the United States can be obtained.

AFB Directory of Services for Blind and Visually Impaired Persons in the United States and Canada (24th ed.)

This comprehensive listing of blind rehabilitation centers is updated regularly.

49 Sheridan Avenue
Albany, NY 12210
1-800-877-2693


The Voice of the Diabetic

NFDB Diabetics Division
811 Cherry Street, Suite 306
Columbia, MO 65201
314-875-8911
The newsletter of the Diabetics Division of the National Federation of the Blind (NFDB) is published quarterly.


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