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Older adults' self-reported barriers to adherence to dietary guidelines and strategies to overcome them

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Abstract

Once an older adult develops type 2 diabetes, they often need to change their diet as part of the treatment. We report differences in dietary barriers and strategies to overcome them in 17 older adults without type 2. Data were gathered through 24-hour diet recalls, collected barriers and strategies in changing diet, and the health locus of control scales. Differences in barriers and strategies were partially explained by health locus of control subscales. People who believed that others (e.g. doctors) controlled their health were less likely to identify barriers or strategies to overcome them. The results contribute to training materials and decision aids.

Keywords

age, beliefs, diabetes, diet, elder, health behavior, individual differences, locus of control, older person

Type 2 diabetes is prevalent in adults over age 60 years, with an estimated 27 percent of older adults in the United States having diagnosed or undiagnosed diabetes and a further 40 percent having pre-diabetes (Cowie et al., 2010). The number of older adults in the United States is expected to nearly double from 37 million in 2005 to 72 million in 2020, a statistic that highlights the importance of examining diabetes management and education in this population (He et al., 2005).

Diabetes educational programs are not well customized for the needs of older learners and tend not to target motivation and empowerment along with learning goals (Bruce et al., 2003). For example, older persons with diabetes report using inaccurate heuristics to judge what or how much to eat (Klein and Meininger, 2004). This failure of knowledge can result in cumulative ill effects on their health (Nagelkerk et al., 2006). Evidence shows that lifestyle modifications can limit the progression of type 2 diabetes more than medications such as metformin (Knowler et al., 2002). Indeed, progression from pre-diabetes into diabetes can be delayed or even prevented through lifestyle changes (Tuomilehto et al., 2001). Similarly, empowerment and a perception of control has been associated with *improved* adherence to a diabetes diet (White et al., 2010) and are some of the highest predictors of intending to follow and following a diabetes diet (Blue, 2007; McPherson et al., 2008). Thus, designers of

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education programs must not only try to improve the knowledge of the newly diagnosed person but also address motivational issues and the day-to-day barriers to changing their lifestyle.

Shared decision-making between health care providers and patients may provide the best avenue for lifestyle change (Suhl and Bonsignore, 2006). Guidelines from the International Diabetes Federation (IDF) state that "education should be individualized, include goal setting and focus on safety, risk management, and complication prevention" and "appropriate decision aids and cues to action should be developed with the individual and their family carers." This can be done via assessments of dietary preferences and addressing potential barriers to dietary adherence (Suhl and Bonsignore, 2006). It is also recommended that health care providers focus on shared decision-making with their older patients (Kirkman et al., 2012). This includes establishing trust through partnership, information sharing, working through various choices and their consequences, and actions from decisions together. However, one of the important components of shared decision-making, information exchange, relies on the ability of the older person to generate that information and the provider/technology to elicit information. Unfortunately, such elicitation depends both on the ability of the provider to gather useful information and on the patient to produce it.

There are likely individual differences in how older persons perceive barriers to dietary changes and how they develop strategies to address the barriers. A potential predictor of the number and types of barriers/strategies is health locus of control (HLoC), or to what extent persons believe they are in control of their health and health outcomes (Wallston and Wallston, 1981). There are three subtypes of HLoC: internal HLoC is the degree to which an individual believes his or her health is due to personal actions, chance HLoC is the degree to which an individual believes health is due to chance, and "powerful others" HLoC is the degree to which an individual believes others, such as health care professionals or family members, control their health. Beliefs in chance and powerful others tend to increase with age (Lachman, 1986) and HLoC scores correlate with numerous health behaviors and outcomes (Masters and Wallston, 2005). In a study comparing older adults with diabetes to those without, those with diabetes reported greater beliefs in powerful others (Robinson-Whelen and Storandt, 1992) and locus of control significantly predicted whether someone with diabetes would attend an appointment with their dietician (Spikmans et al., 2003). Thus, when asking newly diagnosed patients to make dietary changes, it is likely HLoC beliefs play a role in their ability to generate plans for change.

Study overview

In 2012, a consensus group was formed to discover holes in the research literature regarding diabetes in older adults (Kirkman et al., 2012). The research questions they believed were most needed included "How can evidence-based lifestyle intervention strategies be widely implemented in the community in ways that maximize the participation of older adults?" and "What aspects of patient-provider communication are most effective in shared decision-making with older patients and caregivers?" These questions were addressed in this study by exploring the personality-based aspects of lifestyle intervention strategies as well as particular difficulties that may appear in patient–provider communication. We predicted that there would be differences between individuals in their identification of barriers and strategies, both in type and number. Furthermore, we predicted that barriers and strategies would be related to an individual's belief in their HLoC.

Method

Participants

All materials and procedures were approved by the Institutional Review Board (IRB). A total of 17 participants with no diagnosis of diabetes

and not living with a partner with diabetes were recruited from independent senior living centers via a newsletter advertisement that described the requirement to be over the age of 65 years and not diagnosed with any form of diabetes. A non-diagnosed sample of participants was chosen to best represent older persons who have not yet had to make any dietary changes related to diabetes.

Materials

The multi-dimensional HLoC scale measures three aspects of the locus of control construct: beliefs in internal, chance, and powerful others (Wallston and Wallston, 1981). Participants indicated their agreement with statements such as "If I take the right actions, I can stay healthy" on a Likert scale from 1 (strongly disagree) to 6 (strongly agree). Scores could range from 6 to 36 on each subscale.

A validated test of knowledge of diabetes and diabetes care was administered to participants at the beginning of the study (Fitzgerald et al., 1998). This 23-item multiple-choice test has been shown to predict health literacy and HbA_{1c} levels (Powell et al., 2007) and contained questions such as "What effect does unsweetened fruit juice have on blood glucose? a. Lowers it b. Raises it c. Has no effect."

Participants also rated their physical health on a scale from 1 to 5 where 1 indicated *excellent* and 5 indicated *poor*.

Procedure

After all questionnaires and the diabetes knowledge test were collected, a 24-hour diet recall interview was conducted and recorded. Recordings were later transcribed for coding. The interview began with a request for a detailed list of the food and drink consumed by the participant the day before. To prompt their memory, an hourly matrix was constructed and the interviewer wrote down each food from the previous day as the participant recounted. The interviewer supplied prompts when necessary, such as "And what did you do then? Do you remember eating or drinking anything at that time (or place?)" and "Can you estimate how much of that item you ate (or drank?)." This resulted in a detailed list of food/drink intake from which to elicit barriers to and strategies for dietary change.

Once the list was complete, the interviewer presented the participant with dietary guidelines from the American Diabetes Association (ADA). These guidelines included guidelines for meals, including portion sizes, percentage goals for non-starchy vegetables, proteins, and starches, and instructions to limit caffeine and sugars. The guidelines were discussed with the participant and examples shown of each food type until the participant indicated an understanding of the guidelines, generally 4–6 minutes. The ADA materials remained available so that participants did not need to rely on memory when considering how to hypothetically change their diets.

Next, the interviewer went through the list of the previous day intake and discussed each item with the participant. The participant was asked whether she or he thought any changes needed to be made to a meal or item to adhere to the ADA guidelines. If a change needed to be made, the interviewer prompted the participant to say how it should be changed and what barriers the participant anticipated in making that change. Then, the interviewer prompted the participant to generate strategies to overcome each barrier. This was repeated for every food in the list.

All interviews were transcribed and coded for barriers and strategies mentioned using codes developed in-house (See Supplementary Material online). The general categories for barriers were those of personal preference, a stated lack of knowledge, issues with convenience, problems with appetite, time required, the negative influence of others, cost, and memory issues. Some major categories contained sub-categories: for example, personal preference could be a preference for an undesirable food item or a preference against a desirable food item. These sub-categories were combined for analysis purposes into the major categories listed. Participants could also

state that there was no barrier to making the required change. Strategies were coded for involving planning, self-control, alteration of a food item, gathering information to make better choices, measuring portions, logging to keep track, asking someone else for a desirable option, and exercise. These also contained sub-categories, such as altering an unpreferred (but nutritious) item to make it more palatable or altering a preferred (but undesirable for a diabetes diet) item to make it adhere to the ADA guidelines. Participants could also state the strategy of not making a change to their current dietary choices. Example barriers were "Vegetables is what I don't like" or "Coffee and cookies has been taking precedence. Because they're there. It's just easy." Example strategies included "I could eat at home before we went out" or "I would throw the bag of donuts in the trash." Strategies were not necessarily desirable or effective, such as the strategy of using exercise to make up for a sugary or high fat food choice. Once coded, these data were analyzed via frequencies and Pearson's correlation coefficients. All analyses were two-tailed with alpha set to .01.

Results

Based on their ages, those in the sample approximated the knowledge levels and age of a typical person newly diagnosed with type 2 diabetes (Table 1; Cukierman et al., 2005). The most often listed barrier category was personal preferences, mostly preferences for an unhealthy item ($n=29$), though many cited preferences against a healthy item ($n=15$). The second most frequent barrier category was a lack of knowledge. This was either due to a lack of creativity or options for meal planning ($n=16$), not knowing the nutritional facts of a food or what foods would conform more closely to the ADA guidelines ($n=15$), judging what amounts would be appropriate ($n=5$), or not knowing there was a healthier option ($n=4$). Inconvenience was the third largest barrier category, mostly citing the ease of obtaining nutritionally undesirable foods ($n=29$). When participants generated strategies to overcome these barriers, by far the most frequently mentioned strategy was to plan specifically for a meal, either by purchasing items for that meal or planning ahead for a restaurant visit ($n=146$). The second most frequent strategy was self-control ($n=73$). The third most frequent strategy was altering an item to make it healthier ($n=50$) or altering a healthy item to make it more palatable ($n=14$).

In the following analyses, only the largest categories of barriers and strategies were examined. For barriers, this included personal preference, lack of knowledge, inconvenience, and a statement that there was no barrier. For strategies, this included planning, use of self-control, and altering the food item (Figure 1).

Correlations

Participants who generated more barriers also generated more strategies ($r=.83$, $p<.001$). This was likely partially because if they were able to come up with a barrier to a change in their diet, they were prompted for a strategy to overcome that barrier. Particular types of barriers did not correlate with any particular types of strategies.

Health knowledge and belief measures analyses

There were no significant correlations between scores on the Diabetes Knowledge test, internal, chance, and powerful others HLoC scores ($p>.01$) When alpha was adjusted to .05, chance and powerful others scores were correlated ($r=.52$, $p<.05$).

Individual differences in barriers and strategies

In the final analysis, the relationships between health knowledge/beliefs and barriers/strategies were examined. The more one believed in powerful others and chance as controlling their health, the fewer convenience-related barriers they listed ($r=-.75$, $p<.01$; $r=-.50$, $p<.05$,

Table 1. Demographics, knowledge, and belief assessments.

	Mean	SD
Age	76.60	7.79
Self-reported physical health[a]	2.00	0.79
Diabetes knowledge score[b]	12.35	2.31
Health locus of control[c]		
Internal	25.29	4.51
Chance	14.18	4.46
Powerful others	19.82	4.57
	Frequency	
Education		
High school	2	
Some college/associates	3	
College	5	
Graduate work	7	
Race		
Caucasian	13	
African-American	3	
Other	1	
Gender		
Female	13	
Male	4	

SD: standard deviation.
[a]Measured on a scale from 1 to 5 where 1 indicated *excellent* and 5 indicated *poor*.
[b]Fitzgerald et al. (1998).
[c]Wallston and Wallston (1981).

respectively). Also, the more one believed in powerful others controlling their health, the fewer planning strategies they generated ($r=-.53$, $p<.05$) and the fewer barriers and strategies they generated overall ($r=-.58$, $p<.05$; $r=-.52$, $p<.05$, respectively). There were no significant correlations between other health belief scores, test scores, and barriers/strategies (all $ps<.05$).

Discussion

When given a concrete scenario of their own diet and asked to make hypothetical changes that adhered to ADA guidelines, individuals differed in the number and types of barriers and strategies generated. The belief that "powerful others" control health was connected to the number and types of barriers and strategies generated. Those with higher scores on belief in powerful others generated fewer barriers or strategies overall, were less likely to generate planning strategies, and less likely to generate barriers related to inconvenience. The authors speculate that this could be due to a lack of insight; a lack of belief in control may prevent someone from recognizing their behaviors are affected by convenience and the less control one feels, the less reason there is to plan for success. Furthermore, the current sample of older adults was highly educated and reported good physical health (Table 1). Finding issues in such an educated and healthy sample suggests that those differences would be exacerbated in an actual newly diagnosed group.

The IDF (2013) Working Group identified the importance of evidence-based treatment for older persons with type 2 diabetes, concluding

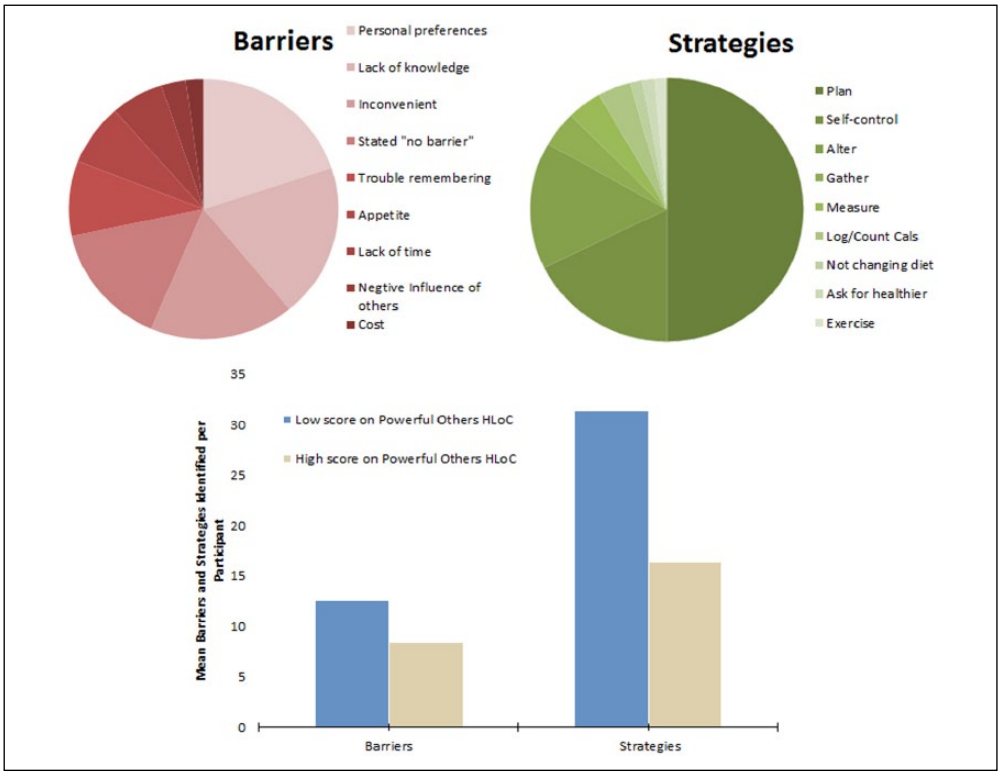

Figure 1. Distributions of barriers and strategies across participants. Participants with a high score for their belief in others controlling their health generated fewer barriers and fewer strategies. Groups for low and high powerful others HLoC were created through a median split of the powerful others HLoC score for visual presentation, but were analyzed as continuous variables.

that individual assessments should be made of the older patient, with emphasis on measuring frailty, self-care ability, pain, and hypoglycemia risk. The current results suggest that personality and motivational measures should be added to this list, particularly HLoC.

The strategies identified in our study for overcoming dietary barriers varied in their presumed efficacy. Planning strategies, the most commonly described approach to overcoming dietary barriers, involved behaviors such as controlling the environment which are widely accepted as clinically effective in weight management (Foreyt and Goodrick, 1993). However, the second most frequently reported strategy in this study was self-control. Research suggests this is a poor strategy because self-control is a limited resource; exerting self-control in one scenario means that subsequent attempts at self-control are less likely to succeed (Muraven and Baumeister, 2000). Indeed, blood glucose appears to play an important role in self-control (Gailliot and Baumeister, 2007) with self-control more difficult for those with uncontrolled blood glucose. A person who relied on self-control to avoid an unhealthy choice at breakfast would likely be less able to resist an unhealthy choice later in the day. Other research suggests that having a lower working memory capacity may be a liability when trying to resist a tempting food choice (Hofman et al., 2008). Because working memory capacity tends to decline with age, relying on self-control to dietary behavior may be a particularly ineffective strategy for older adults. The use of self-control strategies in our study suggests that on their own, older adults may not

always select the most effective approach to overcoming barriers to modifying their diet.

Limitations

Although diet may be the most important component of type 2 diabetes self-management, it is only one component. In this study, the authors asked for concrete changes based on ADA recommendations for diet, but did not address interactions with medication, exercise, insulin use, or actual counting/estimating of carbohydrates. Thus, the data generated in this study are at a relatively simple level. However, there were differences in the generation of barriers and strategies based on HLoC scores even given this simplicity and the relatively high education levels of our sample. The authors believe that belief in powerful others scores would have even more of an impact if the complexity of the task increased or if the education level of the sample was decreased.

Conclusion

The health control beliefs of an individual could be important for the design of educational and motivational interventions. For example, for those who believe powerful others control their health, one tactic might be to give supportive but explicit direction via a decision aid. Another tactic might be to use motivational messages and positive reinforcement via supportive technology to increase feelings of personal control over health. For those who do not believe powerful others control their health, allow them have more tailored control so they are the powerful person in the decision, but support them with information and prompts. These patients will likely be most able to make their own informed choices, associated with better self-management and quality of life (Murphy et al., 2011).

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