Factors Predictive of Knowledge and Self-Management Behaviors among Male Military Veterans with Diabetes Residing in a Homeless Shelter for People Recovering from Addiction

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Abstract

Diabetes disproportionately affects individuals with lower income in the U.S. (CDC, 2012). Specifically the control of diabetes through self-management has been found to be sub-par and an important contributor to complications (Seligman, Davis, Schillinger, & Wolf, 2010). People experiencing homelessness also experience barriers. One such group is homeless veterans who have diabetes. The purpose of this study was to investigate self-management behaviors and knowledge regarding diabetes among homeless military veterans in order to establish a baseline of knowledge, self-management behaviors, attitudes, and barriers. A cross-sectional convenience sample of 27 homeless military veterans at a local shelter completed face-to-face structured survey interviews. Blood glucose monitoring behaviors were adequate but foot and eye care behaviors need improvement. Gaps existed in knowledge and attitudes about diabetes. Barriers such as lack of access to healthy food and lack of knowledge of how to cook limited their ability to self-manage diabetes. Veterans who had higher knowledge scores, and had been diagnosed longer, had higher self-management scores. Findings from this study help to inform the existing need for health educators to engage with veterans diagnosed with diabetes to improve health outcomes.

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Introduction

Torpy and Golub (2011) described diabetes as being a very common chronic medical ailment usually leading to high levels of blood sugar (glucose). There could be many severe complications due to the acquisition of diabetes such as heart disease, vascular disease, poor circulation, blindness, kidney failure, inadequate healing, stroke and additional neurological diseases. Although there is no current cure for diabetes, it can be treated successfully, as long as the disease is managed properly. For example, complications from diabetes could be prevented with meticulous blood glucose management, control of high blood pressure and high cholesterol levels if present. According to the Centers for Disease Control and Prevention (CDC), in 2011, diabetes affected 25.8 million people residing in the United States. These numbers included those individuals who were diagnosed as having diabetes (18.8 million people) and those individuals who were undiagnosed (7.0 million people). In other words, about 8.3% of the United States' population has diabetes (CDC, 2011). Statistics from the American Diabetes Association noted that in 2010, 1.9 million new cases of diabetes were diagnosed in people aged 20 and older (2012). About 12% of males 20 years and older have diabetes and about 11% of women 20 years and older have diabetes (American Diabetes Association, 2012).

The CDC Diabetes Report Card (2012) is a "profile of diabetes and its complications at the national and state level." (2012, p.2) Studies have shown that diabetes disproportionately affects both racial minorities and those individuals who present as low income within the United States (CDC, 2012). Specifically the control of diabetes is sub-par and the rates of complications within low income populations are higher even when health care access is available (Seligman, Davis, Schillinger, & Wolf, 2010; Zhang et al., 2008). One such population is that of people experiencing homelessness. As published in *Who is Homeless*? by the National Coalition for the Homeless (2009), the definition of a person who is homeless set forth in 1994 in the Stewart B. McKinney Act 42 is a follows:

"A person is considered homeless who lacks a fixed, regular, and adequate night-time residence; and. . . has a primary night time residency that is: (A) a supervised publicly or privately operated shelter designed to provide temporary living accommodations... (B) An institution that provides a temporary residence for individuals intended to be institutionalized, or (C) a public or private place not designed for, or ordinarily used as, a regular sleeping accommodation for human beings. " The term "homeless individual" does not include any individual imprisoned or otherwise detained pursuant to an Act of Congress or a state law" (July, 2009).

As reported in *The State of Homelessness in America 2012*, a study contrasting homelessness between the general population and specific subgroups, there was a 1% (643,067 to 636,017) overall decrease of individuals experiencing homelessness in the United States from 2009 to 2011 (National Alliance to End Homelessness & Homelessness Research Institute, 2012). Results showed an increase among people who were unsheltered and a decrease among military veterans. In fact, the largest decrease was found among military veterans with 11% (8,000) in 2011. It is also important to note that although the national rate was 21 per 10,000 people, the rate for military veterans was 31 per 10,000 according to the National Alliance to End Homelessness (NAEH) & the Homelessness Research Institute HRI (NAEH & HRI, 2012). The United States Department of Veterans Affairs (2013) reported that: on a single night in January 2011, 67,495 veterans who were experiencing homelessness spent the night on the streets of the United States; an estimated 144,842 veterans spent at least one night in an emergency shelter or transitional housing program in one recent year; and many other veterans are considered at risk of homelessness because of poverty, lack of support from family and friends, substance use or mental health issues, and precarious living conditions. The U.S. Department of Veterans Affairs (VA) (2013) stated the U.S.'s military veterans experiencing homelessness are mostly males (96%), are mostly single, come from poor or disadvantaged communities, almost 50% suffer from mental illness, and 50% have a substance abuse problem (US Department of Veterans Affairs, 2013). The VA also reports that nearly 1 in 4 of VA patients receiving medical care have diabetes (2013). There are many barriers regularly faced by people who are homeless but having to manage a chronic health condition like diabetes further exacerbates the complexity of self-management. Wahowiak (2012) expands upon these barriers, one of which is food security. Finding a balance of food, exercise, and medication is made treacherous when one is unsure of where to obtain the next meal or what it may be. Similarly problematic is gaining access to medication, particularly when finding food and shelter supersede caring for one's health. With lack of a permanent address, reliable transportation, insurance, or income, securing appointments with a health care provider becomes less pressing. However, these are also the risk factors that make people experiencing homelessness more prone to disease and infection than the rest of the population (Wahowiak, 2012).

Military veterans who are diabetic and who are experiencing homelessness have a very unique and multidimensional set of aspects to consider in the self-management of a chronic condition. As a basis for future health education programming, an exploratory pilot study was conducted with a small, sheltered sample of men in a Midwestern city. The purpose of this study was to investigate self-management behaviors, knowledge, attitudes and barriers regarding diabetes among homeless military veterans in order to establish a baseline of knowledge and self-management behaviors. Results of this study offer insight into this often overlooked subgroup of the population. Three research questions were addressed in this study: a) What are some of the barriers that homeless military veterans who live with diabetes face living in shelters? b) What are the diabetes knowledge level, self-management behaviors, attitudes regarding self-management and the prevention of complications in diabetes? and c) Are demographical characteristics or length or time since diagnosis predictive of self-management, diabetes knowledge or attitudes?

Methods

This exploratory study utilized a convenience sampling. The study was specifically designed to address the potential diabetes self-management health education needs of military veterans who utilize a community homeless shelter. The specific shelter was selected because it is the only homeless shelter specifically serving military veterans. It was an observational cross-sectional study of adult male veterans of one of the five branches of the US Military (Air Force, Army, Army National Guard, Marine Corps, or Navy) who self-reported as having type II diabetes.

Participants & procedures

Following Institutional Review Board approval at the University of Cincinnati arrangements were made for the director of the community shelter to make an announcement that a university researcher would be inviting them to participate in a study. The researcher, a university graduate student, attended the shelter daily during open visiting hours and recruited participants from the common area. The program manager at the selected shelter approximated that 40-45% of residents would have diabetes (about 40). The diagnosis status of residents was not known to the researchers and thus all 90 residents were invited to participate. Of the expected 40 residents who had diabetes and thus eligible for the study, 27 men participated producing a participation rate of 67.5%. The validated semi-structured survey included open ended, scale, true/false, and multiple choice items. Administration of the surveys was conducted in a private room free of camera surveillance or other recording devises and free of view from the facility managers in an effort to protect the privacy of their answers and the confidentiality of their participation. All study participants completed a signed consent form and were provided with a copy of the consent form. All consent forms and survey documents were maintained private by utilizing numeric codes to match the survey to the consent form. Only the researchers had access to these documents.

Instrumentation

The survey instrument contained 38 items organized into 5 sections: *Demographics, Diabetes and You, Diabetes Knowledge, Attitudes about Diabetes,* and *Barriers Faced.* Basic demographical items were written to assess gender and diabetes type 2 diagnosis. In addition, 14 items measured: age, race/ethnicity, marital status, education level, length of residency in the area, length of time being homelessness, length of time attending shelters, number of shelters utilized, patterns of attendance to the shelter (days, nights, and weekends), geographical distribution and Military Service background. The next section, *Diabetes and Me*, included 7 Likert scale items (that measured length of time since diagnosis, self-management practices such as frequency and ease of inspecting feet, measuring blood glucose, visiting a health care provider, and receiving eye care. Reliability analysis of Self-management scale resulted in a Cronbach alpha of .578

with acceptable subscale scores (foot care alpha=.864, blood sugar check = .803, health care access = .627 and eye care alpha=.562).

The next part of the instrument was the *Knowledge about Diabetes* section. The 12 items utilized in this scale were adapted from the Diabetes Knowledge Test (DKT) and the Diabetes Attitude Scale - (DAS-3) by the Michigan Diabetes Research Training Center [MDRTC] (1998). All of the questions were tested by the MDRTC for both validity and reliability. A shortened adaptation by Jones, Sharma, Guyler & Stegeman was tested and reported to have appropriate validity and reliability in a recent thesis study (2011). The shortened instrument was then adapted for this study, based on the already established reliability and the potentially problematic participant fatigue of a longer instrument. Thus, the *Knowledge* scale had 12 multiple choice items that were scored as correct or incorrect and a high or low level knowledge score assigned to each participant. Internal reliability was tested using Cronbach's alpha and found to be acceptable (alpha = .602).

The *Attitudes* section of this instrument consisted of 3 Likert scale items (1= Strongly Disagree - 5= Strongly Agree) which were summed. However the reliability testing revealed an unacceptable coefficient alpha and thus only item analysis is presented here versus scale score comparisons. The last section of the instrument, *Barriers,* included two novel open-ended items to assess self-reported barriers to self-management of diabetes for male military veterans who reside in the selected homeless shelter. The entire survey was evaluated by a panel of experts, including the clinical director and the operations manager at the shelter and a male who had previously experienced homelessness and had diabetes, for both face and content validity. In addition, the readability level of the survey was tested, utilizing Microsoft Word, which resulted in a Flesch-Kincaid grade level of four.

Results

A total of 27 participants completed the survey. The mean age of the participants was 53.74, nearly three out of four (71.4%) were African American or Black and 25.9% White or Caucasian, and just under half (48.1%) reported being single (never married). Five branches of the military were represented with more than half of the participants (n = 14, 51.9%) having served in the United States Army. About 40.7% had completed high school, while 59.3% had completed some college (1-3 years). Most participants (81.5%) reported having experienced homelessness for more than one year. Most had been attending the shelter for 1 year and nearly all (96.3%) spent 7 days a week at the shelter (See table 1).

Table 1

Demographic Characteristics

Variable		N	M	%	SD
Age					
		27	53.74	--	4.72
Ethnicity					
African American/Black		20	--	74.1	--
Caucasian/White		7	--	25.9	--
	Total	27	--	100.0	--
Marital Status					
Divorced		13	--	51.9	--
Single, never married		14	--	48.1	--
	Total	27	--	100.0	--
Branch of Military Served					
Air Force		3	--	11.1	--
Army		14	--	51.9	--
Army National Guard		2	--	7.4	--
Marine Corps		6	--	22.2	--
Navy		2	--	7.4	--
	Total	27	--	100.0	--
Highest Level of Education Completed					
High School		11	--	40.7	--
Some College (1-3 years)		16	--	59.3	--
	Total	27	--	100.0	--

Self-management

The average length since diagnosis was 8.25 years and ranged 1 month to 37 years. When asked about self-management of diabetes participants reported a range of self-management behaviors. Table 2 shows details of behavior frequency, perceived importance, and self-efficacy for 4 self-management behaviors: foot care, blood glucose measurement, health care seeking behavior, and eye care seeking behavior. Results show that although 66.6% reported daily inspection of their feet (33.3% did not) and that 29.6% found it difficult or very difficult to do so. Further 25.6% felt that checking their feet was of little or no importance. All but 1 participant (96.3%) reported that they check their blood sugar. Most (63%) reported doing so daily, 88.8% felt it was easy or very easy and the majority (88.8%) felt it was important or very important. Although health care access was rated as easy or very easy by 88.9% and 96.3% felt it was important or very important to have their diabetes checked by a doctor or nurse, 70.4% reported only seeing a health care provider twice a year. In regards to eye care, 77.8% reported having their eyes checked by a doctor at least once a year however 14.8% do so only every few years. Further, two participants have never had their eyes checked. Health care access was rated as easy or very easy by most with only 4 participants having rated accessing an eye doctor as difficult or very difficult and only one reported that it is not important to do so. Overall lower score values in the self-management scale items were indicative of more protective and positive self-management behaviors such as regular foot inspections and regular self-blood glucose measurements. Scores across the four subscales were summed and participant scores were categorized into high or low self-management levels. Scores had a possible range of 12-48 and participant scores ranged between 12 and 31 (M=22, SD=4.07). An examination of the skewness and kurtosis statistics for the observed variables was conducted prior to doing scale score analyses. The distribution was normal (kurtosis statistic was less than two times greater than the standard error). A score between 12 and 19 was categorized as high self-management level and those between 20 and 48 were categorized as low self-management level. Descriptive analysis of the dichotomous scale scores showed that 74.1% of participants had high scores in self-management. The mean score, 22, was in the low category (Table 2).

Diabetes knowledge

The diabetes knowledge scale was scored by assigning a correct or incorrect designation to answers given by each participant, where a correct answer was worth 1 and an incorrect answer was worth 0 producing a possible range of scores of 0-12. Results showed that scores ranged from 4 to 11 and had a mean score of 7.67 (SD = 2.11). Normal distribution was also confirmed by comparing the Kurtosis statistic and its standard error. Scale scores were dichotomized into high or low with the cut off score of 6 where scores between 7 and 12 were indicative of high diabetes knowledge levels. Descriptive analysis revealed that 74.1% of participants had high levels of diabetes knowledge as measured by this scale and that 25.9% of participants had low knowledge about diabetes.

Attitudes about diabetes

Three items were utilized to measure attitudes about diabetes. These included a) *people who do not need to take insulin to treat their diabetes have a pretty mild disease* (40.7% agreed or strongly agreed); b) *keeping the blood sugar close to normal can help to prevent the problems of diabetes* (96.2% disagreed or strongly disagreed) and c) *people whose diabetes is treated by just a diet do not have to worry about getting many long term problems* (25.9% agreed and 22.2% were neutral). Given the low Cronbach alpha of the attitude scale (.446) further analysis was prohibitive and thus we only present descriptive item analysis.

Interactions between observed variables

Knowledge of diabetes and level of self-management were tested to identify if, as one would predict, higher knowledge would be associated with higher self-management. T-test were conducted resulting in a statistically significant relationship (t = 14.652, df = 26, alpha < 0.00). It was also hypothesized that self-management and knowledge levels could be associated with demographical characteristics or length of time since diagnosis. Linear regression analysis revealed that age, marital status, race or occupation did not predict self-management or knowledge levels. However, length since diagnosis did predict knowledge levels (F = 3.352, alpha < .037, B = 20.940, R^2 = .220) and self-management levels (F = 3.352, alpha < .037, B = -10.722, R^2 = .220) in that length of time since diagnosis predicted approximately 20% of the variance in both self-management and in diabetes knowledge scores.

Barriers

Two open ended questions were utilized to assess barriers experienced by study participants. The questions were a) *What are some barriers that you face being a military veteran and having diabetes in using shelters?* and b) *How can this shelter better serve your needs as a military veterans who is experiencing homelessness and living with diabetes?* These questions were analyzed by looking for common themes and the frequency of these themes. Responses to the questions are summarized, with a few direct quotations from participants in Table 3. Theses quotations were selected because they best represented summaries of answers presented. This was done according to research performed by Blauner (1987). The author noted that there were two different kinds of philosophies, when it came to reporting personal excerpts; that of the 'preservationist' and that of the 'standardized'. The difference between these two is as follows: a 'preservationist' is one who utilizes another's responses as correctly as possible; being 'standardized' means to keep the meaning of the response, but edit it down to the general meaning (Blauner, 1987).

Question A: Barriers in using shelter. Many participants had been resident or utilized other shelters prior to attending the selected community shelter. A common theme found after analyses was the higher quality of services available in comparison to other shelters attended. Participants reported increased levels of assistance from the shelter in managing their diabetes. Specific factors reported as contributing to higher satisfaction include: 'strict house rules' and assistance

Table 2

Self-Management: Reported Behaviors, Importance and Perceived Comfort

Self-management Behavior	%	n
Foot care		
How Often do you check your feet?		
Daily	66.7	18
Every other day	3.7	1
Once a week	29.6	8
Never	0.0	0
How Easy is it for you to check your feet?		
Very Easy	29.6	18
Easy	40.7	1
Difficult	14.8	8
Very Difficult	14.8	0
How important is it to check your feet?		
Very Important	37.0	10
Important	37.0	10
A little important	3.7	1
Not Important	22.2	6
Blood sugar monitoring		
How often do you check your blood sugar?		
Daily	63.0	17
Every Other Day	29.6	8
Once a Week	3.7	1
Never	3.7	1
How easy is it for you to check your blood sugar?		
Very Easy	40.7	11
Easy	48.1	13
Difficult	3.7	1
Very Difficult	7.4	2
How important is it to check your blood sugar?		
Very Important	48.1	13
Important	40.7	11
A little important	7.4	2
Not Important	3.7	1
Eye care check ups		
How often do you have your eyes checked by a doctor?		
Twice a year	11.1	3
Once a year	66.7	18
Every few years	14.8	4
Never	7.4	2
How easy is it for you to access your doctor to check your eyes?		
Very Easy	25.9	7
Easy	59.3	16
Difficult	7.4	2
Very Difficult	7.4	2
How important is it to have your eyes checked by a doctor?		
Very Important	55.6	15
Important	40.7	11
A Little Important	0.0	0
Not Important	3.7	1

Table 3

Open-ended Items Representative Quotes and Relevant Themes

Question	Representative Quotes	Theme
What are some barriers that you face being a military veteran and having diabetes in using shelters?	*This place is one of the best places I have ever stayed. They really care about you here and watch out for you. They don't mess around. They want to help you get better.* *This is home for me. The guys care about me and help me with my diabetes by telling me 'hey – you takin' your medicine?' or 'when's the last time doc check you?'* *You go to these other shelters and you don't feel good. You worry 'bout if someone gonna take your meter [glucometer] when you're sleeping 'cause they been eyein' you and it. You don't rest at night.* *I don't wanna complain 'bout food 'cause you eat what you can, but the food can't be good for a diabetic. My doctor says to eat one way and I can't because of shelter food.*	There were fewer barriers at this shelter than at others but there are common barriers often encountered such as food quality and access and the importance of supportive services.
How can this shelter better serve your needs as a military veteran who is experiencing homelessness and living with diabetes?	*There's always someone here teaching us about STDs, but we need classes about diabetes too. We know about STDs.* *It would be nice to have a nurse or someone come in to give us care. Sometimes I can't get to my doctor's appointment because I don't feel good and I need to run catch the bus. If I miss the doctor, it can take a while before I see him again. There needs to be someone here to check our diabetes and someone who can answer our questions.* *You see me here, I don't know how to cook. You know what I know to do... I can push something in the microwave and push a few buttons. I know that's not doing my diabetes any good. If someone could show me how to make easy meals, that would be it, that would be good.*	Educational opportunities and improved food quality were welcomed as were localized opportunities for access to health care providers on site.

received by peers and staff to ensure one is 'staying on the right path.' Although these stood out as positives, barriers were also reported. The barriers included: 'having a difficult time sleeping' due feeling insecure at the shelter; lack of awareness of the person charged with answering questions regarding medications; lack of access to healthy diabetes-appropriate food choices; and reported worry over perceived lack of control over one's medications.

Question B: Recommended improvements for the shelter. This question focused on how the shelter could better meet the needs of those who had diabetes. In general, most participants reported a high degree of needs being met by the shelter for residents who were diabetic. Some recommendations were frequently repeated such as: providing educational classes about diabetes; providing onsite access to a nurse on a weekly or bi-weekly basis to 'answer health questions' and provide 'quick check-ups'. Additional recommendations related to health care accesses onsite and the benefit of having

and eye care provider visit the shelter once or twice a year. Specifically participants reported that they seek eye care at a location different than the VA hospital, which they reported as 'difficult'. Further, veterans requested educational classes on proper food choices and preparation. At the shelter, residents are expected to cook for themselves. A task which they carry out with limited skills. Many rely on microwave options and pre-packaged foods.

Discussion

According to Shi & Stevens, homelessness and being a minority are both vulnerabilities which are associated with higher risk of chronic illness and negative outcomes (2010). Additionally, lower levels of social support, such as those that can be found in singlehood and homelessness can also affect wellbeing. Based on demographic characteristics of this sample, and considering such, it is important to address marital

status and length of homelessness. Thus, it can be posited that singlehood and homelessness, coupled with the inherent lower level of social support, could be associated with the length of residence of most participants in the shelter.

Findings related to self-management showed a rate much lower that the recommendation by the American Diabetes Association that all people who have diabetes conduct daily foot inspections (ADA, 2013a). A health education message that needs reinforcement among veterans who give little importance to foot care behaviors.

In general health care access was less than adequate. Similarly eye care access was also found to be less than adequate, even though access did not appear to be a barrier. Self-management scores also elucidate a need for improvement. As reported by Torpy and Golub (2011), good self-management can significantly aid in the prevention of negative complications of diabetes.

Results related to attitudes about self-management and the prevention of complications support a need to address misconceptions of severity of disease and self-management behaviors. One specific link explored was that between complications and insulin use, blood glucose monitoring and the role of diet and exercise was assessed. This type of misunderstanding of the potential severity is cause for concern and possibly indicative of a gap in knowledge and understanding about the disease and its progression. The ADA reports that people who effectively manage diabetes through diet and exercise or lifestyle changes can prevent or delay complications (2013b). It was established that in this sample, veterans who had higher knowledge scores also reported better self-management behaviors. It was also found that the longer the participants had been diagnosed the more likely they were to have higher knowledge scores and more positive self-management behaviors.

Regarding barriers to self-management of diabetes participants reported that strict resident rules and schedules posed difficulty to maintaining consistent self-management. In regards to nutrition and educational needs, their skills (e.g. cooking) limited them in improving self-management as well. And in response to being asked how the center could better serve individuals, two major recommendations arose. First, they recommended health education opportunities such as nutrition knowledge and cooking skills development. A second suggestion was to provide onsite health care access for residents.

Implications for future research

Given the dearth of professional literature, this exploratory pilot study is integral to building our understanding of this vulnerable group of individuals. Future follow up studies are needed and should aim to utilize participatory research and practice principles. Specifically in the development and implementation of health education programs to address the needs identified in the present study such as nutrition and self-management skills. The participatory and community based types of research and program design are a good fit for this population because they have been reported to provide a voice, address power inequality issues, and recognize the participant as the 'expert' of their own situation (Chesnay & Anderson, 2008). Specifically, focus groups and participant involvement

in curriculum and program development are recommended. Lastly, it is recommended that other factors be also examined such as: possible effects of gender to compare these findings in a replication study of female veterans; reproducing study with a larger sample size; exploring further the effects of recovery from addiction on diabetes and self-management behaviors; and increasing the generalizability of these findings by replicating with a representative sample.

Limitations

The findings presented here should be interpreted with caution as results are based on an exploratory study utilizing a small convenience sample. Further, results are limited by the following: the non-representative sample; the potential effect of social desirable answers, especially considering the face to face nature of the interview; and the nature of self-report and memory recall data. It is important to point out that scales had low reliability coefficients which may impact the validity of results with such a small sample. Lastly, although this study did not specifically address substance addiction, residents of the selected shelter are recovering or recovered from addiction. It is possible, although not observed, that this may have affected responses.

Conclusion

Findings on self-management behaviors, knowledge levels, attitudes about diabetes that are present and barriers faced are an important part of the body of knowledge about this vulnerable population. It is important because it can increase understanding and enable health educators to design relevant and accurate programming. In conclusion, results indicate that there are gaps in knowledge, negative attitudes about prevention of complications in diabetes and a need for improving self-management skills among this sample of veterans experiencing homelessness. Shelters play a significant role in the lives of homeless veterans and in their management of diabetes. Specifically veterans in this study reported positive environmental factors to improve self-management and disease management as well as opportunities for health educators to address and improve knowledge and skills through onsite programs and support.

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