Enhanced Diabetes Self-Management using Peer Health Coaches

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Final Report

Abstract

Diabetes is both prevalent in society, and responsible for significant morbidity and mortality. It is characterized by long-term sequelae on both the micro and macrovascular levels. Minority groups share a disproportionate burden. Strict control of blood sugar can decrease the prevalence and severity of these complications, yet strict glycemic control requires close attention to a multiple behaviors including diet, physical activity, blood sugar monitoring, medication use and multiple appointments with health care providers. Many people are faced with barriers that that make these behaviors difficult. This study proposed an innovative approach to the treatment of chronic illness, specifically diabetes, with the introduction of Peer Coaches as a complementary resource to the primary care setting. The specific goals were to use Peer Coaches to provide social support and help institute diabetes self-management utilizing individual readiness to change. The Coach, along with an educational program, sought to increase physician attention to diabetes care using feedback, cues and reminders. It was hypothesized that these methods would lead to improved glycemic control, diabetes knowledge and quality of life in adult diabetic patients. As a pilot program, this study was to serve to address the feasibility of the approaches and methods utilized. Preliminary data analysis showed improved glycemic control as measured by a decrease in HbA1c from baseline to follow-up in patients working with a Peer Coach. Weight was also decreased in this group as opposed to weight gain in the other groups. In addition, the program was well received by both patients and physicians. Social support data indicate that many participants were at risk for poor outcomes due to social isolation. The Coach was found to provide support to these individuals. These findings have implications for improved health outcomes in these at risk patients. Future studies will address these issues.

Introduction And Key Literature

Healthy People 2000 estimates the prevalence of diabetes in the U.S. as 6 million diagnosed, and 5 million undiagnosed. (1) Current figures from the ADA place this number even higher, and estimate the cost of diabetes (for 1997) as $44.1 billion in direct medical and treatment costs and $54 billion for indirect costs due to disability and mortality. Minority groups such as African American bear a disproportion burden with increased prevalence (1.7 times) and progression to complications.

Diabetes is characterized by long - term sequelae, including retinopathy, nephropathy, neuropathy and cardiovascular disease causing it to be the leading cause of end-stage renal disease, blindness and non-traumatic amputations among adults. (reviewed in 2, 3) It is a well-established risk factor for cardiovascular disease and strokes. Initial and follow-up results of the Diabetes Control and Complications Trial showed that intensive therapy and strict control of blood glucose slowed the development and progression of sequelae. (4, 5) Diabetes can also result in emotional and psychological complications such as depression. (6)

One of the successes of the DCCT was not only the intensive therapy, but also the intensive support available to the study participants. (4,5,7) Diabetes self-management is now considered to be a key component of effective diabetes care. A number of recent reviews summarize the current status of behavioral research in diabetes. (8-11) This care, however, requires a multitude of behavioral changes and adherence to complex medical regimens impacting most aspects of daily life. Many patients do not attend diabetes education at all. (12)

Although much is known, these reviews highlight the need for continued research and innovative strategies to enhance and self-management.

Social support and social networks have increasingly been shown to have impacts on health.(reviewed in 13) Proactive methods seek out individuals and minimize barriers to participation, rather than dictate stringent courses of education. Peer, or Lay Health, Coaches have been used to provide social support, basic education and assistance in diverse areas including hypertension (14), mammography use (15), tuberculosis control (16.) and asthma.(17) A previous study using home health aides showed a decrease in fasting blood glucose. (18)

Physician recommendation, and the doctor-patient relationship are powerful motivators to behavioral change in patients, particularly in adherence.(19-21) However, physicians cite lack of time, expertise, and counseling skills as barriers to behavioral modification.(22) Cues to physician behavior, such as chart reminders for smoking cessation have been shown to increase physician attention to particular areas of counseling or advice.(23) Multi-component approaches combining education and reminders are even more effective.(24)

This study proposed an innovative approach to the treatment of chronic illness, specifically diabetes, with the introduction of Peer Coaches as a complementary resource to the primary care setting. The specific goals were to use Peer Coaches to provide social support and help institute diabetes self-management utilizing individual readiness to change. The Coach, along with an educational program, sought to increase physician attention to diabetes care using feedback, cues and reminders. It was hypothesized that these methods would lead to improved glycemic control, diabetes knowledge and quality of life in adult diabetic patients. As a pilot program, this study was to serve to address the feasibility of the approaches and methods utilized.

Research Design And Methods

This study was designed as a randomized control trial of use of a Lay Health Counselor, with and without physician education, in diabetes management. As a pilot project, enrollment was targeted at 90, 30 in each of three groups. Patients were recruited from the Joseph P. Levitt Medicine Clinic, a federally qualified Internal Medicine Clinic serving predominantly minority, Medicare/Medicaid patients. The Clinic is organized into 4 Firms (A, B, C, D) with discrete physicians, nursing staff, inpatient units and patients, making this an ideal setting for randomization and initiation of interventions. Patients were identified by the nursing staff at the time of a routine clinic visit, the diagnosis of diabetes confirmed from the chart using ADA criteria, and the patient approached for participation in the study. Patients in Firm B were assigned to the Usual Care group (UCC) where they continued to receive care from their health care team. Physicians on Firm C received diabetes - related education in the form of a Firm conference on diabetes care and provision of key literature. They also received visual cues as reminders for diabetes care. Patients in Firm C were randomized to Usual Care with these "educated" physicians (PEP) or to additionally work with a Lay Health Counselor (CCH.).

After recruitment, the participants in the CCH were contacted by the Peer Coach. The participant and Coach will met via face-to-face and telephone meetings (approximately twice per month at the discretion of the Coach and preference of the participant) over the next year to discuss behavioral aspects of diabetes care. Specific behaviors addressed were: (i) following diet recommendations, (ii) taking medications as prescribed, (iii) monitoring blood glucose levels, (iv) initiating or continuing a physical activity program, (v) foot care and (vi) keeping appointments with their primary physician and any referral services (e.g.: dietitian, ophthalmology, foot care.) The transtheoretical model provided a method for determining an individual's readiness to institute a specific health behavior.(25-27)

In addition to the informal staging by the Coach at each interaction, a formal survey of participants was done via telephone at baseline and 12 month of follow-up. Questions included a formal assessment of the individual's stage of readiness for the five behaviors targeted by the

coach, modified from the Summary of Diabetes Self-Care Activities Questionnaire (28, 29.) Modification included staging criteria following assessment of each behavior, as well determination of any barriers to the behavior. A second section assessed knowledge and use of other aspects of diabetes care including aspirin use, smoking cessation, immunizations and screening for complications. A diabetes quality of life scale, developed for the DCCT measured this important aspect of care.(30) Additional questions addressed the person's health beliefs regarding their diabetes,(31) as well as basic demographic information. Because of the increased prevalence of depression in diabetic patients, a brief depression scale (the CES-D short form) was included.(32)

The primary outcome for this study was glycemic control. This was assessed via levels of HbA1C before and after the study, obtained by chart audit after the conclusion of the study. A number of secondary outcomes will be evaluated. First, was feasibility of these methods by dropout rate, interaction with the Coach and satisfaction with the program by questionnaire. Diabetes self-management was evaluated by self-reported compliance with their diabetes care regimen on the survey, and staging for the behaviors by the Coaches. Comparison to chart documentation helped assess the patient's recall of previous testing and treatment. Outcomes on the physician education component included use of the flow sheet by the physician, and compliance with diabetes care guidelines as assessed by chart audit. Coaches documented interactions with physicians to assess their utilization as a resource. Although other biological outcomes such as weight loss and hypertension are not primarily addressed in this study, some of the behavioral changes (particularly in the areas of diet, physical activity and medication compliance) may impact these as well. Therefore, BMI, blood pressure and lipid levels were assessed over the course of the study by final chart audit.

Results

Enrollment was targeted as 30 per group for a total of 90 participants. Due to difficulties in recruitment, the enrollment was 14 in UCC, 22 in PE and 29 in PEC and 29 in CCH. Outcome data was determined by chart audit for additional control subjects to bring the final total of subjects to 28 in UCC, 37 in PEC and 29 in CCH (Table 1). There were no statistically significant differences amongst the groups with respect to age, marital status, education, race or gender. Although not significant, the participants in the CCH group tended to have had diabetes for a longer time period and have slightly higher baseline HbA1c (Table 1).

Preliminary data analysis has revealed interesting findings. The primary outcome variable was HbA1c as a marker for glycemic control. When data was analyzed for all subjects (enrolled plus chart audit) the results are shown in Figure 1a. Figure 1b shows the same analysis for only those subjects that answered questionnaires. In this, there was a slight intermediate decrease in HbA1c for those subjects in the PEC that was not seen when those subjects analyzed only by chart audit are included. This is possibly due to an interactive effect between the physician reminders and the patient being also reminded of their diabetes care by the questionnaire items. Because HbA1c has limits on its possible values, especially at the lower end (corresponding to improved glycemic control) the data was next analyzed to account for baseline HbA1c level. When this was done, the change in HbA1c for the CCH group was significant with a $p<0.001$.

A number of secondary outcome measures were also collected and analyzed. These include blood pressure, cholesterol levels and measures of renal function. There were no differences at baseline or follow-up for any of these measures. When weight was analyzed, there were no differences amongst groups at baseline. At follow-up, there had been an increase in mean weight in the UCC group (+4.0 lbs.), stabilization of mean body weight in the PEP group (+1.7 lbs.) and weight loss in the CCH group (-3.4 lbs.) Although not statistically significant, these data represent an interesting trend. Only a few patients had BMI available due to paucity of

heights in the charts. A preliminary analysis of BMI showed an increase of 2.0 in the UCC, an increase of 2.2 in the PEP and a decrease of 0.28 in the CCH. Although not significant ($p = 0.06$) these data are interesting especially in light of the small number available for analysis (n = 9, 6, and 7 in the three groups, respectively.)

Table 1: Baseline characteristics of participants.

		UCC	PEC	CCH
Age (yrs) at baseline	Mean	56.6	64.1	61.6
	Range	23-80	38-82	30-88
Gender (# male)		8/28	7/37	4/29
Race (# Self-described)	African-American	7	15	24
	Caucasian	1	2	0
	Other	4	0	2
	Unknown	2	5	3
Education (#)	Less than HS	8	9	15
	HS grad	4	7	8
	College Grad	2	0	0
	Unknown	0	6	6
Marital Status (#)	Single	2	4	5
	Married	3	5	3
	Widowed	5	4	7
	Sep/Divorced	4	3	7
	Other	0	0	1
	Unknown	0	6	6
HbA1c (mean)		7.92	7.92	8.56
Years with diabetes (mean)		13.6	14.6	19.4

Self-described race, education level, marital status and years with diabetes were determined from the baseline questionnaire and were only available for these participants. Age, gender, and HbA1c were known for all subjects.

A depression scale, the CES-D short form, was included in the questionnaires due to previous reports of increased rates of depression (up to 1/3) in patients with diabetes. Surprisingly, an even higher number of the participants in this study were found to score as depressed on the questionnaire. At baseline, 36/51 (71%) scored as depressed with a mean score of 12.2. At follow-up, 31/54 (57%) scored depressed with a mean score of 9.74. Interestingly, mean scores on the CES-D decreased for all groups. However, the diagnosis of depression was considered serious enough to trigger a notice to the patient's physician independent of group.

Social support has been shown to be important for outcomes in a variety of illnesses, with social isolation often associated with particularly adverse outcomes. Preliminary questions were asked to determine numbers of friends and relatives available as confidants, for favors and for diabetes care. At baseline, these numbers are shown in Table 2. There were no differences amongst the groups. When the participants in the CCH group were asked about support from the Peer Coach, 22/25 rated the Coach as an excellent or very good source as a confidant, 17/25 as excellent or very good for a favor, and 18/25 as excellent or very good for helping with diabetes. When measures of satisfaction were analyzed, all participants rated their willingness to recommend the program to others and to continue the program themselves as good, very good or excellent.

Table 2: Social support amongst participants.

		Friends	Relatives
Confidants	Median #	2	3
	Range	0-20	0-15
	# answering "0"	8	4
Do Favor	Median #	2	2
	Range	0-20	0-15
	# answering "0"	8	3
Help with Diabetes	Median #	1	2
	Range	0-20	0-8
	# answering "0"	20	6

Discussion

This was a pilot study to test the effects and feasibility of using Lay Health Counselors to assist patients with diabetes self-management. Several points became readily apparent during the course of this study. First, the intervention was well received by participants as seen by a low dropout rate among participants and questionnaire data indicating satisfaction. Anecdotal evidence indicated that the program was well received by the physicians as well.

Data analysis revealing good effects on biological outcome data with a decrease in HbA1c in the group that worked with the Coach. This was surprising for a pilot study with small numbers but demonstrates the potential for using this technique for diabetes management. Improved glycemic control has been shown to decrease a multitude on complications from diabetes, so the effect seen in this study has potential benefits for decreasing complications. Likewise, the effects on weight may have implications for a wide variety of medical conditions including diabetes, hypertension, hyperlipidemia and ultimately complications of these such as cardiovascular and cerebrovascular disease. These data are especially exciting as the patients in this study are particularly at risk of adverse outcomes due to their demographics (minority, poorly educated, low socioeconomic status) and social isolation.

One aspect of the study presented difficulties. The physician education arm was difficult to maintain due to reorganization of the Firm system midway through the study. This was unexpected, and resulted in patients in the PEP and CCH groups being seen by physicians who had not been present for the educational component. This would have had the effect of decreasing the effect of that component, so the effects seen in the CCH group are more striking. This is a potential problem for any intervention of this type as many clinics undergo reorganization or at least personnel changes. An ongoing form of education would help overcome this problem. In addition, there were difficulties in the feedback mechanism between Coach and physician due to perceived educational differences. An intermediary may help diminish this perception.

Further studies are planned to evaluate the effect of using Health Counselors, particularly targeting diabetes. Since chronic illnesses often co-exist, these studies are planned for a longer duration, and targeting behaviors with implications for multiple chronic illnesses. In addition, studies are planned to evaluate the long-term benefit of working with a Health Counselor. Cost analysis is also planned. Data analysis is still ongoing for the questionnaire data, especially the quality of life, barriers, diabetes knowledge and health beliefs. It is expected that this data will also lead to components of continuing studies.

Figure 1: Change in HbA1c from baseline to Follow-up for all subjects (1a) and enrolled subjects (1b.)

Figure 1a: Change in HbA1c for all subjects (Enrolled + Chart audits)

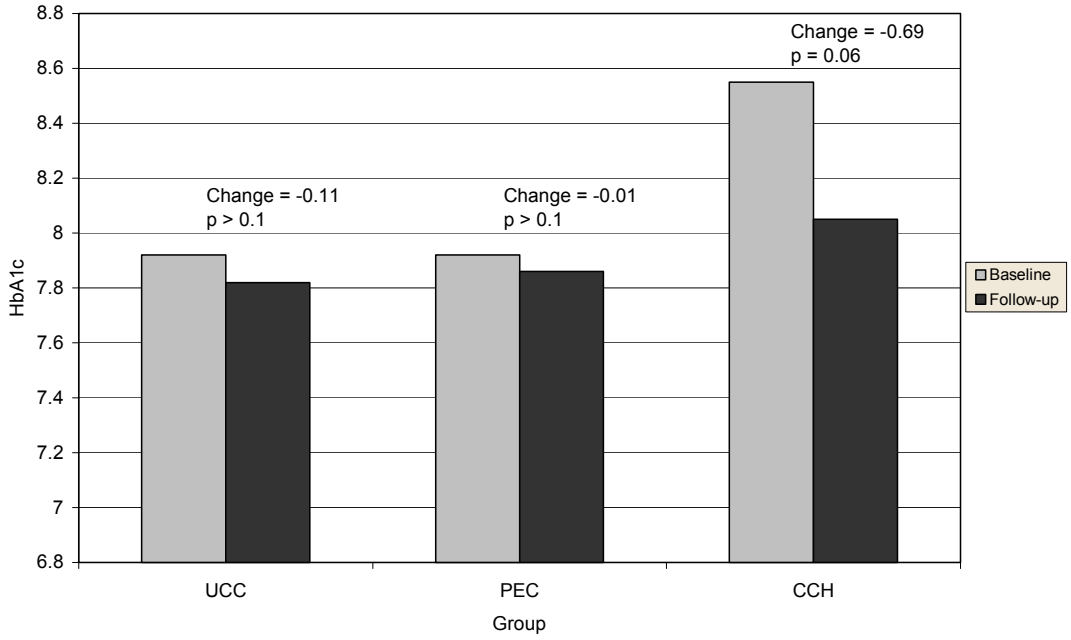
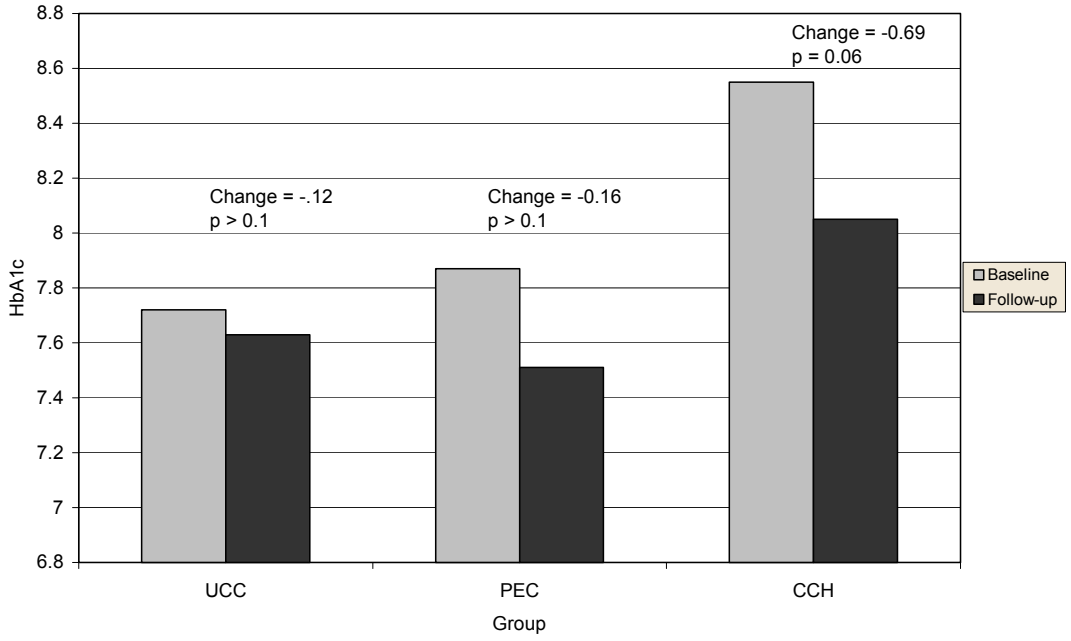


Figure 1b: Change in HbA1c for enrolled participants



References

1. Healthy People 2000 – the Surgeon General's report on health promotion and disease prevention. Washington DC: Government Printing Office, 1979 (DHEW publ. No. 79-55071.

2. Clark CM, Lee DA. Prevention and treatment of the complications of diabetes mellitus. *The New England Journal of Medicine* 332(18): 1210-1217, 1995.

3. Nathan DM. Medical progress: Long-term complications of diabetes mellitus. *The New England Journal of Medicine* 328(23): 1676-1685, 1993.

4. The Diabetes Control and Complications Research Group: The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *The New England Journal of Medicine* 329(14): 977-986, 1993.

5. The Diabetes Control and Complications Trial/Epidemiology of Diabetes Interventions and Complications Research Group: Retinopathy and nephropathy in patients with type 1 diabetes four years after a trial of intensive therapy. *The New England Journal of Medicine* 342(6): 381-389, 2000

6. Lustman PJ, Griffith LS, Gavard JA, Clouse RE. Depression in adults with diabetes. *Diabetes Care* 15: 1631-1639, 1992.

7. Fisher EB, Heins JM, Hiss RG, Lorenz RA, Marrero DG, McNabb WL, Wylie-Rosett J, Garfield SAE. Metabolic control matters: Nationwide translation of the Diabetes Control and Complications Trial: Analysis and recommendations. Bethesda, MD, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, 1994 (NIH publ. No. 94-3773.)

8. Glasgow RE, Fisher EB, Anderson BJ, LaGreca A, Marrero D, Johnson SB, Rubin, RR, Cox DJ. Behavioral science in diabetes: Contributions and opportunities. *Diabetes Care* 22: 832-843, 1999.

9. Ruggiero L; Glasgow RE, Dryfoos JM, Rossi JS, Prochaska JO, Orleans CT, Prokhorov AV, Rossi SR, Greene GW, Reed GR, Kelly K, Chobanian L, Johnson S. Diabetes self-management: Self-reported recommendations and patterns in a large population. *Diabetes Care* 20(4): 568-576, 1997

10. Goodall TA, Halford WK: Self-management of diabetes mellitus: a critical review. *Health Psychology* 10:1-8, 1991

11. Clement S: Diabetes self-management education. *Diabetes Care* 18:1204-1214, 1995

12. Glasgow RE, Eakin EG, Toobert DJ. How generalizable are the results of diabetes self-management research? The impact of participation and attrition. *Diabetes Educator* 22(6):573-4, 581-2, 584-5, 1996.

13. Uchino B, Cacioppo J, Kiecolt-Glaser J. The relationship between social support and psychological processes. A review with emphasis on underlying mechanisms and implications for health. *Psychological Bulletin* 119: 488-531, 1996.

14. Levine D, Bone L: The impact of a planned health education approach on the control of hypertension in a high-risk population. *Journal of Human Hypertension* 4(4): 317-321, 1990

15. Janz NK, Schottenfeld D, Doerr KM, Selig S, Dunn R, Strawderman M, Levine PA: A two-step intervention of increase mammography among women aged 65 and older. *American Journal of Public Health* 87(10): 1683-6, 1997.

16. Moodie AS, Rogers G: Baltimore uses inner city aides in a tuberculosis control program. *Public Health Reports* 85(11): 955-963, 1970.

17. Tarr KL, Highstein G, Sykes R, Musick J, Strunk B, Fisher E. Asthma coaches reach underserved Medicaid enrollees through nondirective support and proactive strategies. Presented at the Society of Behavioral Medicine, 21st Annual Scientific Sessions, Nashville, 2000.

18. Hopper SV, Miller JP, Birge C, Swift: A randomized study of the impact of home health aides on diabetic control and utilization patterns. *American Journal of Public Health* 74(6): 600-2, 1984.

19. Eakin EG, Glasgow RE: The physician's role in diabetes self-management: helping patients to help themselves. *The Endocrinologist* 6:1-10, 1996.

20. Golin CE, DiMatteo MR, Gelberg L. The role of patient participation in the doctor visit: implications for adherence to diabetes care. *Diabetes Care* 19: 1153-1164, 1996.

21. Anderson LA, Zimmerman MA. Patient and physician perceptions of their relationship and patient satisfaction: a study of chronic disease management. *Patient Education and Counseling* 20: 27-36, 1993.

22. Frame PS. Health maintenance in clinical practice: Strategies and barriers. *American Family Physician* 45: 1192-1200, 1992.

23. Chang H, Zimmerman L, Beck J. Impact of chart reminders on smoking cessation practices of pulmonary physicians. *American Journal of Public Health* 77: 313-316, 1987.

24. Oxman A, Thomson M, Davis D, Haynes R. No magic bullets: A systematic review of 102 trials of interventions to improve professional practice. *Canadian Medical Association Journal* 153: 1423-1431, 1995.

25. Prochaska JO, DiClemente CC, Norcross JC: In search of how people change: Applications to the addictive behaviors. *American Psychologist* 47: 1102-1114, 1992.

26. DiClemente CC and Prochaska JO. Self change and therapy change of smoking behavior: A comparison of processes of change in cessation and maintenance. *Addictive Behavior* 7: 133-142, 1982.

27. Prochaska JO and DiClemente CC. Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology* 51: 390-395, 1983.

28. Glasgow RE, McCaul KD, Schafer LC. Self-care behaviors and glycemic control in Type I diabetes. *Journal of Chronic Disease* 40: 399-412, 1987.

29. Glasgow RE, Toobert DJ, Hampson SE, Brown JE, Lewinsohn PM, Donnelly J. Improving self0care among older patients with Type II diabetes: The "Sixty Something . ." Study. Patient Education and Counseling 19: 61-74.

30. The DCCT Research Group: Reliability and validity of a diabetes quality-of-life measure for the Diabetes Control and Complications Trial (DCCT). *Diabetes Care* 11: 725-732, 1988.

31. Hampson SE, Glasgow RE, Foster LS. Personal models of diabetes among older adults: relationship to self-management and other variables. *Diabetes Educator* 21(4):300-7, 1995.

32. Andresen EM. Malmgren JA. Carter WB. Patrick DL. Screening for depression in well older adults: evaluation of a short form of the CES-D (Center for Epidemiologic Studies Depression Scale). *American Journal of Preventive Medicine* 10(2):77-84, 1994.