

## **Journey to Healthy Aging: Impact of Community Based Education Programs on Knowledge and Health Behavior in Older Adults**

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### **Abstract**

The objective of this study was to determine if community based health education programs increased knowledge and health behavior in older adults. The study was a pretest-posttest design with a convenience sample of 111 independent community dwelling older adults. Participants received two disease prevention education presentations: type 2 diabetes and colorectal cancer. Knowledge was assessed as the difference in pretest and posttest scores on the Diabetic Prevention Knowledge Test (DPKT) and the Colorectal Cancer Knowledge Questionnaire (CCKQ). Health behavior change was assessed as the difference between pre and posttest scores on the Health Promoting Lifestyle Profile II Physical Activity and Nutrition subscales and completion of the fasting blood glucose (FBG) and fecal occult blood test (FOBT). There was a significant difference in paired pretest-posttest scores on the DPKT ( $t = -7.678, p = .000$ ) and CCKQ ( $t = -6.115, p = .000$ ). While the mean posttest score on the Physical Activity subscale was significantly higher ( $t = -4.094, p = .000$ ), the Nutrition subscale mean posttest score was not significantly different ( $t = -1.166, p = .246$ ). A greater proportion of participants completed the FBG (84%) than the FOBT (50%). For this profile of independent older adults, community based health education resulted in greater knowledge and limited behavior change.

### **Introduction**

The aging population is nearly a universal phenomenon. Although the global population is relatively young, worldwide in 2002 one out of 14 people was 65 years of age or older (U.S. Census Bureau 2004). The older adult population is currently largest in developed countries with growth projected in all world regions to be faster than for other population segments. Nearly 36 million adults 65 years of age and older live in the United States (Federal Interagency Forum on Aging 2005).

In 2004 in the United States, the average life expectancy from birth was 77.9 years with females living 5.4 years longer than males (National Center for Health Statistics 2005). Further, upon attaining 65 years of age, adults have an average life expectancy of greater than 18 additional years (Arias 2006) and an increased risk for the development of chronic disease and disability (Centers for Disease Control and Prevention 2005). In general, a healthy lifestyle and early disease detection health behaviors are associated with preventing chronic diseases, such as heart disease, cancer, diabetes, and stroke, which have an increased incidence in older adults.

Potential consequences of not preventing or managing chronic disease are hospitalization, disability, dependence on others for care, and care in a nursing home (Goulding 2003). A further impact of the additional years and chronic disease is healthcare expenses for older adults that are twice those of the general population (Administration on Aging 2004). Sound decisions about diet, physical activity, and healthcare are necessary to achieving a healthy lifestyle.

Health education programs provide older adults with information to assist in making informed decisions about health and lifestyle behaviors. One such program is Journey to Healthy Aging, a community based health education program for older adults and their families. The Journey to Healthy Aging in group setting provides information on normative aging changes, chronic diseases with increased risk in older age and prevention strategies. On a monthly basis different speakers provide one-hour programs on health topics of interest to older adults. Principles of adult learning, group support and humor guide the format of the Journey to Healthy Aging programs. The programs provide an opportunity for older adults to gain knowledge and ask questions in a non-threatening environment among a group of peers.

The purpose of this study was to determine if community based health education programs had a significant impact on knowledge and health behavior in older adults. The specific outcomes studied were knowledge of disease prevention and health behavior related to participation in screening tests for type 2 diabetes and colorectal cancer. Journey to Healthy Aging presentations on type 2 diabetes or colorectal cancer provided information on the etiology, incidence, risk factors, symptoms, prevention strategies and screening tests.

## **Methods**

A quasi-experimental pretest-posttest design was used for this study. All participants received two health education presentations using the Journey to Healthy Aging format. One of

the presentations addressed type 2 diabetes prevention and screening and the other focused on colorectal cancer prevention and screening.

### **Population and Sampling**

The population of interest was independent community dwelling older adults. A convenience sample was recruited from among attendees of the Journey to Healthy Aging education programs presented by a rural community college, from a rural Area Agency on Aging Senior Center, from a moderate sized Baptist church, and a regional state Center on Aging. Additionally, participants recruited friends, neighbors, and members of their clubs and churches using a snowball effect. Inclusion criteria were: (a) 65 years of age or older, (b) living independently in the community, and (c) mentally oriented to person, place, and time assessed by an appropriate response to questions of who they are, the location, and the date. The exclusion criteria included: (a) non-English speaking, (b) hearing impairment measured by an inability to repeat the spoken statement “friends skip around the lake,” (c) visual or reading impairment measured by an inability to read and answer the demographic questionnaire, and (d) an inability or refusal to give informed consent. A history of type 2 diabetes or colorectal cancer was not used as an exclusion criterion but was assessed as self reported prior knowledge of either disease on the Demographic Data Form. Approved written consent was obtained from all participants.

### **Instruments**

Data were collected using the Health-Promoting Lifestyle Profile II that was described by Susan N. Walker in a letter to the investigator on April 9, 2002, the Diabetic Prevention Knowledge Test adapted by the investigator, and the Colorectal Cancer Knowledge Questionnaire (Weinrich et al. 1992). Additionally, demographic data were collected with an investigator developed questionnaire. Discussion of each instrument follows.

*Health Promoting Lifestyle Profile II (HPLP II)*. The HPLP II is a 52-item questionnaire developed by Walker, Sechrist, and Pender to measure health promoting behaviors and self-initiated actions that maintain or enhance level of wellness. Health Responsibility, Physical Activity, Nutrition, Spiritual Growth, Interpersonal Relations, and Stress Management are the six subscales of the instrument and each contains eight or nine items. A four-point scale assesses the frequency with which individuals report performing health promoting behaviors. A higher score indicates health-promoting behaviors are performed more frequently. In a letter to the investigator on April 9, 2002, Susan Walker reported the Cronbach's alpha for the total HPLP II as .94 and the Physical Activity and Nutrition subscales as .85 and .80 respectively. Patricia Stockert (2000) reported the HPLP II was a reliable and valid measure in an older adult population,  $\alpha = .91$ . The HPLP II was administered after consent was obtained and again one month after the last presentation. The differences between the pretest and posttest subscale scores of physical activity and nutrition were presumed to indicate a health behavior change.

*Diabetic Prevention Knowledge Test (DPKT)*. The 12-item DPKT (McLary 2004, 71-73, 76-79), adapted from the 24-item Diabetes Knowledge Questionnaire (Garcia et al. 2001), was used to measure knowledge of risk factors, symptoms, prevention, and the screening test for type 2 diabetes. Reliability and validity were tested with convenience samples of independent community dwelling non-diabetic older adults ( $n = 33$ ) and diabetic older adults ( $n = 21$ ). Internal consistency of the 12 items of the DPKT was computed using the Kuder-Richardson formula 20 for dichotomous data ( $\alpha = .78$ ). A two week test-retest correlation was calculated to evaluate temporal stability ( $n = 28$ ,  $r = .70$ ,  $p = .01$ ). Construct validity was estimated using a known-groups technique comparing the mean test scores of the non-diabetic older adults ( $n = 33$ ,  $M = 7.91$ ,  $SD = 2.79$ ) and the diabetic older adults ( $n = 21$ ,  $M = 10.67$ ,  $SD = .97$ ) with the

diabetic participants scoring significantly higher ( $t = -4.36, p = .00$ ). A content validity index (CVI) was determined from diabetes educators' ratings of each test item (CVI = .97). Reliability and validity of the DPKT were deemed acceptable for community dwelling older adults. The DPKT was administered as a pretest prior to the type 2 diabetes presentation and 4 weeks after the presentation. The difference between the pretest and posttest score was presumed to indicate a knowledge change attributable to the type 2 diabetes presentation.

*Colorectal Cancer Knowledge Questionnaire (CCKQ).* The 12-item CCKQ was developed by Weinrich and others (1992) to measure knowledge of risk factors, symptoms, prevention, and screening tests for colorectal cancer. The Cronbach's alpha for a sample of community dwelling older adults recruited at a congregate meal site was reported as .69 (Weinrich et al. 1992). The strength of the reliability coefficient may be due to the small number of items in the questionnaire. The CCKQ was administered as a pretest prior to the colorectal cancer presentation and 4 weeks after the presentation. The difference between the pretest and posttest score was presumed to indicate a knowledge change attributable to the colorectal cancer presentation.

*Demographic Data Form.* A demographic data form developed by the investigator obtained information on age, gender, race, household income, and number of years of school completed. Additional information requested from the participant included the level of prior knowledge of diabetes or colorectal cancer, attendance at a diabetes or colorectal cancer education program in the past year and current or prior use of tobacco. Self-reported prior knowledge of diabetes and colorectal cancer was assessed using a visual analog scale consisting of a 100-millimeter horizontal line with anchors of *very little* at one end and *well informed* at the

other end. The participant marked the line at the point that indicated their knowledge of diabetes or colorectal cancer.

### **Procedure**

Approval to conduct the study was obtained from the appropriate institutional review boards and agencies. This study was conducted with full regard for the rights of human subjects. Participants were recruited from four sites with the largest number recruited from the mailing list for a rural community college's older adult health education programs. A letter was sent to attendees from previous programs requesting potential participants call the investigator at the number provided for information on the study. When an interested potential participant called, the investigator explained the study; a mutually agreed upon convenient time was selected for the participant to come to the community college, sign the consent and complete the baseline data collection.

At three additional recruitment sites the investigator explained the study, answered questions, and requested participants. The sites were a rural Area Agency on Aging Senior Center lunch, a community Baptist church senior adult social function, and a regional state Center on Aging community presentation. At each site the investigator collected names, addresses, and phone numbers of potential participants, consents were signed, and a time and location was set to complete baseline data collection. Additionally, the principal investigator's name and phone number was left at the site in the event any older adults were interested in participating at a later time.

A postcard was sent to individual participants or couples with the time and location of the presentation. Before starting baseline data collection, each participant was individually assessed for hearing and orientation to person, place, and time in a private area.

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Each participant attended two health education programs: prevention of type 2 diabetes and prevention of colorectal cancer. Immediately prior to each program the participant completed the appropriate knowledge pretest, specifically the Diabetic Prevention Knowledge Test or the Colorectal Cancer Knowledge Questionnaire. Then three weeks after each program the participant was encouraged to have the screening test at the local hospital free of charge. Four weeks after the program, the posttest was completed. As the programs were held four weeks apart, immediately prior to the second program the participant completed the posttest for the previous program and the pretest for the current program.

All presentations were given by the principal investigator and started with humorous stories or poems related to aging. The purpose of the humor was to gain attention and establish rapport with the participants (Beck 1997; Safford 1991). The type 2 diabetes prevention presentations all had the same objectives, verbal content, and slide content, as did all colorectal cancer presentations. There were 14 PowerPoint slides for type 2 diabetes prevention and nine slides for colorectal cancer prevention. All participants received hand-outs of the presentation content.

The investigator verbally instructed participants on requirements for the screening tests, fasting blood glucose (FBG) and fecal occult blood test (FOBT). Instructions for the FBG included the length of time to be fasting. The FOBT instructions included dietary restrictions, such as avoid red meat, and medication restrictions to avoid non-steroidal anti-inflammatory drugs, as well as the method for collecting the stool specimen. Additionally, detailed written instructions accompanied the packet of fecal occult blood test cards. The investigator verbally told the participants the date and location to complete each screening test.

Data were analyzed using the Statistical Package for the Social Sciences 9.0 (SPSS).

## Results

Findings reported include sample characteristics, results of knowledge measures, and results of health behavior measures. Specifically, knowledge measures include scores on the Diabetic Prevention Knowledge Test and the Colorectal Cancer Knowledge Questionnaire. Health behavior measures include Health Promoting Lifestyle Profile II Physical Activity and Nutrition subscale scores, and participation in fasting blood glucose and fecal occult blood testing.

## Sample

A sample of 111 older adults was recruited with 43 from the community college health education program, 27 from the church, 2 from the Senior Center, 8 from the regional Center on Aging, and 31 by word of mouth. Six enrollees did not attend any of the programs and five participants attended only one program. Of the 100 participants who attended both programs, three did not complete the final data collection and one did not complete all instruments in the initial data collection. Therefore, 96 participants attended both programs and completed all data collection instruments. The majority of participants were female, Caucasian, non-smokers, with household incomes greater than \$25,001. Further, the majority of participants were in the young old cohort (65-74 years) with a mean age of 72.58 ( $N = 106$ ,  $SD = 5.32$ ) years and there was no significant difference between males and females ( $t = .105$ ,  $p = .916$ ). Likewise, the mean years of school completed was 13.6 ( $N = 104$ ,  $SD = 2.82$ ) with no significant difference for mean years of school between males and females ( $t = 1.355$ ,  $p = .178$ ).

Initial baseline data obtained included self-reported prior knowledge of type 2 diabetes, self-reported prior knowledge of colorectal cancer and a Health Promoting Lifestyle Profile II score. Using a 100-millimeter visual analog scale, mean self-reported prior diabetes prevention

knowledge was 41.29 millimeters ( $N = 105$ ,  $SD = 31.40$ ) and mean self-reported prior colorectal cancer knowledge was 38.75 millimeters ( $N = 105$ ,  $SD = 30.42$ ). There was no significant difference in prior diabetes prevention knowledge between males and females ( $t = -.003$ ,  $p = .997$ ) and between age cohorts ( $F(2, 101) = .452$ ,  $p = .637$ ). Prior colorectal cancer prevention knowledge did not differ significantly between males and females ( $t = -.072$ ,  $p = .942$ ). A significant difference was noted for prior knowledge of colorectal cancer prevention between age cohorts ( $F(2, 101) = 4.292$ ,  $p = .016$ ) with mean scores increasing with age. For the age cohorts of 65-74 years, 75-84 years and 85 years and older mean prior knowledge was 35.5 millimeters, 43.6 millimeters and 93.5 millimeters respectively. Although not significantly different self-reported prior diabetes prevention knowledge increased by age cohort.

The initial Health Promoting Lifestyle Profile II mean score for all participants was 2.837 ( $N = 105$ ,  $SD = .4113$ ) with no significant difference between groups for gender ( $t = -.164$ ,  $p = .87$ ) nor age cohort ( $F(2, 101) = .105$ ,  $p = .90$ ). Scores ranged from “1” indicating the participant never performed the described behavior to “4” which indicated the participant routinely performed the behavior.

Fifteen diabetes prevention programs and thirteen colorectal cancer programs were presented for a total of 28 programs. The mean average attendance was 6.87 ( $n = 15$ ,  $SD = 4.47$ ) and 7.92 ( $n = 13$ ,  $SD = 5.77$ ) for the diabetes and colorectal cancer programs respectively, a non-significant difference ( $t = -.485$ ,  $p = .636$ ) for mean program size.

### Knowledge Measure Results

For both programs, knowledge increased between pretest and posttest. For the diabetes prevention program, a significant paired difference in pretest-posttest Diabetes Prevention Knowledge Test (DPKT) score ( $n = 103$ ,  $t = -7.678$ ,  $p = .000$ ) was identified. Between males and

females there was no significant difference in mean DPKT pretest scores ( $t = -.963, p = .338$ ), mean posttest scores ( $t = -.344, p = .731$ ) or the mean difference from pretest to posttest ( $t = .769, p = .444$ ). Findings between age cohorts were mixed with no significant difference for the mean DPKT pretest score ( $F(2, 99) = .148, p = .229$ ) or the difference from pretest to posttest ( $F(2, 99) = .148, p = .862$ ). A significant difference was identified for mean DPKT posttest scores ( $F(2, 99) = 5.139, p = .008$ ) with lower scores for the oldest-old cohort, 85 years and older.

A similar significant finding ( $n = 99, t = -6.115, p = .000$ ) was identified for the colorectal cancer prevention program Colorectal Cancer Knowledge Questionnaire (CCKQ) paired pretest-posttest score. No significant difference was found for CCKQ pretest ( $t = -.023, p = .982$ ), posttest ( $t = -.554, p = .581$ ) or the change in scores ( $t = .332, p = .740$ ) between males and females. Significant differences were identified between age cohorts for the CCKQ pretest ( $F(2, 98) = 3.253, p = .043$ ) and posttest ( $F(2, 95) = 3.371, p = .039$ ) scores. Mean pretest scores were lowest in the old-old cohort, 75 – 84 years, and posttest scores were lowest in the oldest-old cohort, 85 years and older. The mean score difference ( $F(2, 95) = 1.973, p = .145$ ) was not significant between age cohorts.

### **Health Behavior Measure Results**

Participation in the screening tests as a measure of health behavior change revealed mixed results. A greater proportion of participants had the screening test for type 2 diabetes (83.8%) than the screening test for colorectal cancer (49.5%). No significant differences for fasting blood glucose test participation by age cohort ( $\chi^2 = 1.997, p = .368$ ) or gender ( $\chi^2 = .000, p = .996$ ) were identified. Similar non-significant findings for the fecal occult blood test by age cohort ( $\chi^2 = 1.148, p = .563$ ) and gender ( $\chi^2 = .573, p = .449$ ) were found.

The findings related to health behavior lifestyle change were mixed. A significant increase was identified for the paired pretest-posttest Physical Activity subscale score ( $t = -4.094, p = .000$ ) at the end of data collection. The difference in pretest and posttest Physical Activity scores ( $t = .689, p = .493$ ) were not significantly different by gender. Additionally, mean pretest ( $t = 1.206, p = .231$ ) and posttest ( $t = .667, p = .507$ ) scores were not significantly different between males and females. Non-significant findings were identified by age cohort for the Physical Activity pretest ( $F(2, 101) = 1.649, p = .197$ ), posttest ( $F(2, 92) = .653, p = .523$ ) and the difference ( $F(2, 91) = .615, p = .543$ ).

A slight non-significant increase for the paired pretest-posttest Nutrition subscale ( $t = -1.166, p = .246$ ) was found. Differences in scores by gender for Nutrition pretest ( $t = -1.354, p = .179$ ), posttest ( $t = -.499, p = .619$ ) and the difference in pretest-posttest scores ( $t = -.855, p = .395$ ) were not significant. By age cohort, Nutrition subscale pretest ( $F(2, 101) = .566, p = .569$ ), posttest ( $F(2, 92) = .429, p = .653$ ) and pretest-posttest difference ( $F(2, 91) = 1.634, p = .201$ ) scores were non-significant.

## **Discussion**

In this study, a sample of 105 participants attended at least one health education program. Independent community dwelling older adults are active and involved in a number of programs. To maximize attendance, programs were scheduled one or two per week on different days of the week to accommodate the personal schedules of the participants. Reminders were sent to participants one week before the presentations to further facilitate attendance. The goal was 20 participants per program, which was not achieved due to a fluctuation in the pattern of recruitment and in a few instances last minute cancellations by the participants. In this study, the multiple presentations and the delayed screening tests posed a scheduling problem for some of

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the participants. The average number of attendees for the type 2 diabetes prevention and colorectal cancer prevention programs was not significantly different although there was wide variation between presentations. Further investigation of optimum class size is needed.

Best teaching practices were used for all presentations to facilitate learning. A positive environment, auditory and visual teaching modalities, age relevant information, and incorporation of prior knowledge were the strategies used (Tileston 2000). In general, the findings support the assumptions older adults can learn new information and older adults do want to learn about disease prevention. Difference in posttest scores on the Diabetes Prevention Knowledge Test may reflect the actual knowledge gained or may be a result of the test environment. Additionally, teaching strategies may need to be changed for the oldest-old cohort. Further investigation is warranted in this area.

The findings related to health behavior change were mixed for both the scores on the Health Promoting Lifestyle Profile II subscales and having the screening tests. There was a significant increase on the Physical Activity subscale indicating that individuals in both groups reported performing physical activities more frequently. A possible explanation for this increase, in addition to increased knowledge, might be a change in the climate. Most of the participants completed the initial Health Promoting Lifestyle Profile II in the summer and the retest in the fall. As Arkansas summers are hot and humid, a cooler climate may have contributed to being more physically active. Further investigation of physical activity levels in the winter may provide more explanation.

The Nutrition subscale score was not significantly different. A possible explanation may be the eating habits of older adults are more set and a longer time frame would be needed to detect a significant change. Additionally, several of the participants indicated they were eating a

low carbohydrate, high protein, moderate fat diet, which would have an effect on the Nutrition subscale scores. Although the older adults did increase in knowledge, the increase did not necessarily translate into an increase in health promoting behaviors in Physical Activity and Nutrition. Stockert (2000) reported older adults scored lowest in activities related to nutrition and physical activity.

The findings related to screening tests for type 2 diabetes and colorectal cancer were also mixed. A possible explanation for the significantly greater percentage of participants having the fasting blood glucose was the difference in preparation for the screening test. The fasting blood glucose test preparation was simply a 12-hour fast. Additionally, a blood cholesterol test was drawn at the same time. The experience of the investigator has been older adults particularly desire to know their cholesterol level. The fecal occult blood test preparation involved avoiding nonsteroidal anti-inflammatory drugs for seven days prior to the test and during the collection of stool samples. Many older adults take nonsteroidal anti-inflammatory drugs for the treatment of osteoarthritis and limiting the drugs may have negated the benefit of the screening test. Several participants shared they had asked their healthcare provider for a colonoscopy to screen for colorectal cancer as a result of attending the colorectal cancer prevention program.

### **Conclusion**

The findings support increased knowledge of disease prevention and some health behavior changes secondary to health education programs among this group of independent community dwelling older adults however, this conclusion may not apply to other groups. The findings are limited to a profile of older adults, who are better educated, have higher income, and are physically and socially active. Further research is needed to determine if another profile of older adults, such as those less active, with less education, with less income, and more ethnically

diverse, would have increased knowledge and health behavior change. Further research is also needed to determine the impact of best teaching practices with independent community dwelling older adults. In reality, best teaching practices are not always used in preparing community presentations. With the growing older adult population the impact of health education in community group settings must continue to be investigated.

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