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Psychosocial determinants of intention to screen for Alzheimer disease

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Abstract

Background—There is little information about how receptive older adults are to discuss memory problems with healthcare providers. Here we test the psychosocial factors explaining older adults' intention to undergo screening for Alzheimer disease (AD).

Methods—A population-based, random-digit dialing strategy surveyed 1039 older adults. The Behavioral Model of Health Services Use was used as a conceptual framework for a questionnaire testing constructs from several behavioral theories. Structural equation modeling assessed the relationship of latent variables to each construct with goodness-of-fit indices.

Results—The study had an 82% response rate and 72% completer rate. The respondents' mean age was 62.7 ± 10.2 y (range 50–97). The sample was 67% women, 86% were Caucasian and less than 40% had personal experience with AD. Respondents were nondemented (Short Blessed scores = 1.7 ± 2.2). Predictors of intention to screen included perceived benefits ($\gamma=.35$), knowledge of dementia ($\gamma=.26$), self-efficacy ($\gamma=.23$), preventive health behaviors ($\gamma=.17$), and perceived susceptibility ($\gamma=.14$). Knowledge was positively correlated with perceived benefits ($\phi=.29$) and susceptibility ($\phi=.20$). Preventive behaviors ($\phi=.20$) were positively correlated with perceived benefits. Self-efficacy correlated positively with preventive behaviors ($\phi=.24$) and perceived benefits ($\phi=.37$) and negatively with perceived susceptibility ($\phi=-.11$). Goodness-of-fit indices suggested a good fit of this model (RMSEA = .037, CFI = 0.98, RFI = .96).

Discussion—Older adults who have knowledge of dementia and perceive benefit from diagnosis and treatment are more likely to exhibit willingness and confidence to be tested for cognitive problems. Individuals with high self-efficacy, perceived susceptibility and positive preventive health behaviors are also more likely to exhibit intention. These constructs can now be used to develop interventions to evaluate cognitive health in the elderly.

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Keywords

Screening; Dementia; Alzheimer's disease; Intention

1. Introduction

Alzheimer disease (AD) is a major public health problem [1–3] that affects approximately 4.5 million Americans with prevalence estimates exceeding 14 million within a generation [4]. Current research has focused on developing reliable biomarkers [5–7] and cognitive tests [8] that discriminate between normal aging, mild cognitive impairment [9], and AD [10]. These strategies may enable clinicians to make early diagnosis and identify at-risk individuals who would receive the greatest benefit from newly developed therapies [11]. If these new therapeutic strategies are to succeed, a dementia screening program to identify at-risk individuals at the earliest possible stage will need to be developed.

However, there are currently no clear guidelines for dementia screening of the general population [1] or knowledge of how receptive older adults would be to discussing memory problems with their health care providers. Little is known about what community-dwelling older adults know about AD or which factors may influence an individual's intention to be screened. One recent study among elderly community residents found that 50% were not willing to be screened for memory loss [12]. Perceived barriers were the most significant predictors of intention to get genetic testing for AD in individuals with a strong family history [13]. We performed a population-based survey to examine the psychosocial factors that would help explain older adults' willingness to undergo screening for AD and related disorders [14].

The number of individuals who have undergone cognitive screening is likely to be quite low, limiting our ability to identify this type of cohort. We therefore chose to use *intention* to be screened as a proxy for actual screening behavior. The Theory of Reasoned Action (TRA) suggests that intention is the most important predictor of behavior [15,16]. Although we were unable to identify other studies that used intention as a proxy for dementia screening, intention to take a genetic test for AD has been used as the outcome variable in one study [17], and intention to be screened has been successfully used in cancer research [18,19], genetic testing for hereditary disease [20–22], HIV testing [23,24], depression [25], and prenatal screening [26].

We hypothesized that intention in the older adult to undergo dementia screening would be predicted as follows: 1) Perceived barriers, followed by perceived benefits, severity, and susceptibility. 2) There will be a direct positive relationship between the older adults' knowledge of dementia and intention. 3) Individuals with strong social networks will have greater intention. 4) Individuals with high self-efficacy and previous preventive health behaviors for other medical conditions will have greater intention.

2. Methods and Design

2.1 Survey Design

The development and validation of the survey and conceptual model has been previously described [14]. Key questions most highly correlated with our latent constructs are shown in Table 1; however the entire questionnaire can be viewed at <http://alzheimer.wustl.edu/Galvin.pdf>. We relied on established theoretical models, including the Health Belief Model (HBM) [27], TRA [15], Self-Efficacy [28], and Social Support [29, 30] for questionnaire development. These constructs were placed in the framework of the Behavioral Model of Health Services Use (BMHSU) [31] to develop our conceptual model

(Figure 1) organizing predictor variables into three factors: predisposing, enabling and need [14]. Published scales were identified and validated in geriatric populations; when no scale was available, we generated survey items guided by theoretical models [14].

Information about knowledge and beliefs about dementia, Alzheimer's disease, memory loss in old age and the availability and access to screening tests for memory loss and other medical conditions was collected to test the HBM constructs of perceived susceptibility, perceived severity, perceived benefits, and perceived barriers [27,32]. Self-efficacy, a mediator for knowledge and attitudes [28], was assessed by investigator-generated questions. Two items from the General Health Questionnaire [33] were used to rate the respondents' perceived physical and mental health status. Investigator-generated questions probed previous experiences with preventive health behaviors (cancer screening, dental appointments, annual physical exams).

We examined both structural (i.e., number of ties and frequency of contact with ties) and functional (i.e., emotional or instrumental support) aspects of social support guided by the Social Support Survey of the Modified Medical Outcomes Study [35] and the Social Support Questionnaire [36]. Lastly, intention to be screened was measured by four investigator-generated items that explore intention under a variety of circumstances. The total number of survey items including qualifying, conditional, and demographic questions was 169. Respondents were offered a \$10 gift certificate as remuneration for their participation. All procedures were approved by the Human Studies Committees at Washington University, St Louis University, and the University of Missouri and met requirements of the Health Information Portability and Accessibility Act (HIPAA).

2.2 Random Digit Dialing Strategy

A random digit dialing (RDD) strategy was used to contact the sample in three Missouri counties: urban setting (population 343,279), suburban setting (population 1,009,235), and rural setting (population 24,666). The RDD was conducted by the Center for Health Care Quality at the University of Missouri using the Mitsosky-Waksberg method [36,37] to generate phone numbers and a computer-assisted telephone interview with commercial software (GeneSys Inc, Washington PA). During the initial phone contact, a household census was taken, and the first age-eligible household member was interviewed. After verbal informed consent was obtained participants were administered a telephone-version of the Short Blessed test [38] prior to beginning the survey. A weighted score of < 6 (i.e., be nondemented) determined eligibility.

This RDD strategy provided a representative sample composed of urban, suburban, and rural older individuals with a spectrum of socioeconomic classes, occupations, and educational levels. By sampling both urban and rural areas we also anticipated equitable representation of women and African-Americans based on the Missouri census. Eligibility criteria for the study included nondemented, English-speaking individuals over the age of 50 who were willing to complete the entire telephone survey.

2.3 Statistical analyses

Descriptive statistics were determined for the sample as a whole and for each region using SAS (SAS Inc, Cary NC). One-way ANOVA was used to test mean difference for continuous dependent variables. Pearson chi-square test was used to examine associations between categorical variables.

A matching procedure that was implemented in PRELIS was used to impute missing values on a variable by matching on other variables [39–41]. We used the following strategy. If a

respondent did not answer a particular survey question, we hypothesized that the missing answer would be similar to that given by other respondents who have the same response pattern on a set of matching variables. Thus, this respondent's missing value on the variable was substituted by the value from those respondents with the same response pattern. Missing values were only imputed if matching cases were found.

We treated each variable that was used to measure a construct (i.e. latent variable) as an ordinal variable, assuming an underlying continuous scales following normality. We computed covariance matrix and its asymptotic covariance matrix according to the alternative parameterization method using PRELIS [39]. Those two matrices were used as the input summary data for the structural equation modeling analysis using robust maximum likelihood estimation available in LISREL 8.7 [41]. We assessed the measurement models for each construct that has at least three indicators. This procedure was carried out for every construct to identify a best measurement model for the construct. A detailed description of those measurement models has been published elsewhere [14]. We then fitted the structural models to the data. The residual variance of observed variables across constructs was not allowed to be correlated, but the residual variances of observed variables may be correlated in a construct. Model fit was assessed using the Satorra-Bentler Scaled Chi-Square test [42]. A p-value over 0.05 indicated a good fit. Because the chi-square statistic is sensitive to sample size, other fit indices were also used including RMSEA, comparative fit index (CFI), and relative fit index (RFI). RMSEA values below 0.06 or RFI and CFI over 0.95 are considered an indication of good model fit [42]. For nested models we used chi-square difference with degrees of freedom (df) by subtracting the df in the submodel from the df in the full model. A nonsignificant chi-square test result suggested two models to have a similar fit to the data. The more parsimonious model was preferred and *t*-tests were used to test a statistical significance for each parameter estimate in the model. By convention, primary path coefficients are designated by gamma (γ) and secondary path coefficients are designated by phi (ϕ).

3. Results

3.1 Random Digit Dialing Sample

A total of 31,341 phone numbers with appropriate prefixes were generated and 14,849 total calls were attempted between August 10, 2004 and January 1, 2005 (Figure 2). Contact was made with a 7289 private residences. Of the total households contacted, 5976 (82%) responded to the interviewer by answering the eligibility questions; 1445 (20%) individuals were eligible. The reasons for ineligibility included: no one in household over the age of 50 (88%); Short Blessed scores >6 (9%); and non-English speaking (3%). Seventy-two percent of eligible individuals completed the entire survey.

3.2 Sample characteristics

A total of 1039 community-dwelling older adults responded and completed the telephone interviews. The sample was equally divided among urban, suburban, and rural dwellers. The mean age of the respondents was 62.7 ± 10.2 y (range 50–97); 94% had at least a high school education. The sample was 67% women, 48% married, and 86% Caucasian. The highest proportion of African American respondents was from the urban setting, which accurately represents the demographics in the counties sampled. Less than 40% of the respondents had a personal experience with AD, either a family member or close friend. All respondents were nondemented with a mean Short Blessed Test score of 1.7 ± 2.2 . Demographic characteristics, social structure, personal experiences with AD, and self-rating of physical and mental health for each geographic stratum are provided in Table 2.

3.3 Model Fitting

The full model including nine constructs was fitted to two 45×45 covariance matrices based on 837 respondents (81% of the sample) with completed data on each ordinal variable after imputation. The model provided a good fit to the data, given RMSEA=0.04, CFI=0.98, and RFI=0.96. However, Perceived Barriers, Social Support and General Health were not significant predictors for Intention. A series of parsimonious models were subsequently evaluated by excluding each nonsignificant predictor from the full model. We present only the results from the best-fitting model (Figure 3). This structural model provided a good fit to the data, given RMSEA =0.04, RFI = 0.96 and CFI = 0.98, although the Satorra-Bentler scaled chi-square was significant ($\chi^2=460.5$, $df=212$, $p<0.01$).

3.4 Primary Predictors of Intention to Screen for Dementia

The model elicited five predictors from four constructs representing the predisposing and needs domains from the BMHSU [32], Self-Efficacy [28], and Preventive Behaviors, which explained intention of the older adult to undergo screening for dementing illness (Figure 3, all p-values <0.05). The strongest predictor of intention was the predisposing factor Perceived Benefits ($\gamma=.35$). Other significant predictor constructs were Knowledge of Dementia and its consequences ($\gamma=.26$), Self-Efficacy ($\gamma=.23$), Preventive Health Behaviors ($\gamma=.17$), and the need factor Perceived Susceptibility ($\gamma=.14$).

3.5 Secondary Pathways to Predict Intention

Secondary paths were also demonstrated (Figure 3, all p-values <0.05). Knowledge and Consequences of Dementia were positively correlated with the two HBM constructs, Perceived Benefits ($\phi=.29$) and Perceived Susceptibility ($\phi=.20$). Self-Efficacy was positively correlated with both Preventive Behaviors ($\phi=.20$) and Perceived Benefits ($\phi=.37$). Preventive Health Behavior was correlated with Perceived Benefits ($\phi=.20$). Finally, Perceived Susceptibility ($\phi=-.11$) was negatively correlated with Self-Efficacy.

4. Discussion

The intention to undergo screening for cognitive disorders in older adults can be explained by a number of psychosocial factors. Older adults who have knowledge about dementia and some understanding of the consequences of being diagnosed with dementia for them and their family and who perceive that there is a tangible benefit to being diagnosed were most likely to manifest intention. Self-efficacy which encompasses the confidence to perform a particular behavior was an important predictor of intention. This is consistent with theory that self-efficacy is the most important requisite for behavioral change, affecting the amount of effort and level of performance given by an individual [29].

Previous preventive health behaviors such as cancer screening (colon, breast for women, prostate for men), and annual dental examinations proved to be predictors of intention. Prior research suggested that positive behaviors for one type of cancer screening (i.e. mammography) are strong predictors of future cancer screening behaviors such as colonoscopy [43,44], and that by increasing knowledge [45,46], perceived benefits [45,47], and self-efficacy [46] behavioral intention is improved. Our results suggest that although prior preventive behaviors for physical disease directly predicted intention to undergo dementia screening, these prior behaviors may play a greater role increasing self-efficacy and perceived benefits to undergo dementia screening.

Although the Social Support construct did not predict intention, previous reports suggest that the type as well as amount of support available from one's social network is associated with

positive health outcomes [29,30]. We believe that future interventions should take into account the strength of personal and community resources when addressing screening behaviors.

Older adults who perceived a threat or risk of dementia were more likely to seek out cognitive testing to determine their own risk of dementia regardless of whether symptoms were present (perceived susceptibility). Respondents in this study were not overly influenced by personal experience with AD since less than 40% of those individuals completing the survey have a relative or close friend with AD.

Our results support three of our four *a priori* hypotheses (Knowledge, Self-efficacy, and Preventive Health Behavior) with Social Support being encompassed by the other constructs. The fourth hypothesis that barriers would be the most important predictor was not supported, although two other constructs from the HBM (perceived benefits and susceptibility) were included in the final model. This result suggests that for the behavior (intention to screen) to occur these constructs must exceed any perceived barrier. It also appears that older adults are more proactive in screening for physical impairments than for cognitive impairments and that increasing knowledge would have a positive impact on screening behavior [45,46].

Taken together, our data support the premise that older adults who have some knowledge of dementia that leads to a perceived susceptibility and perceived benefit from diagnosis and treatment have higher intention to screen. Individuals with high self-efficacy and prior screening behaviors for other medical conditions (i.e. cancer) are also more likely to exhibit intention. Our data also suggest that predisposing factors (particularly knowledge and perceived benefits) might be more important than enabling and need factors in promoting the screening for dementia among older adults. Intention to screen may translate clinically to willingness to discuss cognitive problems with their healthcare provider and accept screening and treatment recommendations.

This study uses a random-sample, population-based strategy to examine the health perceptions of the aging population and how these perceptions might influence individuals to obtain cognitive screening for dementia. Other attempts to study screening behaviors have focused on genetic testing in family members at risk [17] or have used convenience samples [12,13, 48,49]. Studies examining intention to be evaluated in first degree relatives of AD patients reveals that decision making processes are complex, related to sociodemographic factors of the respondent and perceived barriers to screening [48]. In another study, intention to obtain a cognitive evaluation was examined in a convenience sample of 150 individuals who did not have a personal experience with AD. Intention was significantly influenced by the age of the respondent with older adults less likely to screen. This may be due to decreased knowledge or decreased perception about the risk of disease [49].

The results of this study have practical implications. As the population continues to age, the prevalence of AD will increase. Even as novel therapeutic agents are developed, it is unclear how services for mental health can be provided to the aging population. Understanding the motivation and psychosocial factors underlying the community-dwelling older adult's understanding of dementia and intention to be screened serves the public interest by defining an effective and efficient way to assist people at the greatest risk for dementia to obtain correct diagnosis at the earliest possible stage. Our results support the notion that increasing knowledge about dementia; understanding the benefits of early diagnosis and treatment; confidence to address this issue with their physicians; and translating screening behaviors already present for physical disease to mental health issues facilitates older adults' willingness to be tested for dementia. The questions described in Table 1 offer examples of potential targets for community interventions and the development of educational materials. For example, health education materials designed for older adults should provide information about likelihood of developing

dementia and focus on the benefits of early diagnosis and treatment. Increasing older adults knowledge base about AD may positively impact their confidence to talk with their provider and be screened. These findings are also consistent with results from previous smaller studies using convenience samples [12,13,48,49].

Our study is not without limitations. There is only information collected on subjective experiences; no elements of independent observer-based assessment were included. Because of the cross sectional nature of study, “effects” are associations and not necessarily causal. The survey was only offered in English; non-English speaking minorities will be excluded. It was not possible to collect information regarding reasons for refusal as many of these individuals simply hung up the phone. However, this random had a representative mix of gender, race and geographic location, a very high responder rate (82%) to the eligibility questions, and a very high (72%) completer rate for eligible older adults.

We now have theoretical basis for developing interventions that include programs that clarify dementia syndromes, the consequences of disease, and the benefits of early diagnosis and treatment. Programs provided through community resources such as community centers and churches can increase community awareness and support older adults’ decision to be evaluated for cognitive disorders. Involving and educating the community may also diminish the stigma that is often associated with dementia diagnosis. Strategies such as these have improved screening behaviors for cancer in the community [43–50]. The long term goals of this project were to develop a profile of the health beliefs, attitudes, and perceptions of the aging population towards memory loss, dementia, and screening tests. The information we have derived can now be used to develop interventions to address underutilization of screening services.

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REFERENCES

1. Agency for Healthcare Research and Quality. Early Alzheimer’s Disease: Recognition and Assessment. Guideline Overview No. 19. Accessed from the World Wide Web 2/14/07
<http://www.ahrq.gov/clinic/uspstf/uspstdeme.htm>
2. Berg L, McKeel DW Jr, Miller JP, et al. Clinicopathologic studies in cognitively healthy aging and Alzheimer’s disease. Relation of histologic markers to dementia severity, age, sex, and apolipoprotein E genotype. Arch Neurol 1998;55:326–335. [PubMed: 9520006]
3. Galvin JE, Powlishta KK, Wilkins K, et al. Predictors of preclinical Alzheimer’s disease and dementia: a clinicopathologic study. Arch Neurol 2005;62:758–765. [PubMed: 15883263]
4. Hebert LE, Scherr PA, Bienias JL, Bennett DA, Evans DA. Alzheimer disease in the US population: prevalence estimates using the 2000 census. Arch Neurol 2003;60:1119–1122. [PubMed: 12925369]
5. Csernansky JG, Wang L, Swank J, et al. Preclinical detection of Alzheimer’s disease: hippocampal shape and volume predict dementia onset in the elderly. Neuroimage 2005;25:783–792. [PubMed: 15808979]
6. Klunk WE, Engler H, Nordberg A, et al. Imaging brain amyloid in Alzheimer’s disease with Pittsburgh Compound-B. Ann Neurol 2004;55:306–319. [PubMed: 14991808]
7. Fagan AM, Csernansky CA, Morris JC, Holtzman DM. The search for antecedent biomarkers of Alzheimer’s disease. J Alzheimers Dis 2005;8:347–358. [PubMed: 16556966]
8. Galvin JE, Roe CM, Powlishta KK, et al. The AD8: A brief informant interview to detect dementia. Neurology 2005;65:559–564. [PubMed: 16116116]

9. Petersen RC, Doody R, Kurz A, et al. Current concepts in mild cognitive impairment. *Arch Neurol* 2001;58:1985–1992. [PubMed: 11735772]
10. Morris JC, Storandt M, Miller JP, et al. Mild cognitive impairment represents early-stage Alzheimer disease. *Arch Neurol* 2001;58:397–405. [PubMed: 11255443]
11. Cochrane AL, Holland WW. Validation of screening procedures *Br Med Bull* 1971;27:3–8.
12. Boustani M, Watson L, Fultz B, Perkins AJ, Druckenbrod R. Acceptance of dementia screening in continuous care retirement communities: a mailed survey. *Int J Geriatr Psych* 2003;18:780–786.
13. Werner P. Factors influencing intentions to seek a cognitive status examination: a study based on the Health Belief Model. *Int J Geriatr Psych* 2003;18:787–794.
14. Galvin JE, Scharff DP, Glasheen C, Fu Q. Development of a population-based questionnaire to explore psychosocial determinants of screening for memory loss and Alzheimer Disease. *Alz Dis Assoc Disord* 2006;20:182–191.
15. Ajzen, I.; Fishbein, M. *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, NJ: Prentice Hall; 1980.
16. Montano, DE.; Kasprzyk, D. *The Theory of Reasoned Action and the Theory of Planned Behavior*. In: Glanz, K.; Rimer, BK.; Lewis, FM., editors. *Health Behavior and Health education*. 3rd edition. San Francisco, Calif: Jossey-Bass; 2002. p. 85–113.
17. Frost S, Myers LB, Newman SP. Genetic screening for Alzheimer's disease: what factors predict intentions to take a test? *Behav Med* 2001;27:101–109. [PubMed: 11985183]
18. Steadman L, Rutter DR. Belief importance and the theory of planned behaviour: comparing modal and ranked modal beliefs in predicting attendance at breast screening. *Br J Health Psychol* 2004;9:447–463. [PubMed: 15509354]
19. Berglund G, Nilsson S, Nordin K. Intention to test for prostate cancer. *Eur J Cancer* 2005;41:990–997. [PubMed: 15862747]
20. Nordin K, Bjork J, Berglund G. Factors influencing intention to obtain a genetic test for a hereditary disease in an affected group and in the general public. *Prev Med* 2004;39:1107–1114. [PubMed: 15539044]
21. Kessler L, Collier A, Brewster, Kiyona MA, Smith CC, Weathers B, Wileyto EP, Halbert CH. Attitudes about genetic testing and genetic testing intentions in African American women at increased risk for hereditary breast cancer. *Am College Med Genetics* 2005;7:230–238.
22. Bunn JY, Bosompra K, Ashikaga T, Flynn BS, Worden JK. Factors influencing intention to obtain a genetic test for colon cancer risk: a population-based study. *Prev Med* 2002;34:567–577. [PubMed: 12052015]
23. Fernandez MI, Collazo JB, Bowen GS, Varga LM, Hernandez N, Perrino T. Predictors of HIV testing and intention to test among Hispanic farmworkers in South Florida. *J Rural Health* 2005;21:56–64. [PubMed: 15667010]
24. Hou SI, Wisenbaker J. Using a web-based survey to assess correlates of intention towards HIV testing among never-been-tested but sexually experienced college students. *AIDS Care* 2005;17:329–334. [PubMed: 15832880]
25. Van Voorhees BW, Fogel J, Houston TK, Cooper LA, Wang NY, Ford DE. Beliefs and attitudes associated with the intention to not accept the diagnosis of depression among young adults. *Ann Fam Med* 2005;3:38–46. [PubMed: 15671189]
26. Michie S, Dormandy E, Marteau TM. Increasing screening uptake amongst those intending to be screened: the use of action plans. *Patient Educ Couns* 2004;55:218–222. [PubMed: 15530757]
27. Becker MH, Maiman LA. Sociobehavioral determinants of compliance with health and medical care recommendations. *Medical Care* 1975;13:10–24. [PubMed: 1089182]
28. Bandura A. Health promotion by social cognitive means. *Health Educ Behav* 2004;31:143–164. [PubMed: 15090118]
29. Kinney AY, Bloor LE, Martin C, Sandler RS. Social ties and colorectal cancer screening among Blacks and Whites in North Carolina. *Cancer Epidemiol Biomarkers Prev* 2005;14:182–189. [PubMed: 15668494]
30. Berkman, LF.; Glass, T. *Social Integration, Social Networks, Social Support, and Health*. In: Berkman, LF.; Kawachi, I., editors. *Social Epidemiology*. New York, NY: Oxford Press; 2000.

31. Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? *J Health Soc Behav* 1995;36:1–10. [PubMed: 7738325]
32. Elder JP, Ayala GX, Harris S. Theories and intervention approaches to health-behavior change in primary care. *Am J Prev Med* 1999;17:275–284. [PubMed: 10606196]
33. Goldberg DP, Gater R, Sartorius N, et al. The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychological Medicine* 1997;27:191–197. [PubMed: 9122299]
34. Sherbourne CD, Stewart AL. The MOS Social Support Survey. *Social Sci Med* 1991;32(6):705–714.
35. Saranson IG, Saranson BR, et al. A brief measure of social support: Practical and theoretical implications. *J Social Personal Relationship* 1987;4:497–510.
36. Scherl WF, Krupp LB, Christodoulou C, et al. Normative data for the selective reminding test: a random digit dialing sample. *Psychol Rep* 2004;95:593–603. [PubMed: 15587227]
37. Potthoff RF. Telephone sampling in epidemiologic research: to reap the benefits, avoid the pitfalls. *Am J Epidemiol* 1994;139:967–978. [PubMed: 8178785]
38. Kawas C, Karagiozis H, Resau L, Corrada M, Brookmeyer R. Reliability of the Blessed Telephone Information-Memory-Concentration Test. *J Geriatr Psychiatry Neurol* 1995;8:238–242. [PubMed: 8561839]
39. Joreskog, KG. Structural equation modeling with ordinal variables using LISREL. 2005. <http://www.ssicentral.com/lisrel/techdocs/ordinal.pdf>
40. Joreskog, KG.; Sorbom, D. PRELIS 2 user's Reference Guide. Chicago: Scientific Software International; 1999.
41. Joreskog, KG.; Sorbom, D. LISREL 8 User's Reference guide. Chicago: Scientific Software International; 1999.
42. Hu LT, Bentler PM, Kano Y. Can test statistics in covariance structure analysis be trusted? *Psychol Bull* 1992;112:351–362. [PubMed: 1454899]
43. Lafata JE, Williams LK, Ben-Menachem T, Moon C, Divine G. Colorectal carcinoma screening procedure use among primary care patients. *Cancer* 2005;104:1356–1361. [PubMed: 16092119]
44. Harewood GC, Wiersema MJ, Melton LJ 3rd. A prospective, controlled assessment of factors influencing acceptance of screening colonoscopy. *Am J Gastroenterol* 2002;97:3186–3194. [PubMed: 12492209]
45. Hur HK, Kim GY, Park SM. Predictors of mammography participation among rural Korean women age 40 and over. *Taehan Kanho Hakhoe Chi* 2005;35:1443–1450. [PubMed: 16415625]
46. Friedman LC, Puryear LJ, Moore A, Green CE. Breast and colorectal cancer screening among low-income women with psychiatric disorders. *Psychooncology* 2005;14:786–791. [PubMed: 15690427]
47. Denberg TD, Melhado TV, Coobes JM, et al. Predictors of nonadherence to screening colonoscopy. *J Gen Intern Med* 2005;20:989–995. [PubMed: 16307622]
48. Werner P, Heinik J. Intentions of first-degree relatives of patients with Alzheimer's disease to seek a cognitive examination. *Int J Geriatr Psychiatry* 2004;19:479–486. [PubMed: 15156550]
49. Werner P. Knowledge about symptoms of Alzheimer's disease: correlates and relationship to help-seeking behavior. *Int J Geriatr Psychiatry* 2003;18:1029–1036. [PubMed: 14618555]
50. Zapka JG, Taplin SH, Solberg LI, Manos MM. A framework for improving the quality of cancer care: the case of breast and cervical cancer screening. *Cancer Epidemiol Biomarkers Prev* 2003;12:4–13. [PubMed: 12540497]

Figure 1. Conceptual Model Explaining Intention to Screen

Depicted here is the conceptual model to test intention to undergo cognitive screening for dementia. The BMHSU served as the conceptual framework with three constructs: predisposing factors, enabling factors, and needs factors. Two additional constructs were added to the model: self-efficacy and preventive health behaviors. The model proposes to test factors that directly and/or indirectly influence intention to screen for memory loss.

Figure 2. Schematic of Random Digit Dialing Process

A total of 31341 phone numbers were generated and 14849 calls were made. A total of 7289 contacts with private residences were made; 1313 individuals refused to speak with the interviewers. Eligibility criteria was not met in 4531 contacts (no one over age 50, Short Blessed scores >6, non-English speaking). Of 1445 individuals who met eligibility and started the interview, 1039 (72%) completed the entire questionnaire. Further details of RDD process is found in the text.

Figure 3. SEM model explaining Screening Behavior in Older Adults

The best-fitting model elicited five constructs representing predisposing and needs domains (constructs from the *Behavioral Model of Health Services Use*), Self-Efficacy and Preventive Health Behaviors that best explained intention of the older adult to undergo cognitive screening for dementing illness. Standardized parameter estimates ($\pm$ standard errors) are shown for the structural model (Model fit indices: $\chi^2(212) = 460.5$, $p < 0.01$, RMSEA=0.04, CFI=0.98, RFI=0.96). See text for complete description of constructs.

Table 1
Key Survey Questions Highly Correlated with Latent Constructs Explaining
Intention

Knowledge	
1.	If the screening test for memory loss showed that my risk is high, it might have a large financial burden on me and my family.
Perceived Benefits	
2.	Diagnosing memory loss at a very mild stage will allow me to get medication to treat it.
3.	Early diagnosis will allow me to plan my life.
Preventive Health Behaviors	
1.	I have regular mammograms (if female) or prostate checks (if male)
2.	I have regular colonoscopy examinations
3.	I see the dentist regularly
Perceived Susceptibility	
1.	Compared to other people my age, I have a pretty good chance of getting Alzheimer's disease.
2.	As I age, I am more likely to get Alzheimer's disease.
Self-Efficacy	
1.	I am confident I can get a screening test for memory loss.
2.	I am confident I could find out about how to get a screening test for memory loss.
3.	I am confident I can ask my doctor for a referral to get a screening test for memory loss.

Table 2

Sample Characteristics by Geographic Strata

Variable	Urban		Suburban		Rural		p-value
	No.	%	No.	%	No.	%	
Age, y (SD)	349	62.4 (10.3)	351	62.2 (9.9)	339	62.4 (10.3)	ns
Gender, % Women	233	66.4	229	68.1	225	66.0	ns
Ethnicity							<0.01
White	227	68.2	307	91.4	329	98.8	
Black	96	28.8	25	7.4	0	0	
Other	10	3.0	4	1.2	4	1.2	
Education							0.003
Less than High School	25	7.5	8	2.4	26	7.8	
High School	85	25.5	83	24.7	101	30.4	
College or Higher	223	67.0	245	72.9	205	61.8	
Marital Status							<0.01
Married	114	32.5	191	54.4	198	58.1	
No Longer Married	177	50.4	133	37.9	126	37.0	
Never Married	60	17.1	27	7.7	17	5.0	
Having Children, % Yes	258	73.5	307	87.5	295	86.5	<0.01
Church Attendance, % Yes	223	68.0	222	67.3	216	65.5	ns
Personal Experience							ns
Family History of AD	349	26.4	351	23.5	339	21.6	
Friends with AD	349	30.0	351	38.4	339	38.1	
Personal Health Ratings							
Physical (Good or better)	349	61.8	351	74.7	339	67.9	.005
Mental (Good or better)	349	82.6	351	87.5	339	82.3	ns
Short Blessed Scores (SD)	349	1.8 (2.3)	351	1.4 (2.2)	339	1.8 (2.3)	ns

ns = not significant