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Original Research

Alzheimer's Disease Biomarker Decision-Making among Patients with Mild Cognitive Impairment and Their Care Partners

C.G. Cox[1], C.R. Salazar[2], A.I. Birnbaum[3], M. Witbracht[2], S.P. Tam[2,4], G.T. Thai[2,5], S.A. Sajjadi[2,5], D.L. Gillen[2,3], J.D. Grill[2,6,7]

1. Department of Health Behavior and Health Education, University of Michigan, Ann Arbor, MI, USA; 2. Institute for Memory Impairments and Neurological Disorders, University of California, Irvine, CA, USA; 3. Department of Statistics, University of California, Irvine, CA, USA; 4. Department of Family Medicine, University of California, Irvine, CA, USA; 5. Department of Neurology, University of California, Irvine, CA, USA; 6. Department of Psychiatry and Human Behavior, University of California, Irvine, CA, USA; 7. Department of Neurobiology and Behavior, University of California, Irvine, CA, USA

Corresponding Author: Chelsea G. Cox, Department of Health Behavior and Health Education, University of Michigan School of Public Health, 1415 Washington Heights, Ann Arbor, MI 48109-2029, USA, email: chelseak@umich.edu

Abstract

BACKGROUND: Alzheimer's disease (AD) biomarker tests can be ordered as part of the diagnostic workup of patients with mild cognitive impairment (MCI). Little is known about how patients with MCI and their care partners decide whether to pursue testing.

OBJECTIVE: To examine factors that influence AD biomarker testing decisions among patients with MCI and their care partners.

DESIGN: We performed structured research interviews with patients with MCI and their study partners to assess the importance of eight factors in the decision whether to undergo AD biomarker testing (6-point Likert scale; 1-extremely unimportant to 6-extremely important): cost, fear of testing procedures, learning if AD is the cause of cognitive problems, concern about health insurance, instructing future planning, informing treatment decisions, family members' opinions, and doctor recommendation.

SETTING: Two researchers administered interviews with participants in-person (i.e., participant home, research center) or remotely (i.e., telephone, video-conference).

PARTICIPANTS: We completed interviews with 65 patients with a diagnosis of MCI and 57 study partners, referred by dementia specialist clinicians from the University of California, Irvine health system.

MEASUREMENTS: We used generalized estimating equations (GEE) to examine the mean importance of each factor among patients and study partners, and the mean difference in importance of each factor within dyads.

RESULTS: One third of participants reported the patient had previously undergone AD biomarker testing. Fifty-five percent of patients and 65% of study partners who reported no previous testing indicated a desire for the patient to be tested. GEE analyses found that patients and study partners rated the following factors with highest importance: informing treatment decisions (mean score 5.29, 95% CI: 5.06, 5.52 for patients; mean score 5.56, 95% CI: 5.41, 5.72 for partners); doctor recommendation (4.94, 95% CI: 4.73, 5.15 for patients; 5.16, 95% CI: 4.97, 5.34 for partners); and instructing future planning (4.88, 95% CI: 4.59, 5.16 for patients; 5.11, 95% CI: 4.86, 5.35 for partners). High dyadic agreement was observed for all factors except fear of testing, which patients rated with lower importance than their study partners.

CONCLUSIONS: Biomarker testing for AD in patients with MCI is a rapidly evolving practice and limited data exist on patient perspectives. In this study, most patients and their care partners were interested in testing to help inform treatment decisions and to plan for the future. Participants placed high importance on clinician recommendations for biomarker testing, highlighting the need for clear communication and education on the options, limitations, risks, and benefits of testing.

Key words: Alzheimer's disease, mild cognitive impairment, biomarkers.

Introduction

Mild cognitive impairment (MCI) is a clinical syndrome characterized by memory or other cognitive changes that are noticeable but do not interfere with activities of daily living (1). In the United States, approximately 12% to 18% of people age 60 and older are living with MCI, and the prevalence increases with age (2). MCI is a syndromic diagnosis and can be challenging for clinicians, patients, and families confronted with an unclear etiology and uncertain prognosis (3). It is estimated that 10% to 15% of individuals with MCI progress to dementia each year (4); however, some never progress and some revert to normal cognition (5, 6).

Individuals with MCI due to Alzheimer's disease (AD) (7) compared to another cause may be at increased risk to progress to dementia (8-10). Over the past decade, the US Food and Drug Administration has approved clinical use of biomarker tests for AD, including positron emission tomography (PET) imaging compounds (11-14) and cerebrospinal fluid (CSF) markers (15) for the detection of amyloid beta and tau proteins in the brain, key pathological features of AD. Appropriate Use Criteria for AD biomarkers were published in 2013 for amyloid PET imaging (16) and 2018 for CSF biomarkers (17), both indicating patients with MCI as appropriate for biomarker testing. Though biomarker testing is available, it is not routinely used in the

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diagnostic workup of patients with MCI, in part due to cost and lack of coverage by Medicare and private insurers that cite insufficient evidence of clinical utility (18, 19). This may change, however, as the Centers for Medicare and Medicaid Services reconsider National Coverage Determination as new evidence of the clinical value of biomarker testing (20) and treatments for which biomarker testing is needed to instruct prescribing emerge (21, 22). For example, Imaging Dementia – Evidence for Amyloid Scanning (IDEAS), a multi-site study of clinical amyloid imaging in 11,000 Medicare beneficiaries with MCI or dementia, found that clinicians made frequent changes in diagnoses and medical management (i.e., prescribed medications) in patients with MCI based on amyloid PET results (20).

A critical component of advancing AD biomarker testing in clinical practice is to understand the patient and care partner perspective to facilitate informed, shared decision-making between clinicians and their patients with MCI. Most studies on this topic have been conducted in cognitively unimpaired participants who received biomarker testing and results in structured research settings (e.g., clinical trials) (23, 24). Here, we report results from an interview study with memory clinic patients diagnosed with MCI and their family members about their experiences with, and attitudes toward, AD biomarker testing in the context of clinical care.

Methods

Overview

We performed structured research interviews with patients with MCI and their care partners from August 2019 to May 2021. Before the COVID-19 pandemic, participants were interviewed in-person in their homes or at the research center. During the pandemic participants were interviewed remotely over the telephone or over a secure, HIPAA-compliant, video-conferencing platform. Interviews took approximately 30 to 60 minutes to complete, were audio-recorded, and were performed separately for patients and their study partners to minimize potential influence on responses. All patients and study partners signed an informed consent form or provided verbal consent to participate in the study and received compensation for their participation. The study was reviewed and approved by the University of California, Irvine (UCI) Institutional Review Board.

Study population

Three UCI health system dementia specialist clinicians, including two neurologists (GTT and SAS) and one geriatrician (SPT), referred 176 patients who met Petersen criteria for MCI (1) during the 22-month period of the study. Newly diagnosed and returning patients with presumed underlying neurodegenerative etiology were eligible. Exclusion criteria included other neurological disorders that can cause cognitive impairment, psychiatric diagnoses, and history of cancer (except for basal and squamous cell skin cancers) in the previous five years. Patients were contacted up to three times via telephone and/or email to receive information about the study and to schedule an interview. Patients who were interested in participating were asked to identify a close family member or friend who could also be contacted to participate in a separate interview, though availability of a study partner was not required for patient enrollment in the study.

Data collection

Two researchers (CGC and CRS) performed structured interviews with patients and study partners from the same dyad. Before the interview, we administered the 30-item or a modified 22-item telephone version of the Montreal Cognitive Assessment (MoCA (25), T-MoCA (26)). We read scripted educational primers on the MCI diagnosis and AD biomarker testing to patients and study partners. We then used a series of questions with Likert-type responses to examine previous experience with AD biomarker testing, interest in AD biomarker testing, and factors important to the decision whether to have AD biomarker testing. Data were collected and managed using Research Electronic Data Capture (REDCap) (27).

Experience with biomarker testing

We asked whether the patient's doctor had ever discussed AD biomarker testing (yes; no; don't know) and whether the patient had ever had an AD biomarker test (yes; no; don't know). If the patient or study partner indicated the patient had undergone an AD biomarker test in the past, we asked them to specify the type of test (amyloid PET scan; fluorodeoxyglucose (FDG) PET scan; lumbar puncture for cerebrospinal fluid (CSF) protein analysis; other) and the result (elevated brain amyloid/supported AD; not elevated brain amyloid/did not support AD; don't know; other).

Interest in biomarker testing

If the patient or study partner reported the patient had not undergone an AD biomarker test in the past or they did not know, we asked two follow-up questions: "Would you want to have a biomarker test for AD, such as a brain amyloid PET scan or lumbar puncture?" (5-point Likert scale ranging from definitely yes to definitely not); "How likely are you to have a biomarker test for AD, such as a brain amyloid PET scan or lumbar puncture?" (6-point Likert scale ranging from extremely likely to extremely unlikely).

Reasons for biomarker testing

We asked all participants, regardless of past experiences and attitudes about AD biomarker testing, to rate the importance of eight different factors in their

decision whether to have a biomarker test for AD. Factors were determined based on a pilot study (28) and included: (1) cost of the test, (2) patient fear of testing procedures, (3) to learn if AD is the cause of cognitive problems, (4) concern that result may affect health insurance, (5) to help instruct future planning, (6) to help the doctor make treatment decisions, (7) family members' opinions about testing, and (8) doctor recommendation. Patients and study partners rated the importance of each factor independently on a 6-point Likert scale ranging from extremely unimportant to extremely important.

Sociodemographic characteristics. Patients and their study partners self-reported sociodemographic characteristics including age, sex (male or female), race (White, African American, Asian/Pacific Islander, Native American/Eskimo, Other), ethnicity (Hispanic, Non-Hispanic), years of education, marital status (single/never-married, married, separated, divorced, widowed), employment status (full-time employed, part-time employed, retired), and relationship of the study partner to the patient with MCI (spouse/partner, adult child, other, no one available). Race and ethnicity were collapsed into mutually exclusive categories (non-Hispanic White, non-Hispanic Asian, Hispanic, Other).

Statistical analyses

Descriptive statistics for the patients and study partners were reported as mean (standard deviation) for continuous variables and count (percent) for categorical variables. We similarly quantified patients' and study partners' experiences and interest in AD biomarker testing. Our primary outcome was the patient ratings of importance of the eight factors in the decision whether to undergo biomarker testing. Secondary outcomes included partner ratings of importance for each factor and vectors of intra-dyad (patient minus partner) differences in importance ratings for each factor. In regression analyses we modeled these as continuous outcomes. To estimate and perform inference on mean importance ratings for each factor as well as differences between mean importance ratings we fit generalized estimating equations (GEE) (29) to each of the outcomes listed above. Each model consisted of an intercept term for an arbitrary reference decisional factor and indicator variables corresponding to each other decisional factor. In these models, the intercept represents the mean importance rating for the reference factor (arbitrarily chosen to be the cost of the test) and model coefficients for each indicator variable represent the mean difference in importance rating between the factor corresponding to that indicator variable and the reference factor.

We chose GEE to allow us to control for potential correlation between importance ratings across factors within patients, partners, and dyads. We used an unstructured working correlation matrix to allow for the possibility that some factor importance ratings might be positively correlated while others might be negatively correlated. Mean importance ratings for each decisional factor (or mean differences in importance ratings in the case of the model using intra-dyad importance score differences) were all formulated as linear contrasts of coefficients from these GEE models. To investigate whether importance ratings systematically differed by interview modality, we performed exploratory analogous GEE models stratified by interview type.

There were no missing importance scores for any patient or study partner. Eight patients did not have a corresponding partner and one partner did not have a corresponding patient. These dyads were necessarily omitted from the intra-dyad analysis. All confidence intervals and p-values were constructed using Wald statistics and robust standard errors (30). Our primary hypothesis test was an omnibus multivariate Wald test of the null hypothesis that patients have the same mean importance ratings across all decisional factors. Analogous omnibus tests for secondary outcomes, confidence intervals for mean importance ratings on individual factors, and confidence intervals for pairwise differences between factor mean importance ratings were all treated as secondary analyses and no corrections for multiple comparisons were performed. Therefore, p-values reported for these secondary analyses should be interpreted accordingly. We performed these analyses in R version 4.2.2 using the `geepack' package.

Results

Sociodemographic characteristics

Of the 176 patients referred to this study, we were unable to reach 61 patients and 50 patients declined participation. We completed interviews with 65 patients with MCI and 57 study partners. Of the latter, 84% were a spouse or partner, 11% were adult children, and 5% were another relation to the patient (Table 1). Eight patients were unable or unwilling to identify a study partner who could participate in the interview. Forty-six percent of patients completed the interview in-person in their homes (n=11) or at the research center (n=19), and 54% of patients completed the interview remotely via telephone (n=12) or video-conferencing (n=23). The mean score for the standard in-person MoCA was 21.1 (3.4) out of 30 and for the remote T-MoCA was 16 (3.1) out of 22, consistent with average scores among patients with MCI in previous studies (25, 26). We found no meaningful differences in the distribution of sociodemographic characteristics between those in-person compared to remotely. Two-thirds of MCI patients were male, 88% were non-Hispanic White, 6% were non-Hispanic Asian, and 5% were Hispanic. On average (SD), patients were 74.9 (8.4) years of age and had 16.8 (2.0) years of education. Among study partners, 74% were female, 91% were non-Hispanic White, 7% were non-Hispanic Asian, and one partner was Hispanic. Study partners were, on average, 70.3 (13.6)

Table 1. Sociodemographic characteristics of study participants (n=122)

Characteristic	Patients (n=65)	Study Partners (n=57)
Age in years, mean (SD)	74.9 (8.4)	70.3 (13.6)
Education in years, mean (SD)	16.8 (2.0)	16.6 (2.2)
Female sex, n (%)	22 (33.9)	42 (73.7)
Race and ethnicity, n (%)		
White, non-Hispanic	57 (87.7)	52 (91.2)
Asian, non-Hispanic	4 (6.2)	4 (7.0)
Hispanic	3 (4.6)	1 (1.8)
Other race, non-Hispanic	1 (1.5)	0
Employment status, n (%)		
Retired	54 (83.1)	46 (80.7)
Part-time work	7 (10.8)	5 (8.8)
Full-time work	4 (6.2)	6 (10.5)
Marital status, n (%)		
Married/partnered	51 (78.5)	51 (89.5)
Divorced	8 (12.3)	0
Widowed	5 (7.7)	3 (5.5)
Single	1 (1.5)	3 (5.5)
Relationship to the patient, n (%)		
Spouse/partner	-	48 (84.2)
Adult child	-	6 (10.5)
Other family/friend	-	3 (5.3)
MoCA, mean (SD)	21.1 (3.4)	-
T-MoCA, mean (SD)	16.0 (3.1)	-

Abbreviations: SD, standard deviation; MCI, mild cognitive impairment; MoCA, Montreal Cognitive Assessment; T-MoCA, telephone-based Montreal Cognitive Assessment

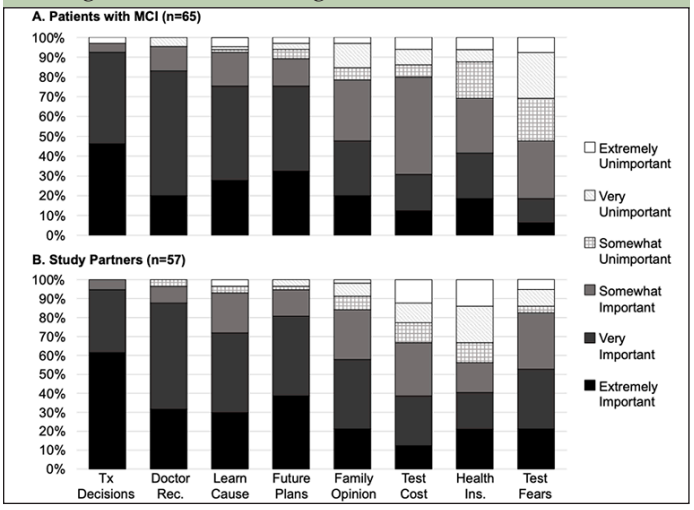
years of age and had 16.6 (2.2) years of education. Most patients (83%) and study partners (81%) were retired.

Experience with and interest in biomarker testing

Thirty-one percent of patients and 46% of study partners said they had discussed biomarker testing for AD with the patient's doctor (Table 2). Around a third of patients and study partners reported the patient had undergone biomarker testing (n=23 patients, n=20 study partners). Among those who reported previous biomarker testing, nearly half of patients (n=12) and a quarter of study partners (n=5) were unaware of the result. The most frequently reported biomarker procedure undergone was lumbar puncture, followed by amyloid PET scan.

Among participants who had not undergone testing in the past or did not know whether the patient had undergone testing in the past (n=42 patients, n=37 study partners), 55% of patients and 65% of study partners reported they would probably or definitely want the patient to have a biomarker test for AD. Most others (33% of patients, 27% of study partners) were unsure. Forty-three percent of patients and 41% of study partners reported the patient would be very or extremely likely to have a biomarker test for AD, while 41% of patients and 46% of study partners reported they would be somewhat likely.

Figure 1. Patient (A) and study partner (B) self-reported importance of eight factors in decision whether to undergo biomarker testing for Alzheimer's disease



The stacked bar chart presents raw proportions of importance ratings for each factor among patients and study partners. Corresponding interview questions for each factor (left to right) – "Tx Decisions": How important is it that test results could help your doctor and you [patient] make treatment decisions?; "Doctor Rec.": How important is the doctor's recommendation to have the test?; "Learn Cause": How important is the opportunity to learn whether or not Alzheimer's disease is the mostly likely cause of your [patient's] mild cognitive problems?; "Future Plans": How important are test results to help instruct future planning, such as financial and legal decisions?; "Family Opinion": How important are your [patient's] family members' opinions about testing?; "Test Cost": How important is the cost of the test?; "Health Ins": How important are your concerns that test results may affect your [patient's] health insurance?; "Test Fears": How important are your [patient's] fears related to the testing procedure?

Table 2. Experience with and interest in Alzheimer's disease biomarker testing

Experience with biomarker testing	Patients (n=65)	Study Partners (n=57)
Have discussed biomarker testing with patient's doctor, n (%)		
Yes	20 (30.8)	27 (45.6)
No	34 (52.3)	26 (47.4)
Don't know	11 (16.9)	4 (7.0)
Patient has undergone biomarker testing, n (%)		
Yes	23 (35.4)	20 (35.1)
No	34 (52.3)	36 (63.2)
Don't know	8 (12.3)	1 (1.8)
If tested, type of test	(n=23)	(n=20)
Amyloid PET scan	5	6
FDG PET scan	3	2
Lumbar puncture	11	9
Don't know	8	4
Other	4	4
If tested, biomarker result	(n=23)	(n=20)
Elevated amyloid or supported AD	6	6
Not elevated amyloid or did not support AD	3	4
Don't know	12	5
Other	2	8
Interest in biomarker testing if not previously tested	**Patients (n=42)**	**Study Partners (n=37)**
Would want biomarker test for patient, n (%)		
Definitely yes or probably yes	23 (54.8)	24 (64.9)
Not sure	14 (33.3)	10 (27.0)
Definitely not or probably not	5 (11.9)	3 (8.1)
Likelihood of patient to have biomarker test, n (%)		
Extremely likely or very likely	18 (42.9)	15 (40.5)
Somewhat likely	17 (40.5)	17 (46.0)
Somewhat unlikely	3 (7.1)	1 (2.7)
Extremely unlikely or very unlikely	4 (9.5)	4 (10.8)

Abbreviations: MCI, mild cognitive impairment; PET, positron emission tomography; FDG, fluorodeoxyglucose; AD, Alzheimer's disease

Reasons for biomarker testing

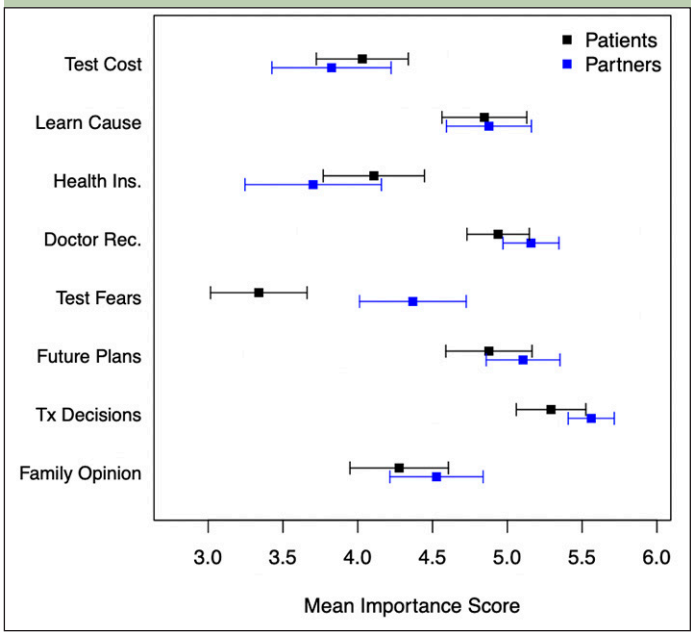
Participants (92% of patients and 95% of study partners) most frequently indicated that helping to inform treatment decisions was extremely or very important to the decision whether to have biomarker testing (Figure 1). The doctor's recommendation to have the test was the next most frequently endorsed reason (83% of patients and 88% of study partners), followed by instructing future planning (75% of patients and 81% of study partners), and learning if AD is the cause of the patient's cognitive problems (75% of patients and 72% of study partners).

GEE analyses found significant differences across mean importance ratings of decisional factors for both patients and their study partners ($p < 0.001$ for both omnibus tests). Figure 2 presents a forest plot containing point estimates and 95% confidence intervals for mean importance ratings by factor for patients and study partners. The factor with the highest estimated mean importance for both patients and study partners was the potential for biomarker testing to help inform treatment decisions (mean score 5.29, 95% CI: 5.06, 5.52 for patients; mean score 5.56, 95% CI: 5.41, 5.72 for partners) followed by the doctor's recommendation to have the test (4.94, 95% CI: 4.73, 5.15 for patients; 5.16, 95% CI: 4.97, 5.34 for partners) and to help instruct future planning (4.88, 95% CI: 4.59, 5.16 for patients; 5.11, 95% CI: 4.86, 5.35 for partners). The factor with the lowest mean importance rating for patients was fear of testing procedures (3.33, 95% CI: 3.02, 3.66) while for partners it was concerns that the result may affect health insurance (3.70, 95% CI: 3.25, 4.16).

Figure 3 presents a forest plot of the intra-dyad differences in mean importance ratings (patient rating minus study partner rating) by factor. Overall, patients and their study partners tended to rate factors with similar importance. Patients, however, tended to rate fear of testing procedures as significantly less important than their study partners (estimated intra-dyad mean difference: -1.04, 95% CI: -1.52, -0.55, $p < 0.001$). No other intra-dyad difference was significantly non-zero, though we observed a moderate and near significant difference for concerns that the result may affect health insurance

(0.41, 95% CI: -0.09, 0.92, p = 0.11). In analyses stratified by interview type (in-person vs. remote), we found no overall systematic pattern of differences in importance ratings. Additionally, with possible exception of participants' ratings of informing future plans (estimated difference in mean of 0.58, p = 0.05), we observed no differences for the individual factors.

Figure 2. Forest plot of patient and study partner mean importance scores for eight factors in decision whether to undergo biomarker testing for Alzheimer's disease

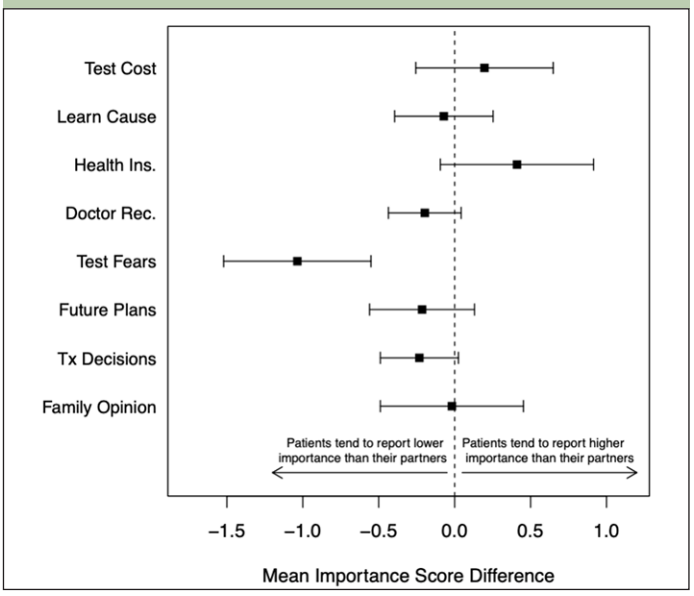


The forest plot presents point estimates and 95% confidence intervals for mean importance ratings of each factor among patients and study partners, based on GEE analyses. The factor with the highest estimated mean importance for both patients and study partners was the potential for biomarker testing to help inform treatment decisions ("Tx Decisions" mean score 5.29, 95% CI: 5.06, 5.52 for patients; mean score 5.56, 95% CI: 5.41, 5.72 for partners) followed by the doctor's recommendation to have the test ("Doctor Rec." mean score 4.94, 95% CI: 4.73, 5.15 for patients; 5.16, 95% CI: 4.97, 5.34 for partners) and to help instruct future planning ("Future Plans" mean score 4.88, 95% CI: 4.59, 5.16 for patients; 5.11, 95% CI: 4.86, 5.35 for partners). The factor with the lowest mean importance rating for patients was fear of testing procedures ("Test Fears" mean score 3.33, 95% CI: 3.02, 3.66) and for study partners was concerns that the result may affect health insurance ("Health Ins." mean score 3.70, 95% CI: 3.25, 4.16).

Discussion

This study explored patient and care partner experiences with and attitudes toward biomarker testing for AD in specialist clinical settings. About a third of participants in this study reported having previously undergone biomarker testing for AD. Among those who had not, most indicated they would want a biomarker test and more than 80% said they were at least somewhat likely to undergo testing in the future. Patients and care partners were mostly aligned in their reasons for wanting a biomarker test for AD, reporting that helping inform treatment decisions, the doctor's recommendation for testing, future planning, and learning if AD is the cause of the patient's cognitive problems were highly important factors. These findings are consistent with previous qualitative research examining patient and care partner motivations for pursuing amyloid PET imaging (31) and emphasize the need for clear communication between clinicians and patients about biomarker testing options and potential outcomes.

Figure 3. Forest plot of intra-dyad mean importance score differences for eight factors in decision whether to undergo biomarker testing for Alzheimer's disease



The forest plot presents intra-dyad differences in mean importance ratings (patient rating minus study partner rating) by each factor, based on GEE analyses. Overall, patients and their study partners tended to rate factors with similar importance. Patients with MCI tended to rate fear of testing procedures as significantly less important than their study partners ("Test Fears" estimated intra-dyad mean difference: -1.04, 95% CI: -1.52, -0.55, p < 0.001). No other intra-dyad difference was significantly non-zero, though a moderate and near significant difference was observed for concerns that the result may affect health insurance ("Health Ins." estimated intra-dyad mean difference: 0.41, 95% CI: -0.09, 0.92, p = 0.11).

In this study, more than half of participants reported not discussing or not knowing whether they had discussed the option of AD biomarker testing with their doctor. Among the third of participants who indicated the patient had undergone biomarker testing, many patients and care partners were unaware of the result. Several not mutually exclusive scenarios could explain these findings. First, this could be attributed to challenges in recall or comprehension among cognitively impaired participants. Previous research also suggests, however, that there is inconsistency in whether and how clinicians approach MCI diagnosis and biomarker testing (32, 33). For example, an observational study of clinician-patient interactions in memory clinics found clinicians differed in how they communicated the MCI diagnosis, implicitly discouraged biomarker testing, and rarely addressed risk of progression to dementia and long-term care planning (32). On the other hand, surveys of dementia specialists have shown support for biomarker testing and disclosure with the appropriate guidance and protocols for communicating the information to patients (34-36). Finally, these results could suggest that for at least a small

portion of patients, the discussion of biomarker testing, or even learning results, simply may not be a life-altering experience.

For the most part, patients and their care partners demonstrated a high degree of concordance in their decision-making approaches and reasons for biomarker testing. One notable difference, however, was that care partners rated fear of biomarker testing procedures (i.e., amyloid PET scan, lumbar puncture) as more important in the decision whether to undergo testing than did patients. Though our data do not explain why this difference was observed, we note that in the AD clinical trial decision-making literature, caregivers acknowledge internalizing patient safety risks (37), and caregiver attitudes toward safety are particularly salient in trial enrollment decisions (38).

Recommendations on communicating biomarker information to patients with MCI have previously been published (39-41). Lingler and colleagues evaluated a research biomarker disclosure protocol using satisfaction surveys, comprehension assessments, and focus group data. They found that with pre- and post-biomarker disclosure counseling, educational materials including clear graphics and images, and communication with primary care providers, patients with MCI and their partners demonstrated comprehension of testing limitations and were highly satisfied with the method of education (39). While their study addressed research protocols specifically, expert stakeholders (40) have similarly recommended that patients with MCI who are deemed appropriate (16) be offered the opportunity to discuss AD biomarker testing. This discussion should include the possible outcomes and implications of results, limitations of testing, and cost of the procedure. The guidance also includes exemplary language clinicians might use in sharing results with patients and their families (40, 41).

Though health insurers do not consistently cover the cost of AD biomarker tests (i.e., amyloid PET scans) and few protections are in place to prevent them from using results for future coverage decisions, cost of testing and implications to health insurance were not rated as highly important factors among patients and care partners in this study. While our data do not explain these lower ratings, their occurrence may underscore the importance of addressing potential misconceptions or unintended consequences of AD biomarker testing in patients with MCI. For example, previous qualitative research interviews with patients who have undergone amyloid PET imaging and their care partners have found frequent misconceptions about the capacity of testing, such as the expectation to receive a definitive diagnosis of AD (31, 42). While some studies have found that patients and care partners experience relief in learning the likely cause of cognitive problems, other studies suggest some patients experience emotional difficulty (43). The potential consequences of stigma and discrimination (e.g., long-term care insurance, employment) against people who have evidence of AD biomarkers is another important consideration (44, 45). A survey of U.S. adults found that half of respondents would expect a person with AD to be discriminated against by employers, excluded from medical decision-making, and denied health insurance based on biomarker results (46). Likewise, recent focus group studies performed with patients, care partners, and clinicians have revealed a diversity of social and ethical considerations in the decision whether to pursue AD biomarker testing and diagnosis (e.g., suicidality, inter-family conflicts of interest) (47, 48).

Limitations

While this study is novel and adds to the limited literature on patient and care partner perspectives toward AD biomarker testing, we note some important limitations. Patients in this study were referred from dementia specialists at an academic medical center, which may have resulted in a larger number of patients and care partners informed of (or having undergone) biomarker testing for AD compared to non-academic and non-specialist settings. Patients and care partners were predominantly non-Hispanic White and college-educated and thus not representative of the larger population of patients living with cognitive impairment. To ensure equitable access to dementia healthcare, more research on patient perspectives toward AD biomarker testing in diverse racial and ethnic groups will be critical. The data presented may have been influenced by various factors, including measures relying on recall from cognitively impaired participants and the Covid-19 pandemic that impacted clinical research protocols and patient interactions with healthcare systems. Finally, the landscape of AD clinical care is evolving. Blood biomarkers have entered clinical practice and new treatments have received regulatory approval. The data in this study were collected prior to widescale implementation of either of these advances and may hold limited generalizability now that these changes have occured.

Conclusions

In this study, we found that most patients with MCI and their care partners were interested in biomarker testing to help inform the care provided by their clinician and their own planning for the future. Given the importance placed on the clinical interaction and the strong interest in biomarker testing among patients with MCI and their care partners, resources to facilitate this clinician-patient communication, particularly as biomarkers become more prevalent, will be a key area of need.

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study; in the collection, analysis, and interpretation of data; in the preparation of the manuscript; or in the review or approval of the manuscript.

Conflict of interest: On behalf of all authors, the corresponding author states that there is no conflict of interest.

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Author contributions: CGC, CRS, DLG and JDG designed the study. DLG and JDG secured funding for the project. AIB and CRS performed the analyses. CGC drafted the manuscript. All authors edited and approved the final manuscript for publication.

Ethical standards: This research study was approved by the University of California, Irvine Institutional Review Board and conducted within the standards put forward by the Declaration of Helsinki.

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