



Published in final edited form as:

J Alzheimers Dis. 2020 ; 78(4): 1409–1417. doi:10.3233/JAD-200700.

Impact of Patient Mild Cognitive Impairment on Physician Decision-making for Treatment

Emilie Blair, BA^{1,3}, Darin Zahuranec, MD, MS², Kenneth M. Langa, MD, PhD^{3,4,5,6}, Jane Forman, ScD, MHS^{3,4,5}, Bailey K. Reale, MPH³, Colleen Kollman, MBA⁷, Bruno Giordani, PhD⁸, Deborah A. Levine, MD, MPH^{2,3,4}

¹University of Michigan (U-M), Ann Arbor, MI

²Department of Neurology and Stroke Program, U-M, Ann Arbor, MI

³Department of Internal Medicine and Cognitive Health Services Research Program, U-M Medical School, Ann Arbor, MI

⁴Institute for Healthcare Policy and Innovation, U-M, Ann Arbor, MI

⁵VA Ann Arbor Healthcare System, Ann Arbor, MI

⁶Institute for Social Research, U-M, Ann Arbor, MI

⁷Kollman Research Services, Ann Arbor, MI

⁸Department of Psychiatry and Michigan Alzheimer's Disease Center, U-M, Ann Arbor, MI

Abstract

Background: Older patients with mild cognitive impairment (MCI) should receive evidence-based treatments when clinically indicated. However, patients with MCI appear less likely than cognitively normal patients to receive evidence-based treatments.

Objective: To explore the influence of a patient's MCI diagnosis on physician decision-making.

Methods: Qualitative study of 18 physicians from cardiology, neurology, and internal medicine using semi-structured interviews. We sought to understand whether and how a patient's having MCI has influenced physicians' decisions about five categories of treatments or tests (surgery, invasive tests, non-invasive tests, rehabilitation, and preventive medication). We used qualitative content analysis to identify the unifying and recurrent themes.

Results: Most physician participants described MCI as influencing their recommendations for at least one treatment or test. We identified two major themes as factors that influenced physician recommendations in patients with MCI: Physicians assume that MCI patients' decreased cognitive ability will impact treatment; and physicians assume that MCI patients have poor health status and physical functioning that will impact treatment. These two themes were representative of

Address for Correspondence: Deborah A. Levine, MD, MPH, University of Michigan Division of General Medicine, North Campus Research Complex, 2800 Plymouth Road, 16-430W, Ann Arbor, MI 48109-2800, Telephone: 734-936-5216 deblevin@umich.edu.

Conflict of Interest: The authors declare that they do not have a conflict of interest.

Prior Presentations: We presented an earlier version of the manuscript as an abstract at the Alzheimer's Association International Conference 2018 in Chicago, IL.

physician beliefs that MCI patients have impaired independent decision-making, inability to adhere to treatment, inability to communicate treatment preferences, and increased risk and burden from treatment.

Conclusions: A patient's MCI diagnosis influences physician decision-making for treatment. Some physician assumptions about patients with MCI were not evidence-based. This phenomenon potentially explains why many patients with MCI get fewer effective treatments or tests than cognitively normal patients. Interventions that improve how physicians understand MCI and make decisions for treatments in patients with MCI are needed.

Keywords

mild cognitive impairment; decision making; treatment; aging

Introduction

Mild cognitive impairment (MCI) affects 5.4 million older Americans (65 or older) [1–4]. This number is projected to triple by 2050 [4]. MCI is characterized as measurable cognitive impairment that does not severely impair daily, social, or occupational functioning, whereas dementia does. While dementia worsens in nearly all individuals [5], MCI does not inevitably progress to dementia. Although patients with MCI are at higher risk of progressing to dementia than age-matched controls, patients with MCI might remain stable or reverse to normal cognition (14%–55%) [6]. Many older patients with MCI live years with good quality of life [7,8] and do not progress to dementia [9–11]. These patients face competing health risks of aging, particularly cardiovascular disease (CVD) events and cancer [11]. Despite recommendations that all vulnerable older adults, except those with severe dementia or limited life expectancy, receive established and effective treatments [12–14], evidence suggests that patients with MCI are less likely to receive effective treatments than cognitively normal patients including for CVD [15,16].

Although there is strong evidence that a patient's diagnosis of dementia affects physician decision-making for treatments and tests [17–19], there has been little research on the influence of a patient's MCI diagnosis on physician decision-making. We have previously reported in a mixed-methods study [20] that patient MCI diagnosis can influence some physician recommendations for CVD treatments, particularly invasive procedures. However, little is known about how patient MCI diagnosis influences physician recommendations in general, such as for non-invasive tests, rehabilitation, and preventative medication. Although the primary focus of the project was on CVD treatments, the interview started with discussion of how patient MCI diagnosis impacts physician decisions in their routine practice. In this report, we present results from the qualitative study on whether and how a patient's having pre-existing MCI affects physicians' decisions about five kinds of treatments or tests (surgery, invasive tests, non-invasive tests, rehabilitation, and preventive medication) commonly used to treat diseases of aging.

Methods

We present methods adhering to the consolidated criteria for reporting qualitative research [21].

Study Design and Participant Selection

We conducted a pilot descriptive qualitative study [22, 23] using in-person, semi-structured interviews to explore the influence of MCI on physician decision-making and recommendations for CVD treatments. Details of the study sample are described elsewhere [20]. Briefly, the study population consisted of 18 physicians who practiced in one of three specialties (cardiology, neurology, and internal medicine) at one large academic medical center [24–26]. We chose these specialties because they manage most cases of acute myocardial infarction and ischemic stroke, the two most common CVD events (the primary focus of the larger study). By design, we interviewed a minimum of three physicians in each specialty. The Principal Investigator (DAL) sent an email invitation and recruited participants from a purposeful sample of 39 expert physicians who were selected based on their clinical experience and willingness to participate [23]. We used purposeful sampling to identify and select information-rich subjects efficiently [23]. Eighteen participants completed interviews. No participants refused to participate or dropped out, although some individuals did not respond to the email solicitation. Participants received a \$100 incentive after completing the interview.

Data Collection

A trained qualitative researcher (co-author Colleen Dowd Kollman, MBA, female) conducted one-on-one, in-person interviews. The interviewer conducted interviews in the participants' professional offices or workspaces. Her occupation was qualitative research consultant at the time of the study. Ms. Kollman has training in interviewing and moderating techniques. She did not have an established relationship with the participants before study commencement. The participants' knowledge of the interviewer was limited to knowing her occupation, the reasons for doing the research, and the purpose of the interview. The interviewer told participants that she was a qualitative research consultant and non-medical. Non-participants were not present.

The interviewer used a standard guide [25,26] that has been published [20]. The interviewer stated the purpose of the study and definition for MCI by reading the following introductory statement, "The study is designed to learn about how physicians think about treatment recommendations and health risks in adult patients with mild cognitive impairment. Mild cognitive impairment is currently defined as objective cognitive impairment that is not severe enough to cause difficulties with activities of daily living such as bathing, dressing, grocery shopping, and taking medicines." Interviews consisted of general questions regarding physician experience caring for patients with MCI, then focused more specifically on how patient MCI diagnosis influences decision-making and recommendations for specific treatments and tests: a) surgery; b) invasive tests or procedures; c) noninvasive tests like ultrasounds; d) rehabilitation; and e) preventive medicines (Table 1). Subsequent questions asked about how patient MCI diagnosis influences physician recommendations for stroke

and myocardial infarction treatments. Repeat interviews were not conducted. The interviewer used audio recording to collect the data. The interviewer did make field notes during or after the interview. The interview duration was 60 minutes.

We discontinued data collection after 18 physicians were interviewed because thematic saturation was achieved based on the inductive approach; specifically, interviews did not identify new codes for how patient MCI influenced physician decision-making or recommendations for treatments and tests [27]. A professional transcriptionist transcribed the interviews. Transcripts were not returned to participants for comment and/or correction. De-identified transcripts were uploaded into Dedoose (<http://www.dedoose.com/>) [28], a qualitative and mixed methods software package, for analysis.

Data Analysis

We performed qualitative content analysis to identify unifying and recurrent themes from the interview data using the Dedoose web application. The coding team consisted of a vascular neurologist (DZ), internal medicine physician (DAL), qualitative researchers (JF, CK), and study staff. We used a descriptive qualitative methodology grounded in a naturalist philosophy, wherein the goal is to be “data-near”, reporting findings in their everyday terms, rather than more highly theorized terms [29]. The underlying epistemology is subjectivism [30]. In using inductive qualitative content analysis [26] as our approach to coding, we accepted data as representing our participants’ subjective perceptions, and our role as researchers as using our skills to interpret the phenomenon based on these perceptions. This approach supports our goal of producing concrete findings for real-world practice.

First, the coding team read through the first several transcripts to identify factors that might explain why physicians might treat patients with MCI differently than cognitively normal patients. The team then created and defined codes corresponding to these factors. Codes were not pre-specified, but emerged from the data and were iteratively discussed by the coding team. Codes were organized into two main themes – patient cognitive ability and functional health. Transcripts were coded with themes (not original factor codes) in an iterative process that included discussing and fine-tuning themes and sub-themes. Themes were derived from the data and not identified in advance. Inter-coder reliability was established through double-coding one third of the interviews and discussing discrepancies. The University of Michigan Institutional Review Board approved the study.

Results

Participant characteristics are described in Table 2. Most participants were men, of Caucasian race/ethnicity, and doing outpatient clinical work. Participants had been practicing medicine a median (interquartile range) of 16 (11 to 25) years from medical school graduation.

All participants but one described MCI as influencing their recommendations for treatments and tests. We identified two overarching themes that address how patient MCI diagnosis may influence physician decision-making for treatments and tests (Table 3). These themes are presented below with their sub-themes generally organized in decreasing order of the

number of participants in whose interviews we identified them. Representative quotations from the participant interviews can be found in the text and also in Table 3.

Theme 1: Physicians assume that the decreased cognitive ability of MCI patients will impact treatment.

Impaired Independent Decision-Making—A majority of participants believed that patients with MCI do not understand treatments and tests, their risk and benefits, and potential alternatives (Table 3). Participants expressed concerns that patients with MCI may not be capable of making informed decisions or providing consent: *“I think it might be difficult for them to understand completely why they are getting the treatment and understand what the risks and benefits of the two or three alternatives are. That can be challenging.”* (MD14, neurologist). When discussing treatment options with patients with MCI, many participants noted that they felt there is often a need to have a family member present to help the patient understand the information.

Participants discussed using different approaches to informed consent discussions for treatment in patients with MCI such as using simpler language and slower speech, verifying patient understanding (e.g., having the patient to teach back the information), and increasing family involvement in discussions. For example, one participant reported their belief that it could be necessary at times to make treatment decisions on behalf of patients with MCI instead of consulting with them, *“I think there is a very conscious decision of treatment adversity and harm that happens either in discussion with patients and their families or in a substituted judgment type approach where you are now making decisions on behalf of the patient with respect to potential side effects.”* (MD3, internist).

Inability to Adhere to Treatment—Some participants assumed that patients with MCI will not adhere to treatment (Table 3). One participant explained, *“I think we shouldn’t be as aggressive with this person because clearly there are issues here with their mental faculties or ability to adhere to treatment recommendations and follow through in what we’re seeing.”* (MD3, internist). Similarly, another participant explained how clinical decision-making for treatments during the acute hospitalization is influenced by concerns about long-term treatment adherence, *“Longer term, it matters though because I worry about follow-up a lot, that if people are forgetful of their appointments and they’re not able to get their blood draws or get to appointments or things like that and I worry a little bit about overcomplicating their medication regimen and somebody who may not have help with their medications.”* (MD7, neurologist).

Inability to Communicate Treatment Preferences—Some participants reported the belief that patients with MCI may struggle with communicating their preferences about treatment (Table 3). Participants said that treatment decision-making can be hindered by the MCI patients’ inability to communicate their treatment preferences clearly. Participants said that physicians might assume that patients with MCI want less care because they have difficulty expressing their preferences for treatment. A participant stated, *“I certainly have seen examples where the primary team has, you know, taken patients with MCI’s statements maybe at face value. ‘I don’t want to have surgery’, you know, whereas what they’re really*

saying is, *'I'm scared to have surgery...I'm aware that I'm sick but I don't exactly know why and I don't really understand sort of what the benefits are'...*" (MD8, internist). Participants also suggested that patients with MCI might need more time to communicate their preferences.

Theme 2: Physicians assume that the poor health status and physical functioning of MCI patients will impact treatment.

Poor Health, Life Expectancy and Functional Status—Many participants raised the issue of patient age in response to the question in Table 1. Many participants made assumptions that MCI is associated with poor health, old age, shortened life expectancy, and co-morbidities. Their narratives stated or implied that these assumptions would cause them to recommend fewer treatments to patients with MCI (Table 3). One participant explained, *"Patients with MCI tend to be, in my mind, a little older than patients that don't have MCI and there are some treatments and therapies that I find myself not sort of willing to recommend with respect to the overall implications of that treatment for that patient"* (MD4, internist). One participant stated that MCI can be a predictor of a patient's overall health and life expectancy, *"We know that patients with mild cognitive impairment have a reduced lifespan [sic], compared to someone who has no cognitive impairment... You know, it's like anything else – maybe one system doesn't work, then what if two systems don't work, or three systems don't work. So that does affect my decision-making in a sense."* (MD10, cardiologist).

Many participants assumed that MCI is associated with frailty and poor functional status. Some participants stated that patients with MCI may not be appropriate candidates for treatments because they believed patients with MCI are incapable of functioning independently or do not have the capacity to care for themselves, especially following treatment (Table 3). A participant said: *"...they're [patients with MCI] not going to be able to cope with the aftermath of that [surgery]. Then they're going to have to go to a rehab facility or a nursing home, and, you know, are they ever going to be able to get out of that and regain independent living?"* (MD2, cardiologist).

Increased Risks and Burden from Treatment—A majority of participants assumed that patients with MCI have increased treatment risks and burden. Participants were concerned that treatments might increase dementia risk and cause agitation and delirium in a patient with pre-existing MCI, *"For someone who has cognitive issues, they oftentimes will have more cognitive decline after a major operation...I think sometimes it's the wrong thing to do to recommend that [surgery]."* (MD2, cardiologist). Participants also thought that inpatient rehabilitation and noninvasive tests (such as cardiac event monitors and electroencephalograms) might be frightening or stressful to a patient with MCI (Table 3). Owing to these concerns, multiple participants commented that they would consider the necessity of the treatment more in patients with MCI than in those with normal cognition. A participant stated, *"When we are doing procedures that are on the margins of elective, most of the specialists I interact with will say, 'Look, I don't know if this is really in the best interest of this patient'... I just am not certain whether this particular therapy would have value given where they are with their lifestyle"* (MD3, internist).

High Risk of Dementia—Many of the participants assumed that patients with MCI are likely to progress to dementia. For example, regarding the treatment of a feeding tube, a participant stated, “*I would tell them upfront that there is risk of patients with MCI progressing into a condition with dementia, and is that something they would want to be sustained with a feeding tube while they have dementia?*” (MD13, neurologist). Some participants seemed to conflate the diagnosis and features of MCI and dementia, and assume individuals with MCI have more severe cognitive deficits than they do. One participant said, “*my bias is that as you say MCI, I am unwittingly thinking dementia.*” (MD1, cardiologist). Another participant described a patient with MCI as requiring help with daily activities, a feature of dementia (Table 3). Some participants expressed concerns that a patient diagnosed with MCI might actually have dementia because there is uncertainty in diagnosing MCI, with one participant stating, “*I think not knowing a patient has MCI versus mild dementia or moderate dementia – it happens more than we probably think.*” (MD18, neurologist).

Discussion

In this qualitative study of eighteen physicians, we identified multiple ways in which patient MCI diagnosis might influence physician decision-making and recommendations for diagnostic tests and treatment. All physician participants but one reported that MCI has affected their decision-making for surgery, invasive tests or procedures, noninvasive tests, rehabilitation, and preventive medicines. We identified two primary themes and several sub-themes for reasons why physicians might recommend a less intensive treatment approach for patients with MCI. Some physicians made assumptions that patients with MCI, compared to cognitively normal patients, have problems with cognitive ability that will impact treatment, including problems with independent decision-making, ability to adhere to treatment, and ability to communicate treatment preferences. The majority of physician participants assumed that MCI is associated with health and functional problems that will impact treatment, including poor health, limited life expectancy, functional impairment, increased risks and burden from treatment, and high risk of dementia.

Previous research suggests that patient MCI diagnosis influences physician recommendations for specific invasive procedures for acute CVD events like myocardial infarction and ischemic stroke [20]. Our results extend prior work by showing how a patient’s MCI diagnosis influences physician decision-making and recommendations for general treatments and tests including noninvasive procedures, rehabilitation, and preventive medicines that are frequently used to manage chronic conditions in older adults, like cancer and osteoarthritis. We identified multiple misunderstandings of MCI by physician participants—many of whom have treated patients with MCI. Some participants conflated MCI with dementia, a more advanced cognitive impairment that severely affects daily functioning and worsens over time in nearly all patients. Although MCI is characterized as a measurable deficit in cognition that does not severely affect activities of daily living, some physician participants assumed that MCI severely impacts patient capacity for self-management, treatment adherence, and decision-making. Evidence suggests that patients with MCI, except the minority with executive decision-making dysfunction as a foremost feature, do not have substantially worse decision-making capacity than cognitively normal patients [31, 32]. It is notable that physician participants made these assumptions despite

being reminded of the definition of MCI at the interview onset. Our results highlight that treating patients with MCI is complicated and difficult for physicians. A study suggests that inadequate physician training may contribute to their challenges in treating patients with MCI and dementia, and suggests that education might increase physicians' confidence in dementia care competency and use of cognitive screening tools [33].

Physician participants assumed that patients with MCI have frailty and poor functional status so they cannot tolerate certain treatments. Some studies [34] suggest that frailty might be associated with dementia, MCI, and cognitive decline. Yet, many patients with MCI are not frail and many patients with frailty do not have MCI [35,36]. Physician participants also assumed that patients with MCI are likely to progress to dementia. While patients with MCI are more likely to progress to dementia than cognitively normal patients, dementia is not inevitable. Many patients with MCI live years with good quality of life, and do not progress to dementia even after 10 years, while a small percentage see improvements in cognition [9,37,38]. We were unable to find evidence in the literature that patients with MCI want less treatment than cognitively normal patients to support this physician assumption.

Our study has several strengths. Common themes emerged prominently. Although our sample size was small, our participants included men and women, Asians, and Whites, and had a broad range of clinical experience in varying fields of expertise. This diversity enabled us to gather a wide range of perspectives that inform the understanding of physician beliefs about patients with MCI. Despite the differences in our participants, many shared common experiences and beliefs about treating patients with MCI. The method of conducting interviews allowed for collection of rich data on whether and how a patient's MCI influences physician decision-making and recommendations for tests and treatments.

Our study has limitations. Although the sample size of this pilot study was small, the size was typical for qualitative interviews [24,25], and we used purposeful sampling to select information-rich cases, and we achieved thematic saturation. Although the physician participants were recruited from three clinical specialties, these specialties treat most cases of stroke and myocardial infarction, the focus of the pilot study. We recruited participants from one academic center so our findings may not be generalizable to other medical settings. However, it is plausible that physicians in community-based practices share similar beliefs to those in academic settings. We were primarily able to assess reasons why patient MCI might affect decision-making and recommendations known to physicians, and we were unable to assess any unconscious biases that physicians have. We did not assess differences by type (e.g., amnesic vs. non-amnesic) of MCI. The sample size limited power to examine differences by physician specialty. Although we asked questions about non-CVD treatments and drew inferences about physician decision-making for treatments in general, these data were taken from a pilot study largely focused on CVD, and we cannot exclude the possibility that participants were thinking about CVD when answering general treatment questions. However, the interviewer stressed that the interview questions about how patient MCI diagnosis influences their recommendations for the 5 general treatments was to focus on a larger scope of treatments, not just those for CVD. Our study focused on patients with MCI. We did not assess physician beliefs about the ability of other older patients with poor functional health to understand treatments, how physicians communicate with patients'

families generally, and how physicians' concerns about treating patients with MCI might be mitigated. We are conducting a larger-scale study of how patient MCI influences decision-making and recommendations in physicians from academic and non-academic settings.

This work has clinical and policy implications for improving the medical care of older adults diagnosed with MCI, a population expected to grow in size because the Baby Boomer generation is aging and the Medicare Annual Wellness Visit requires an assessment to detect cognitive impairment [39]. Patients with MCI warrant effective treatments to manage their competing health risks. Yet, evidence shows that patients with MCI are less likely to receive effective procedures than cognitively normal patients including cardiac catheterization and coronary revascularization after acute myocardial infarction as well as cataract surgery [15, 16, 40]. Our study suggests one potential explanation for this disparity. Physicians might recommend less intensive treatment to patients with MCI because they assume that patients with MCI have decreased cognitive ability, poor health status, and impaired physical functioning that will impact treatment. Our results also suggest that many physicians are uncertain about the diagnosis of MCI, with some confusing MCI with dementia and others assuming MCI inevitably leads to dementia, consistent with previous research [41]. These physician assumptions and, in some cases, misconceptions about patients with MCI could lead to potential under-treatment.

Our findings suggest a scientific need to better understand how patient MCI influences physician recommendations for treatment. More research is needed to inform decision-making tailored to patients with MCI [42]. In particular, evidence for effective strategies that ensure the safety and efficacy of diagnostic and treatment decisions in patients with MCI is lacking. As a result, recommendations for specific strategies to improve physician decision-making for the treatment of competing health risks in patients with MCI are premature. Promising evidence shows that educational interventions improve physician knowledge and confidence in diagnosing and managing dementia, including distinguishing between MCI and dementia [43]. Enhanced physician education about MCI and decision support tools might help ensure that patients get the guideline-concordant care they would want if adequately informed, but studies are warranted. Given that MCI is common in older adults [1–4], it is important for physicians to recognize and verify their assumptions about MCI and ensure that patients with MCI receive high-quality care. Without awareness of incorrect physician assumptions and knowledge about MCI, a large portion of the elderly population may not get effective, evidence-based treatments.

Conclusion

These results suggest that physicians might recommend less evidence-based treatment to patients with MCI compared with cognitively normal patients owing to questionable assumptions that MCI patients' cognitive ability, poor health status and physical functioning will detrimentally impact treatment. Further study is needed to determine if these assumptions represent targets for physician educational interventions.

Acknowledgments

Funding: This work was supported by the Michigan Alzheimer's Disease Center Berger Endowment - Pilot Project Program. Dr. Levine was supported by National Institutes of Health K23 AG040278, R01 AG 051827, and R01 NS 102715, and Dr. Zahuranec by National Institutes of Health K23 AG038731. Ms. Kollman is employed by Kollman Research Services, Ann Arbor, MI. The funder provided support in the form of salaries for authors [CDK], but did not have any additional role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript.

References

- [1]. Graham JE, Rockwood K, Beattie BL, Eastwood R, Gauthier S, Tuokko H, McDowell I (1997) Prevalence and severity of cognitive impairment with and without dementia in an elderly population. *Lancet* 349, 1793–1796. [PubMed: 9269213]
- [2]. Plassman BL, Langa KM, Fisher GG, Heeringa SG, Weir DR, Ofstedal MB, Burke JR, Hurd MD, Potter GG, Rodgers WL, Steffens DC, McArdle JJ, Willis RJ, Wallace RB (2008) Prevalence of cognitive impairment without dementia in the United States. *Ann Intern Med* 148, 427–434. [PubMed: 18347351]
- [3]. Mufson EJ, Binder L, Counts SE, DeKosky ST, de Toledo-Morrell L, Ginsberg SD, Ikonomic MD, Perez SE, Scheff SW (2012) Mild cognitive impairment: pathology and mechanisms. *Acta Neuropathol* 123, 13–30. [PubMed: 22101321]
- [4]. Alzheimer's Association (2020) 2020 Alzheimer's disease facts and figures. *Alzheimers Dement* 16, 391–460.
- [5]. Knopman DS, Petersen RC (2018) Mild cognitive impairment and mild dementia: a clinical perspective. *Mayo Clin Proc* 89, 1452–1459.
- [6]. Petersen RC, Lopez O, Armstrong MJ, Getchius TSD, Ganguli M, Gloss D, Gronseth GS, Marson D, Pringsheim T, Day GS, Sager M, Stevens J, Rae-Grant A (2018) Practice guideline update summary: mild cognitive impairment: report of the guideline development, dissemination, and implementation subcommittee of the American Academy of Neurology. *Neurology* 90, 126–135. [PubMed: 29282327]
- [7]. Barrios H, Narciso S, Guerreiro M, Maroco J, Logsdon R, de Mendonca A (2013) Quality of life in patients with mild cognitive impairment. *Aging Ment Health* 17, 287–292. [PubMed: 23215827]
- [8]. Ready RE, Ott BR, Grace J (2004) Patient versus informant perspectives of quality of life in mild cognitive impairment and Alzheimer's disease. *Int J Geriatr Psychiatry* 19, 256–265. [PubMed: 15027041]
- [9]. Mitchell AJ, Shiri-Feshki M (2009) Rate of progression of mild cognitive impairment to dementia--metaanalysis of 41 robust inception cohort studies. *Acta Psychiatr Scand* 119, 252–265. [PubMed: 19236314]
- [10]. Farias ST, Mungas D, Reed BR, Harvey D, DeCarli C (2009) Progression of mild cognitive impairment to dementia in clinic- vs community-based cohorts. *Arch Neurol* 66, 1151–1157. [PubMed: 19752306]
- [11]. Sachs GA, Carter R, Holtz LR, Smith F, Stump TE, Tu W, Callahan CM (2011) Cognitive impairment: an independent predictor of excess mortality: a cohort study. *Ann Intern Med* 155, 300–308. [PubMed: 21893623]
- [12]. Watson K, Fung CH, Budoff M (2007) Quality indicators for the care of ischemic heart disease in vulnerable elders. *J Am Geriatr Soc* 55, S366–S372. [PubMed: 17910559]
- [13]. Cheng EM, Fung CH (2007) Quality indicators for the care of stroke and atrial fibrillation in vulnerable elders. *J Am Geriatr Soc* 55, S431–S437. [PubMed: 17910567]
- [14]. Wenger NS, Solomon DH, Amin A, Besdine RK, Blazer DG, Cohen H, Fulmer T, Ganz PA, Grunwald M, Hall WJ, Katz PR, Kitzman DW, Leipzig RM, Rosenthal RA (2007) Application of assessing care of vulnerable elders - 3 quality indicators to patients with advanced dementia and poor prognosis. *J Am Geriatr Soc* 55, S457–S463. [PubMed: 17910571]
- [15]. Gharacholou SM, Reid KJ, Arnold SV, Spertus J, Rich MW, Pellikka PA, Singh M, Holsinger T, Krumholz HM, Peterson ED, Alexander KP (2011) Cognitive impairment and outcomes in older

adult survivors of acute myocardial infarction: findings from the translational research investigating underlying disparities in acute myocardial infarction patients' health status registry. *Am Heart J* 162, 860–869.e1. [PubMed: 22093202]

- [16]. Levine DA, Langa KM, Galecki A, Kabeto M, Morgenstern L, Zahuranec D, Giordani B, Lisabeth L, Nallamothu BK (2020) Mild cognitive impairment and receipt of treatments for acute myocardial infarction in older adults. *J Gen Intern Med* 35, 28–35. [PubMed: 31410812]
- [17]. Saposnik G, Cote R, Rochon PA, Mamdani M, Liu Y, Raptis S, Kapral MK, Black SE (2011) Care and outcomes in patients with ischemic stroke with and without preexisting dementia. *Neurology* 77, 1664–1673. [PubMed: 22042795]
- [18]. Sloan FA, Trogdon JG, Curtis LH, Schulman KA (2004) The effect of dementia on outcomes and process of care for Medicare beneficiaries admitted with acute myocardial infarction. *J Am Geriatr Soc* 52, 173–181. [PubMed: 14728624]
- [19]. Cermakova P, Szummer K, Johnell K, Fastbom J, Winblad B, Eriksdotter M, Religa D. (2017) Management of acute myocardial infarction in patients with dementia: data from SveDem, the Swedish Dementia Registry. *J Am Med Dir Assoc* 18, 19–23. [PubMed: 27639334]
- [20]. Levine DA, Langa KM, Fagerlin A, Morgenstern LB, Nallamothu BK, Forman J, Galecki A, Kabeto MU, Kollman CD, Olorode T, Giordani B, Lisabeth LD, Zahuranec DB (2020) Physician decision-making and recommendations for stroke and myocardial infarction treatments in older adults with mild cognitive impairment. *PLoS One* 15. e0230446. [PubMed: 32182264]
- [21]. Tong A, Sainsbury P, Craig J (2007) Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care* 19, 349–357. [PubMed: 17872937]
- [22]. Sandelowski M (2000) Whatever happened to qualitative description? *Res Nurs Health* 23, 334–340. [PubMed: 10940958]
- [23]. Palinkas LA, Horwitz SM, Green CA, Wisdom JP, Duan N, Hoagwood K (2015) Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Adm Policy Ment Health* 42, 533–544. [PubMed: 24193818]
- [24]. Nunez-Smith M, Curry LA, Bigby J, Berg D, Krumholz HM, Bradley EH (2007) Impact of race on the professional lives of physicians of African descent. *Ann Intern Med* 146, 45–51. [PubMed: 17200221]
- [25]. Britten N (1995) Qualitative interviews in medical research. *BMJ* 311, 251–253. [PubMed: 7627048]
- [26]. Forman J, Damschroder LJ (2008) Qualitative content analysis. In *Empirical Methods for Bioethics: A Primer*, Jacoby L, Siminoff L, ed. Elsevier, Oxford, UK, pp. 39–62.
- [27]. Saunders B, Sim J, Kingstone T, Baker S, Waterfield J, Bartlam B, et al. (2018) Saturation in qualitative research: exploring its conceptualization and operationalization. *Qual Quant* 52, 1893–907. [PubMed: 29937585]
- [28]. Dedoose Version 8.0.35, web application for managing, analyzing, and presenting qualitative and mixed method research data (2018). Los Angeles, CA: SocioCultural Research Consultants, LLC.
- [29]. Sandelowski M (2010) What's in a name? Qualitative description revisited. *Res Nurs Health* 33, 77–84. [PubMed: 20014004]
- [30]. Bradshaw C, Atkinson S, Doody O (2017) Employing a qualitative description approach in health care research. *Glob Qual Nurs Res* 4:2333393617742282. [PubMed: 29204457]
- [31]. Okonkwo OC, Griffith HR, Belue K, Lanza S, Zamrini EY, Harrell LE, Brockington JC, Clark D, Raman R, Marson DC (2008) Cognitive models of medical decision-making capacity in patients with mild cognitive impairment. *J Int Neuropsychol Soc* 14, 297–308. [PubMed: 18282327]
- [32]. Stormoen S, Almkvist O, Eriksdotter M, Sundstrom E, Tallberg IM (2014) Cognitive predictors of medical decision-making capacity in mild cognitive impairment and Alzheimer's disease. *Int J Geriatr Psychiatry* 29, 1304–1311. [PubMed: 24737535]
- [33]. Lathren CR, Sloane PD, Hoyle JD, Zimmerman S, Kaufer DI (2013) Improving dementia diagnosis and management in primary care: a cohort study of the impact of a training and support program on physician competency, practice patterns, and community linkages. *BMC Geriatr* 13, 134. [PubMed: 24325194]

- [34]. Wallace LMK, Theou O, Godin J, Andrew MK, Bennett DA, Rockwood K (2019) Investigation of frailty as a moderator of the relationship between neuropathology and dementia in Alzheimer's disease: a cross-sectional analysis of data from the Rush Memory and Aging Project. *Lancet Neurol* 18, 177–184. [PubMed: 30663607]
- [35]. Cigolle CT, Ofstedal MB, Tian Z, Blaum CS (2009) Comparing models of frailty: the Health and Retirement Study. *J Am Geriatr Soc* 57, 830–839. [PubMed: 19453306]
- [36]. Shah A, Morani A, Rodriguez-Suarez M, Apracio-Ugarriza R, Ruiz JG (2019) The association of frailty with MCI and dementia in a memory disorders clinic for older veterans. *Innov Aging* 3, S889.
- [37]. Fisk JD, Merry HR, Rockwood K (2003) Variations in case definition affect prevalence but not outcomes of mild cognitive impairment. *Neurology* 61, 1179–1184. [PubMed: 14610117]
- [38]. Larrieu S, Letenneur L, Orgogozo JM, Fabrigoule C, Amieva H, Le Carret N, Barberger-Gateau P, Dartigues JF (2002) Incidence and outcome of mild cognitive impairment in a population-based prospective cohort. *Neurology* 59, 1594–1599. [PubMed: 12451203]
- [39]. CMS Annual Wellness Visit. Available at: <https://www.medicare.gov/coverage/yearly-wellness-visits>. Accessed on June 7, 2019.
- [40]. Stagg BC, Ehrlich JR, Choi H, Levine DA (2019) Association of cognitive impairment and dementia with receipt of cataract surgery among community-dwelling Medicare beneficiaries. *JAMA Ophthalmol* 137, 114–117. [PubMed: 30422225]
- [41]. Bernstein A, Rogers KM, Possin KL, Steele NZR, Ritchie CS, Kramer JH, Geschwind M, Higgins JJ, Wohlgemuth J, Pesano R, Miller BL, Rankin KP (2019) Dementia assessment and management in primary care settings: a survey of current provider practices in the United States. *BMC Health Serv Res* 19, 919. [PubMed: 31783848]
- [42]. Fowler NR, Shaaban CE, Torke AM, Lane KA, Saba S, Barnato AE (2018) “I’m not sure we had a choice”: Decision quality and the use of cardiac implantable electric devices in older adults with cognitive impairment. *Cardiol Cardiovasc Med* 2, 10–26. [PubMed: 29521380]
- [43]. Casey AN, Islam MM, Schütze H, Parkinson A, Yen L, Shell A, Winbolt M, Brodaty H (2020) GP awareness, practice, knowledge and confidence: evaluation of the first nation-wide dementia-focused continuing medical education program in Australia. *BMC Fam Pract* 21, 104. [PubMed: 32522153]

Table 1:

Main Interview Questions from Standard Guide

“Now thinking about patients with MCI who you have treated, I’d like to ask you about decisions about specific tests and treatments (interviewer asks one by one). Has mild cognitive impairment influenced how you make decisions about the following for patients with MCI? If yes, how?”

- a. Surgery;
- b. Invasive tests or procedures like catheterization;
- c. Non-invasive tests like ultrasounds or computerized tomography scans;
- d. Rehabilitation;
- e. Preventive medicines

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Table 2:

Physician Characteristics

Characteristic	n (%)
Years since medical school graduation, (interquartile range)	16 (11 to 25)
Race	
Caucasian	14 (78)
Asian	4 (22)
Female gender	6 (33)
Specialty	
Cardiology	4 (22)
Internal Medicine	5 (28)
Neurology	9 (50)
Board certification	18 (100)
Outpatient work	15 (83)
Academic	18 (100)

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Table 3:

Representative Quotes of the Two Themes Influencing Physician Decision-making for Treatment in Patients with MCI

<p>Theme 1: Physicians assume that the decreased cognitive ability of MCI patients will impact treatment.</p> <hr/> <p style="text-align: center;">Impaired Independent Decision Making</p> <hr/> <ul style="list-style-type: none"> • “The patient themselves might not fully understand or be able to balance the risks and benefits of surgery when it comes to manipulating complex numbers and knowing how they do or don’t apply to them.” (MD4, internist) • “It’s often in those cases I’ll ask - like I had one case where I actually asked to see the document, the consent. I can find it in the computer and then I went over it with a family member who was with them at the visit...I said, “Did you see this form,” and she said, “Well no, they let him [MCI patient] sign it,” and I said, “He’s not been declared legally incompetent to sign documents,” but they didn’t know that actually he doesn’t understand a lot of the language.” (MD12, internist) <hr/> <p style="text-align: center;">Inability to Adhere to Treatment</p> <hr/> <ul style="list-style-type: none"> • “Here’s what’s happening; they’re actually not taking their medicines like they say they are. They don’t do anything; they just sit in a chair and watch TV all day.” (MD2, cardiologist) • “The less somebody is able to understand and be part of their recovery, the rockier that course is going to be.” (MD9, cardiologist) • “With that [electroencephalogram, EEG] there is often a lot of electrodes on the head and that can be quite bothersome to a patient. If they’re not understanding why they’re there they might be pulling at the EEG leads.” (MD13, neurologist) <hr/> <p style="text-align: center;">Inability to Communicate Treatment Preferences</p> <hr/> <ul style="list-style-type: none"> • “I think a lot of that comes from clinicians being busy, consulting services being busy, and there’s a real risk of anchoring bias for what the patient sort of first says to you or what their first impression is... I think with mild cognitive impairment, that’s the type of diagnosis that I think can often be somewhat glossed over and maybe it would not, you know, trip the threshold for the consulting service to say, well, we should really pressure test the statement of, ‘I don’t want to have surgery.’” (MD8, internist) <hr/> <p>Theme 2: Physicians assume that the poor health status and physical functioning of MCI patients will impact treatment.</p> <hr/> <p style="text-align: center;">Poor Health, Life Expectancy and Functional Status</p> <hr/> <ul style="list-style-type: none"> • “I would not put those devices [defibrillators] in if there’s an older patient where the life expectancy would be limited because I feel like they wouldn’t get benefit from it at all...It’s more age than cognitive but they go together very frequently” (MD3, internist) • “If there are three or four different factors and there’s MCI, I might be more conservative and less aggressive in recommending surgery... MCI in that particular case would tip you over to not do something, I think.” (MD14, neurologist) <hr/> <p style="text-align: center;">Increased Risks and Burden from Treatment</p> <hr/> <ul style="list-style-type: none"> • “If they had mild cognitive impairment and now we’re concerned they’re going to become much more impaired than it might make their surgical decision making more conservative.” (MD16, internist) • “If somebody like, for whatever reason gets tested, is found to have [carotid] narrowing but has not had a stroke or a TIA, I’m in general pretty disinclined to recommend those patients ever go for surgery, unless it’s the perfect circumstance. And MCI might be a variable that I could talk myself into being a non-perfect circumstance.” (MD11, neurologist)

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript