Journal of Alzheimer's Disease 99 (2024) 857–867
DOI 10.3233/JAD-240064
IOS Press

Review

Alzheimer's Disease and Related Dementias in Muslim Women: Recommendations for Culturally Sensitive Care

Bilal Irfan[a,b], Ghadeer Ankouni[a,b], Jonathan Reader[a,b], Navid Seraji-Bozorgzad[a,b], Bruno Giordani[a,c], Kelly Bakulski[a,d], Arijit Bhaumik[a,b], Benjamin M. Hampstead[a,e,f] and Annalise Rahman-Filipiak[a,e,*]

[a]*Michigan Alzheimer's Disease Research Center, Ann Arbor, MI, USA*
[b]*Department of Neurology, University of Michigan Medical School, Ann Arbor, MI, USA*
[c]*Department of Psychiatry, University of Michigan Medical School, Ann Arbor, MI, USA*
[d]*School of Public Health, University of Michigan, Ann Arbor, MI, USA*
[e]*Research Program on Cognition & Neuromodulation Based Interventions, Department of Psychiatry, University of Michigan, Ann Arbor, MI, USA*
[f]*Mental Health Service, Veterans Affairs Ann Arbor Health Systems, Ann Arbor, MI, USA*

Accepted 4 April 2024
Pre-press 13 May 2024

Abstract. Alzheimer's disease and related dementias (ADRD) present significant challenges including cognitive and functional loss, behavioral disruption, emotional distress, and significant financial burden. These stressors are amplified in minority groups, who experience higher rates of ADRD but less frequent and later diagnosis. There is therefore a critical need to identify tangible approaches to culturally informed dementia assessment and care for patients from diverse communities. Muslim patients and particularly Muslim women are among the populations most understudied in the ADRD space. Muslim patients may hold unique religious, spiritual, and cultural beliefs and practices that can impact care-seeking for dementia symptoms, diagnostic accuracy, and treatment uptake. This paper outlines culturally informed approaches to assessing and treating Muslim women and families at each stage of ADRD care, though many recommendations extend to the broader Muslim community and others of diverse racial-ethnic backgrounds. We provide concrete suggestions for building rapport within and leveraging common family structures, respecting principles of modesty and privacy for all women including those who observe hijab or niqab, and communicating dementia diagnosis and care in the context of spiritual and ethical beliefs. While not intended as a comprehensive and prescriptive guide, this review provides important points of consideration and discussion with patients of Muslim backgrounds.

Keywords: Alzheimer's disease, culturally informed care, Islam, religious ethics

INTRODUCTION

Alzheimer's disease and related dementias (ADRD) pose a significant challenge for patients and their families [1, 2]. The financial burdens of ADRD can be immense, often requiring specialized

*Correspondence to: Annalise Rahman-Filipiak, PhD, Department of Psychiatry – Neuropsychology Section, University of Michigan Medical School, 2101 Commonwealth Blvd., Suite C, Ann Arbor, MI 48105, USA. Tel.: +1 734 936 3180; E-mail: rahmanam@umich.edu.

care and medication that may not be covered by insurance [3]. ADRD is also emotionally taxing on both the patient and their loved ones, causing stress, anxiety, and grief as they experience or watch cognitive decline and loss of identity. Furthermore, while patients suffer a gradual loss of physical functions and independence, caregivers may encounter increased physical burden and exhaustion along with neglect of their own healthcare needs [4–7]. These multi-faceted challenges can be greater for those of minority ethnic, racial, or religious backgrounds, as culturally informed approaches to care are not well researched [8]. Furthermore, those from historically marginalized communities are more likely to experience AD than non-Hispanic White individuals: in the U.S. alone, 19% of Black and 14% of Hispanic adults aged 65 and older have AD compared to only 10% of their White counterparts [9]. In contrast, diverse backgrounds may confer differential strengths or sources of resilience. For example, strong faith and spirituality may provide community, replenish spiritual exhaustion from the physical and psychological toll, and improve the actual and perceived effectiveness of caregiving [10–13]. It is imperative that healthcare providers adopt an approach that respects patients' and caregivers' identity, values, and preferences. This is particularly critical in the context of the COVID-19 pandemic, which has exacerbated existing challenges in ADRD care including limited healthcare access, increased mortality rates, and the rapid implementation of telehealth with limited consideration of cultural barriers [14–17]. The pandemic has also added an increased burden on caregivers and strained healthcare infrastructure and operations due to re-allocation of limited resources in some communities and geographic regions [18–22].

Studies have shown that incorporating cultural, religious, and linguistic considerations into the conceptualization and treatment of ethnically diverse ADRD patients improves their quality of life [23]. A challenge to accomplishing this goal is the limited representation of minoritized groups in ADRD research, as well as delayed rates of seeking care amongst many minoritized patients [24–27]. As a result, culturally informed recommendations for specific populations are limited. One such population is Muslim patients, and Muslim women in particular. Attention to the unique needs and accommodations of Muslim women, including those who wear a hijab or niqab is vital to delivering culturally sensitive care [28–33]. While there is a limited literature on end-of-life care for the Muslim population, to our knowledge no published guidance exists on a culturally sensitive approach to dementia evaluation and care in this community. We aim to provide considerations for treating Muslim women across dementia care settings, drawing from clinical and clinical research experience and informed by the limited literature on care for Muslim patients in other specialized clinical settings [34–38].

ISLAMIC PERSPECTIVES ON ADRD

Clinicians treating Muslim patients living with ADRD must recognize the profound influence of Islamic beliefs on perceptions and care practices related to this condition. Many Muslims believe that good deeds will be rewarded, and bad deeds punished, often after one's earthly existence, though not necessarily [39]. However, illnesses and diseases such as ADRD are not viewed as punishments for spiritual failures, but rather as biological processes, albeit abnormal [40]. Patients are therefore not likely to be hampered by a sense of responsibility or guilt in seeking care for their memory or other concerns [41, 42]. In contrast, care-seeking may be motivated by the distress caused when dementia symptoms interfere with religious obligations. For instance, Muslims are expected to pray, facing Mecca, five times per day, using a clean space and after specific bathing rituals; however, increasing difficulties in temporal and spatial orientation, bathing, and cleaning may present challenges to executing these important rituals [43, 44]. Similarly, prayers from the Quran are often recited from memory alongside repetition of specific movements or postures – execution and tracking of these tasks are also likely impacted by ADRD. Variability exists in religious practice and framing, and there will be people who may see any tests or trials in life as a consequence of spiritual activity or attach a divine notion of reward or punishment to it [45, 46]. In contrast, Muslim scholars, with support from textual evidence, frame caring for persons with dementia as a pathway to spiritual reward [47]. Family may feel a responsibility to shoulder both the honor and burden of caregiving independently, and may therefore be reticent to seek diagnosis, treatment, or respite care for their loved ones [48, 49]. Understanding these beliefs is vital for culturally competent care, as it informs both the motivation and resilience of caregivers, as well as the patient's exemption from certain religious duties like daily prayers and fasting. Therefore, clinicians should integrate an awareness of these religious considerations into their approach

to diagnosis and treatment, ensuring that medical intervention aligns with the spiritual values and community norms that shape the lives of Muslim patients living with ADRD. With prior family approval, this care could include collaboration with community-based religious leaders like imams, who can support and facilitate adherence to treatment while respecting the profound religious context within which patients and their families understand and cope with the illness.

The concepts of *hijab* and *purdah* (and related terms including *niqab, burka, chador, shayla, al-amira, khimar*) as a social phenomenon, prescribed ruling, and framework for attire, are common in Islamic tradition and Muslim societies. The terms carry a wide variety of meanings depending on the specific cultural, regional, social, or legal context [50, 51]. For the purposes of this paper, hijab will be used to refer to a headscarf that covers the head and neck, while a niqab will be used to delineate the added veil of the face where the eyes remain visible.

It is important to note that great heterogeneity exists among Muslim communities; these considerations should not be used as a one-size-fits-all prescription for all Muslim women. Instead, the following suggestions are intended to increase awareness of possible modifications to enhance cultural sensitivity of dementia care, and as a starting point for collaboration with patients and their families regarding their personal cultural needs.

CULTURALLY-INFORMED CONSIDERATIONS AT EACH STEP OF ADRD CARE

General considerations for patient appointments

In the initial stage of ADRD care, when a patient or family brings up concerns to a primary care physician, it is crucial to provide a comfortable and private setting, especially if telemedicine is utilized. This consideration is particularly important for Muslim women, as the principles of modesty and privacy in Islamic culture may require them to be in a secluded environment that limits outside visibility [52]. Virtual appointments should be conducted in private spaces, using telemedicine platforms that allow customizable virtual backgrounds to minimize distractions [53]. Alternatively, visits not requiring visual examination of the patient may be offered via phone. In-person encounters should be conducted in private, windowless rooms wherein patients may be situated away from the line of sight of passersby in the hallway should the door be opened. Knocking and introducing oneself before entry into a room or beyond a curtain can be particularly important, as it may provide extra time for a patient to modify or reposition their hijab. Utilizing visual aids and illustrations featuring imagery that resonates with Muslim women, such as those wearing a hijab, will enhance communication, understanding, and trust. Sensitivity towards cultural norms, such as limited direct eye-to-eye contact or physical handshakes can be beneficial in creating a more comfortable environment [54]. Furthermore, it is important that these behaviors are contextualized within the patient's values and social norms, rather than pathologized as part of an underlying disease. When questions arise around whether a certain unfamiliar behavior is aberrant or not, close collaboration with family or other clinicians familiar with the patient's background is useful. Providing a reflection room for spiritual activity and restrooms equipped with footbaths to make the *Wudu* (Islamic ablution before the five daily prayers) in clinical settings can serve to enhance patient comfort. Finally, while not always possible, offering the option of a female healthcare provider may enhance Muslim women's comfort [55].

Meeting with clinicians or clinical researchers for initial dementia evaluation

During the evaluation phase, often conducted by a neurologist or geriatrician, the principles of modesty and hijab, deeply ingrained in Islamic culture, must be recognized and honored [56], Islamic jurists are at a consensus in the permissibility of modifications or outright removal of the hijab in dire medical emergencies; however, there is significant hesitancy on the scope of modifications permitted in other non-life threatening interventions or medical care in the absence of female clinicians [57]. Therefore, while patients may agree to modest modifications to clothing for medical purposes [58], clinicians should minimize the need for these modifications and prioritize patient boundaries as much as possible. Clinicians should provide detailed explanation of procedures and physical examinations and strive for maximum flexibility in examinations to allow as little exposure of the patient as possible.

Many Muslim women prefer a female provider [31]. Where and when possible, this wish should be honored. When not feasible due to a limitation of providers or availability, the medical institution or

provider should communicate with the patient prior to the appointment. Early communication with the patient and her family may also provide the opportunity to better understand unique patient practices and preferences. Given that patients with cognitive impairment may find it challenging to articulate their specific needs related to religious practices, clinicians should probe the patient and, if need be, family members about these cultural preferences or considerations. These preferences should be documented in the patient's chart and communicated to other members of the care team (e.g., neuropsychology, social work, psychiatry, physical and occupational therapy).

Muslim women may be accompanied to medical appointments by their mahram, a close family member with whom marriage is impermissible or a spouse [59]. The mahram, who is often someone close to and trusted by the patient, could play an important role in providing collateral information about the patient's symptoms or even communicating directly on behalf of the patient. Clinicians may leverage this important source of information but should also apply the same scrutiny as would be given to any collateral informant (i.e., that perspectives may differ based on individual expectations and motivations; that time and familiarity with the patient may influence the validity and reliability of the information provided). In other words, a mahram should not be automatically considered the best source of information on the patient's past or current symptoms and functioning, and other sources of input should be sought out. The mahram (or other family) may also share insights into religious or cultural preferences or provide counseling regarding acceptable modifications of hijab or niqab to allow for assessment and treatment. Furthermore, the mahram may serve as a bridge between the patient and provider, assisting with communication of test results, diagnosis, and treatment options.

Clinicians often rely on patients and collateral informants to highlight behaviors that are abnormal or unusual for the patient, as behavioral, mood, or personality changes often represent the first noticeable symptoms among individuals with ADRD. For instance, clinicians may ask the patient or her loved ones about socially unusual or inappropriate behavior. Answers must be grounded in what is normative for the patient's culture and living situation. For example, Islam's view on eating with one's fingers, commenting on the looks of a passerby, wearing the same clothes repeatedly, and hugging a stranger (as is done on many celebratory occasions such as Eid) may be different from Western social norms [60].

On the note of caregivers, there is evidence that some Muslim caregivers are unlikely to identify themselves as such, seeing their tasks as an innate part of their role as a family member [61–63]. While this may assuage some aspects of caregiving, it may also make these care providers less likely to seek out assistance or respite services. Furthermore, Muslim families may be more likely to view long-term caregiving and hospice or palliative care as their responsibility and may therefore by reticent to consider home health aides or assisted living/skilled nursing options. These resources should be offered with care and sensitivity, as they may be viewed as a 'last resort' by family caregivers [64–67].

Procedures involving physical samples or donation

Clinicians and clinical researchers must also be attuned to the unique perspectives of Muslim patients concerning end-of-life care and organ donation. There is a difference of opinion amongst the Islamic schools of jurisprudence on organ donation and the conditions that need to be satisfied in order for permissibility [68, 69]. In Islam, the sanctity of the human body is highly revered; therefore, some patients may see organ donation or even the sharing of physical samples like cerebrospinal fluid (CSF) or blood as desecration. It is important to contextualize discussions about physical samples or brain donation within the patient's specific beliefs and explain the utility of these samples for diagnosis and treatment planning.

Cognitive testing and neuropsychological evaluation

The neuropsychological evaluation involves lengthier clinical interactions and largely requires that the patient is alone with an examiner during cognitive testing. The preference for a female test psychometrist or examiner may be even more critical, considering restrictions on being alone with the opposite sex in Islam. If a female examiner is not available, a mahram or other family member may accompany the patient to testing but must be clearly instructed to sit behind and out of view of the patient, and to avoid providing any answers, cues, or distractions during testing.

Additional consideration must be given to selecting a test battery that is individualized to the patient. While comprehensive discussion of the tenets of cul-

turally informed neuropsychological assessment is outside of the scope of this review, some comments specific to Muslim women are provided. Muslims may be of multilingual or immigrant background, and even those with full native English proficiency may struggle with object naming, fluency, verbal abstraction, or other language-based tasks if their usage of certain words was largely restricted to one linguistic setting or employed code-switching [70]. Sentence structures common in Western or English-speaking society but less familiar to others (e.g., "set the clock to 10 past 11" during a Clock-Drawing Test) may impact an individual's answer and response latency. Where possible, the evaluation should be done by an examiner fluent in the patient's first language. The use of interpreters is allowable provided that the interpreter is well-versed on the specific parameters around interpretation in neuropsychological assessment (e.g., no paraphrasing of answers, no repetition or clarification of instructions unless overtly indicated), though mahram or family are discouraged from serving as interpreters. There is therefore a great need for the translation and cultural adaptation of tests [71].

It is also important to consider how culture may influence the battery design or approach. Some Muslim women may wear gloves to cover their hands and preserve modesty. The examiner must consider the impact of this practice on the reliability and validity of the cognitive data or choose to adapt the battery to accommodate this practice. For example, rather than hoping to hear what could be a muted tap during the attention subtest of the Montreal Cognitive Assessment, examiners could instruct the gloved patient to raise her hand. An examiner may elect not to administer tests reliant on fine dexterity (e.g., the Grooved Pegboard Test) under these conditions. Additionally, the examiner must take careful behavioral observations regarding the impact of wearing gloves on drawing or writing tasks.

Muslim women may also prefer not to be directly touched during the appointment, which may limit the examiner's ability to conduct the tactile portions of the sensory perceptual examination. In this instance, the neuropsychologist should consider exploring alternative options with the patient, such as using a device or manipulable (e.g., soft end of a pen or pencil eraser) to touch the patient instead. Head coverings may create an additional barrier to sensation and expression. For example, a hijab or niqab covers a woman's ears; depending on material, it may impact hearing sensitivity, making it more challenging for patients to hear specific stimuli during a sensory perceptual examination or instructions throughout the examination. Clinicians should assess whether this issue is present prior to the onset of testing, and should make accommodations (e.g., providing written instructions in addition to verbal directions, increasing speech volume) one testing has proceeded. A niqab or abaya may limit visibility or certain range of motion functions, such as placing a leg upon another leg or peripheral vision [72]. Examiners should again assess any barriers to movement or communications at the beginning of the evaluation and adjust as needed. Additionally, when speech or verbal abilities represent a key aspect of the presenting problem, the neuropsychologist should carefully differentiate between articulation or expression observations due to clothing or culture versus those driven by neurologic, cognitive, or physical changes (e.g., hypophonia, dysarthria, word-finding difficulty). Careful history-taking and input from the mahram or others familiar with the patient may shed light on whether behaviors noticed in session are culturally appropriate and stable versus abnormal and/or novel. While not all testing accommodations can be granted in the context of the highly standardized neuropsychological evaluation, these creative modifications demonstrate empathy and understanding that may support trust-building with diverse patients.

In the absence of a female provider, great care should be taken in how close interactions for smaller tests assessing motor skills are performed. Maintaining some distance in physical proximity and being mindful of asking before touching or guiding arm movement can be helpful.

Brain imaging

It is important that clinicians and clinical researchers carefully describe, before the appointment, imaging procedures like magnetic resonance imaging (MRI) and computerized tomography (CT), including detailed explanations about the screening process, positioning of the body for testing, and potential physical touch. Patients are often required to change into hospital-provided clothing to ensure safety and comfort in the scanner; when possible, Muslim women should be provided with clothing that offers more coverage of the legs, arms, and neck area to preserve modesty [73]. In the event that patients are allowed to wear their own clothing rather than utilizing hospital-provided clothing, patients should be encouraged to use cloth-tied scarves for ease of

modification or removal. They may choose to wear two-piece garments instead of a full-length abaya for the same reason. Technicians may provide a private space or employ curtains or screens to strategically support patient privacy when clothing modifications are required. As mentioned previously, such options and possible imaging should be discussed collaboratively with the patient well in advance to allow patients to bring appropriate clothing.

Genetic or biomarker testing

Genetic or biomarker testing involving positron emission tomography (PET) scans or CSF collection can be sensitive topics, and healthcare providers should approach them with detailed explanations and clear communication. Amyloid-β testing including PET, lumbar puncture for CSF, or blood draws may become more frequent with the recent development and approval of anti-amyloid medications [73]. Discussions around genetic testing that may have implications for family members, or bioethical implications relating to body parts, should be carefully navigated to create a respectful dialogue that aligns with the patient's beliefs. Offering patients the opportunity to seek counsel from local ulema, or scholars, can be particularly useful as some may wish to consult religious authorities before furthering any care procedures.

Treatment and treatment planning

Feedback and disclosure of diagnostics or biomarkers should be handled with many of the same sensitivities highlighted above with patient interaction and familial participation. Treatment planning must include discussion of whether the patient follows Halal. Halal-compliant medications usually involve no alcohol or meat-derived products (unless sourced from a Zabiha-halal compliant method of slaughtering). This includes common products such as gelatin, glycerol, alcohol stearates, heparin, and many monoglycerides and diglycerides [74].

Non-pharmacologic treatments or lifestyle changes are also effective for the slowing of cognitive symptoms in ADRD but must be modified to ensure compliance and benefit for Muslim patients [75]. For example, neuromodulation (altering nerve activity through targeted delivery of a stimulus, such as electrical stimulation or chemical agents, to specific neurological sites in the body, including the scalp) is a potential therapeutic intervention for cognitive and behavioral symptoms of ADRD [76, 77]. As previously mentioned, procedures that require removal of head coverings and touching of the face and hair should be discussed carefully with the patient prior to treatment, with appropriate modifications made when possible.

Advance care planning and caregiver/family support

In providing advanced care planning for Muslim women living with ADRD, clinicians must recognize the nuanced impact of Islamic beliefs and practices on the sanctity of life and how rulings may apply differently in life-saving conditions [78]. The Qur'an and Hadith make several references to developmental stages and cognitive weakness, specifically memory loss, which is framed as a natural stage in human development and this perception guides end-of-life care, emphasizing life preservation and acceptance of God's will [79–82]. Medical decision-making must align with Islamic ethics, considering the importance of family caregiving and the commandment to care for older adults. The appointment of power of attorney and decisions about housing must be handled with attention to Islamic family dynamics, gender roles, and the family's central role in caregiving. This extends to financial arrangements, including insurance, where many Muslims may seek to comply with Islamic principles like avoiding interest.

Clinicians must also recognize religious obligations and exemptions for dementia patients, such as prayer and fasting, and be aware of the influence of community religious leaders and support networks [83, 84]. Forgetfulness of religious duties such as prayers, confusing prayer timings, or verses of the Qur'an that one has recited for decades may be used by caregivers to gauge progression of memory loss [47]. It is worth noting that due to having learnt many of these verses in early childhood, retention may last longer during disease progression.

Understanding and addressing cultural resistance and stereotypes through respectful dialogue with patients, families, and religious leaders will bridge perceptual gaps and foster collaboration [85, 86]. Legal considerations must be navigated with sensitivity to Islamic principles, possibly involving experts in Islamic law. By embracing these multifaceted considerations, clinicians can craft a comprehensive, culturally aligned care plan that fosters trust, enhances motivation, and accommodates the spir-

Table 1
Overview of considerations for providing culturally sensitive dementia evaluation & care to Muslim women

- Facilitate introductions to ensure patient comfort and privacy during virtual consultations.
- Arrange appointments (including virtual appointments) in secluded spaces to prevent inadvertent exposure of patients in shared workspaces or other settings.
- Utilize telemedicine platforms that offer customizable virtual backgrounds to minimize distractions and provide an option for patients to display additional personal elements discreetly.
- Incorporate visual aids with diverse imagery, such as women wearing hijab, to complement written instructions and facilitate understanding of complex medical concepts.
- Provide detailed guidance on self-examination techniques and the secure submission of relevant materials, allowing patients to capture photographs of affected areas independently or with the assistance of a family member for remote review by healthcare providers.
- Consider phone calls without video components as an alternative option for patient interactions, depending on individual circumstances and needs.
- Maintain awareness of limitations in internet access, or technical difficulties that may cause discomfort during telemedicine services, ensuring appropriate measures are in place to mitigate these challenges.
- Explain procedures prior to each appointment, including the need for changes in dress or physical examination to allow the patient to prepare. When possible, allow the option to make slight adjustments to a hijab or niqab instead of requiring complete removal. Encourage the use of scarves tied with cloth instead of relying on pins, enabling patients to make modifications more easily while maintaining appropriate coverage. Offer the option to wear two-piece garments instead of a full-length abaya.
- Provide additional time after knocking before entering a room to allow patients to adjust head coverings or clothing.
- Explain the need for and request consent before physical touch during an examination.
- Collaborate with mahram or other close family members who may be able to assist in clothing modifications or provide collateral information regarding a patient's functioning.
- Contextualize unfamiliar behaviors within cultural norms, using assistance from mahram or other family. Adapt communication approaches to accommodate individual patient comfort levels, considering factors such as eye-to-eye interaction and respecting personal boundaries.
- Consider whether both the format and content of structured assessments and questionnaires are appropriate for the patient's linguistic and cultural background.
- Whenever feasible, honor requests for female healthcare providers to support patient comfort, privacy, and adherence to cultural preferences during medical consultations.
- Integrate cultural and religious tenets and preferences into treatment plans (e.g., requirement for halal medications).
- Ensure convenient access to sinks, private restrooms, and, if possible, footbaths, enabling patients to engage in ablution practices and make necessary hijab modifications.
- Create designated reflection rooms or private spaces within healthcare facilities to allow patients to engage in spiritual practices or adjust their hijabs comfortably.
- Enhance healthcare providers' understanding of culturally sensitive patient care through comprehensive educational sessions and ongoing training initiatives, including the integration of specialized modules into new staff orientation and annual training programs.

itual, emotional, and practical needs of Muslim patients living with ADRD.

CONCLUSIONS

In conclusion, the care and management of ADRD in Muslim women who wear a hijab or niqab require an intricate understanding of cultural, religious, and gender considerations. We wish to emphasize that accommodating requests for female clinicians whenever possible at every step of ADRD care, be it nurses assisting in ambulation to technicians for MRI scans, is of paramount importance, given that many American Muslim women reported delays in seeking care on account of a perception of a lack of same-sex providers. It stands out as the most useful tool in easing *purdah* (privacy) restrictions for Muslim women and easing comfortability in care with respect to a hijab or niqab.

The insights and recommendations provided in this paper offer a roadmap for healthcare providers to approach ADRD care holistically, honoring the Islamic principles of modesty, ethics, and familial involvement. From the primary care appointment to the complexities of neuropsychological evaluation, brain imaging, genetic testing, and advanced care planning, each step is imbued with specific culturally sensitive measures. By weaving these nuances into daily clinical practice, healthcare providers can foster a trusting environment, enhance patient comfort, and ultimately improve the quality of life for Muslim women living with ADRD. Bridging the existing gaps in the research, this paper stands as a vital resource for understanding and implementing

religio-culturally conscious dementia care, opening avenues for further studies, and setting a standard for inclusivity and empathy in medical care.

By incorporating the considerations outlined in Table 1, healthcare providers can begin building the foundation of culturally sensitive care with the ultimate goals of improving patient experiences and enhancing the well-being of Muslim patients living with dementia. It is worth bearing in mind that there is no one approach that encapsulates the experiences or perspectives of all Muslim women, and that general guidelines for competence need to be balanced with recognition of the heterogeneity in levels of observance and comfort amongst the population. Further research and collaboration between healthcare professionals and Muslim communities are warranted to continually refine and improve culturally sensitive care for this population.

AUTHOR CONTRIBUTIONS

Bilal Irfan (Conceptualization; Methodology; Writing – original draft; Writing – review & editing); Ghadeer Ankouni (Conceptualization; Methodology; Writing – review & editing); Jonathan Reader (Conceptualization; Methodology; Project administration; Resources; Supervision; Writing – review & editing); Navid Seraji-Bozorgzad (Supervision; Writing – review & editing); Bruno Giordani, PhD (Conceptualization; Writing – review & editing); Kelly Bakulski (Resources; Writing – review & editing); Arijit Bhaumik (Conceptualization; Writing – review & editing); Benjamin Hampstead (Conceptualization; Writing – review & editing); Annalise Rahman-Filipiak (Conceptualization; Methodology; Supervision; Writing – original draft; Writing – review & editing).

ACKNOWLEDGMENTS

The authors have no acknowledgments to report.

FUNDING

This work was supported by funding from the Michigan Alzheimer's Disease Research Center, University of Michigan (P30 AG072931; PI: Paulson). Additional support was provided by funding from the National Institute on Aging (R35AG072262 [PI: Hampstead]; K23AG07004401 [PI: Rahman-Filipiak]). The authors would also like to thank the participants and families of the Michigan Alzheimer's Disease Research Center for the time and trust they share with us, which informed this review.

CONFLICT OF INTEREST

The authors have no conflict of interest to report.

DATA AVAILABILITY

Data sharing is not applicable to this article as no datasets were generated or analyzed during this study.

REFERENCES

[1] Clark JL, Phoenix S, Bilbrey AC, McManis T, Escal KA, Arulanantham R, Sisay T, Ghatak R (2018) Cultural competency in dementia care: An African American case study. *Clin Gerontol* **41**, 255-260.

[2] Vu M, Mangal R, Stead T, Lopez-Ortiz C, Ganti L (2022) Impact of Alzheimer's disease on caregivers in the United States. *Health Psychol Res* **10**, 37454.

[3] Zhang J, Wang J, Liu H, Wu C (2023) Association of dementia comorbidities with caregivers' physical, psychological, social, and financial burden. *BMC Geriatr* **23**, 60.

[4] Harris ML, Titler MG, Hoffman GJ (2021) Associations between Alzheimer's disease and related dementias and depressive symptoms of partner caregivers. *J Appl Gerontol* **40**, 772-780.

[5] Brodaty H, Donkin M (2009) Family caregivers of people with dementia. *Dialogues Clin Neurosci* **11**, 217-228.

[6] Lindeza P, Rodrigues M, Costa J, Guerreiro M, Rosa MM (2024) Impact of dementia on informal care: A systematic review of family caregivers' perceptions. *BMJ Support Palliat Care* **14**, e38-e49.

[7] Werner P, Mittelman MS, Goldstein D, Heinik J (2012) Family stigma and caregiver burden in Alzheimer's disease. *Gerontologist* **52**, 89-97.

[8] Liu R, Chi I, Wu S (2022) Caregiving burden among caregivers of people with dementia through the lens of intersectionality. *Gerontologist* **62**, 650-661.

[9] (2023) 2023 Alzheimer's disease facts and figures. *Alzheimers Dement* **19**, 1598-1695.

[10] Giannouli V, Giannoulis K (2020) Gazing at Medusa: Alzheimer's dementia through the lenses of spirituality and religion. *Health Psychol Res* **8**, 8833.

[11] Kaye J, Robinson KM (1994) Spirituality among caregivers. *Image* **26**, 218-221.

[12] Picot SJ, Debanne SM, Namazi KH, Wykle ML (1997) Religiosity and perceived rewards of black and white caregivers. *Gerontologist* **37**, 89-101.

[13] Salamizadeh A, Mirzaei T, Ravari A (2017) The impact of spiritual care education on the self-efficacy of the family caregivers of elderly people with Alzheimer's disease. *Int J Community Based Nurs Midwifery* **5**, 231-238.

[14] Muili AO, Mustapha MJ, Offor MC, Oladipo HJ (2023) Emerging roles of telemedicine in dementia treatment and care. *Dement Neuropsychol* **17**, e20220066.

[15] Rini JF, Tsoy E, Peet B, Best J, Tanner JA, Asken BM, Sanchez A, Apple AC, VandeVrede L, Stephens ML, Erkkinen M, Kramer JH, Miller BL (2022) Feasibility and

acceptability of a multidisciplinary academic telemedicine system for memory care in response to COVID-19. *Neurol Clin Pract* **12**, e199-e209.

[16] Borson S, Chen A, Wang SE, Nguyen HQ (2021) Patterns of incident dementia codes during the COVID-19 pandemic at an integrated healthcare system. *J Am Geriatr Soc* **69**, 3389-3396.

[17] Hardan L, Filtchev D, Kassem R, Bourgi R, Lukomska-Szymanska M, Tarhini H, Salloum-Yared F, Mancino D, Kharouf N, Haikel Y (2021) COVID-19 and Alzheimer's disease: A literature review. *Medicina (Kaunas)* **57**, 1159.

[18] Tannous J, Pan A, Bako A, Potter T, Jones SL, Janjan N, Smith ML, Seshadri S, Ory MG, Vahidy FS (2022) COVID-19 associated disruptions in routine health care of people with mild cognitive impairment or dementia. *Alzheimers Dement (Amst)* **14**, e12323.

[19] Mok VCT, Pendlebury S, Wong A, Alladi S, Au L, Bath PM, Biessels GJ, Chen C, Cordonnier C, Dichgans M, Dominguez J, Gorelick PB, Kim S, Kwok T, Greenberg SM, Jia J, Kalaria R, Kivipelto M, Naegandran K, Lam LCW, Lam BYK, Lee ATC, Markus HS, O'Brien J, Pai M, Pantoni L, Sachdev P, Skoog I, Smith EE, Srikanth V, Suh G, Wardlaw J, Ko H, Black SE, Scheltens P (2020) Tackling challenges in care of Alzheimer's disease and other dementias amid the COVID-19 pandemic, now and in the future. *Alzheimers Dement* **16**, 1571-1581.

[20] Lancashire L, Biggar V, Comer M, Frangiosa T, Gage A, Paulsen R, Roniger A, Wolfe J (2023) Caring for dementia caregivers: Understanding caregiver stress during the COVID-19 pandemic. *Gerontol Geriatr Med* **9**, 23337214231185664.

[21] Brown EE, Kumar S, Rajji TK, Pollock BG, Mulsant BH (2020) Anticipating and mitigating the impact of the COVID-19 pandemic on Alzheimer's disease and related dementias. *Am J Geriatr Psychiatry* **28**, 712-721.

[22] Chen R, Charpignon M-L, Raquib R V., Wang J, Meza E, Aschmann HE, DeVost MA, Mooney A, Bibbins-Domingo K, Riley AR, Kiang MV, Chen Y-H, Stokes AC, Glymour MM (2023) Excess mortality with Alzheimer disease and related dementias as an underlying or contributing cause during the COVID-19 pandemic in the US. *JAMA Neurol* **80**, 919.

[23] Vila-Castelar C, Fox-Fuller JT, Guzmán-Vélez E, Schoemaker D, Quiroz YT (2022) A cultural approach to dementia — insights from US Latino and other minoritized groups. *Nat Rev Neurol* **18**, 307-314.

[24] Chin AL, Negash S, Hamilton R (2011) Diversity and disparity in dementia. *Alzheimer Dis Assoc Disord* **25**, 187-195.

[25] Rosselli M, Uribe IV, Ahne E, Shihadeh L (2022) Culture, ethnicity, and level of education in Alzheimer's disease. *Neurotherapeutics* **19**, 26-54.

[26] Werner P, Friedland RP, Inzelberg R (2015) Alzheimer's disease and the elderly in Israel. *Am J Alzheimers Dis Other Demen* **30**, 448-453.

[27] Bowirrat A, Friedland RP, Farrer L, Baldwin C, Korczyn A (2002) Genetic and environmental risk factors for Alzheimer's disease in Israeli Arabs. *J Mol Neurosci* **19**, 239-245.

[28] Gupta S (2021) Racial and ethnic disparities in subjective cognitive decline: A closer look, United States, 2015-2018. *BMC Public Health* **21**, 1173.

[29] El-Metwally A, Toivola P, Al-Rashidi M, Nooruddin S, Jawed M, AlKanhal R, Razzak HA, Albawardi N (2019) Epidemiology of Alzheimer's disease and dementia in Arab countries: A systematic review. *Behav Neurol* **2019**, 3935943.

[30] Afgin AE, Massarwa M, Schechtman E, Israeli-Korn SD, Strugatsky R, Abuful A, Farrer LA, Friedland RP, Inzelberg R (2012) High prevalence of mild cognitive impairment and Alzheimer's disease in Arabic villages in Northern Israel: Impact of gender and education. *J Alzheimers Dis* **29**, 431-439.

[31] Vu M, Azmat A, Radejko T, Padela AI (2016) Predictors of delayed healthcare seeking among American Muslim women. *J Womens Health* **25**, 586-593.

[32] Raman R, Aisen P, Carillo MC, Detke M, Grill JD, Okonkwo OC, Rivera-Mindt M, Sabbagh M, Vellas B, Weiner M, Sperling R (2022) Tackling a major deficiency of diversity in Alzheimer's disease therapeutic trials: An CTAD Task Force Report. *J Prev Alzheimers Dis* **9**, 388-392.

[33] Babulal GM, Quiroz YT, Albensi BC, Arenaza-Urquijo E, Astell AJ, Babiloni C, Bahar-Fuchs A, Bell J, Bowman GL, Brickman AM, Chételat G, Ciro C, Cohen AD, Dilworth-Anderson P, Dodge HH, Dreux S, Edland S, Esbensen A, Evered L, Ewers M, Fargo KN, Fortea J, Gonzalez H, Gustafson DR, Head E, Hendrix JA, Hofer SM, Johnson LA, Jutten R, Kilborn K, Lanctôt KL, Manly JJ, Martins RN, Mielke MM, Morris MC, Murray ME, Oh ES, Parra MA, Rissman RA, Roe CM, Santos OA, Scarmeas N, Schneider LS, Schupf N, Sikkes S, Snyder HM, Sohrabi HR, Stern Y, Strydom A, Tang Y, Terrera GM, Teunissen C, Melo van Lent D, Weinborn M, Wesselman L, Wilcock DM, Zetterberg H, O'Bryant SE (2019) Perspectives on ethnic and racial disparities in Alzheimer's disease and related dementias: Update and areas of immediate need. *Alzheimers Dement* **15**, 292-312.

[34] Irfan B, Yasin I, Yaqoob A (2023) Tele-ID Politesse: Recognizing cross-culturally sensitive care with Hijab and Niqab. *Clin Infect Dis* **77**, 1614-1615.

[35] Rehman R, Mateen M, Tripathi R, Fahs F, Mohammad TF (2023) Teledermatology etiquette and the hijab: Recommendations for culturally sensitive care. *Int J Dermatol* **62**, e309-e310.

[36] Irfan B, Yasin I, Yaqoob A (2023) Considering Hijab and Niqab: Suggestions to improve care in infectious disease clinics. *Infect Dis Clin Pract* **31**, e1302.

[37] Rehman R, Chabaan A, Hamzavi I, Fahs F, Mohammad TF (2022) The etiquette of hijab: Recommendations to improve care in dermatology clinics. *Br J Dermatol* **186**, 176-177.

[38] Irfan B, Yaqoob A (2023) Dermatological implications of the Taqiyah and Imamah: Recommendations for delivering culturally conscious care. *Cureus* **15**, e45528.

[39] Al-Issa RS, Krauss SE, Roslan S, Abdullah H (2021) To heaven through hell: Are there cognitive foundations for purgatory? Evidence from Islamic cultures. *Religions (Basel)* **12**, 1026.

[40] Albar MA (1999) Counselling about genetic disease: An Islamic perspective. *East Mediterr Health J* **5**, 1129-33.

[41] Bakur KH, Al-Aama JY, Alhassnan ZN, Brooks H, Clancy T, Manea W, Takroni SA, Ulph F (2022) Exploring the role of Islam on the lived experience of patients with Long QT Syndrome in Saudi Arabia. *J Genet Couns* **31**, 922-936.

[42] Mushtaq SB, Ayvaci ER, Hashimi M, North CS (2020) Bringing psychiatry into the mosque: Analysis of a community psychoeducation intervention. *J Psychiatr Pract* **26**, 249-257.

[43] Hafiz J, Dzulkhairi MR, Shamsir MA, Abu N (2016) Knowledge, attitude and practice towards religious obligations

among healthcare workers in Hospital Langkawi, Malaysia. *IIUM Med J Malaysia* **15**, 3-6.
[44] Willis R, Zaidi A, Balouch S, Farina N (2020) Experiences of people with dementia in pakistan: Help-seeking, understanding, stigma, and religion. *Gerontologist* **60**, 145-154.
[45] Saherwala Z, Bashir S, Gainer D (2021) Providing culturally competent mental health care for Muslim women. *Innov Clin Neurosci* **18**, 33-39.
[46] Padela AI, Curlin FA (2013) Religion and disparities: Considering the influences of Islam on the health of American Muslims. *J Relig Health* **52**, 1333-1345.
[47] Daher-Nashif S, Hammad SH, Kane T, Al-Wattary N (2021) Islam and mental disorders of the older adults: Religious text, belief system and caregiving practices. *J Relig Health* **60**, 2051-2065.
[48] Rassool GH (2000) The crescent and Islam: Healing, nursing and the spiritual dimension. Some considerations towards an understanding of the Islamic perspectives on caring. *J Adv Nurs* **32**, 1476-1484.
[49] Zolezzi M, Bensmail N, Zahrah F, Khaled S, El-Gaili T (2017) Stigma associated with mental illness: Perspectives of university students in Qatar. *Neuropsychiatr Dis Treat* **13**, 1221-1233.
[50] Alvi A (2013) Concealment and revealment. *Curr Anthropol* **54**, 177-199.
[51] Alghafli Z, Marks LD, Hatch TG, Rose AH (2017) Veiling in fear or in faith? Meanings of the Hijab to practicing Muslim wives and husbands in the USA. *Marriage Fam Rev* **53**, 696-716.
[52] Othman Z, Aird R, Buys L (2015) Privacy, modesty, hospitality, and the design of Muslim homes: A literature review. *Front Archit Res* **4**, 12-23.
[53] Penn N, Laron M (2023) Use and barriers to the use of telehealth services in the Arab population in Israel: A cross sectional survey. *Isr J Health Policy Res* **12**, 21.
[54] Tackett S, Young JH, Putman S, Wiener C, Deruggiero K, Bayram JD (2018) Barriers to healthcare among Muslim women: A narrative review of the literature. *Womens Stud Int Forum* **69**, 190-194.
[55] Padela AI, Gunter K, Killawi A, Heisler M (2012) Religious values and healthcare accommodations: Voices from the American Muslim community. *J Gen Intern Med* **27**, 708-15.
[56] Malik A, Qureshi H, Abdul-Razakq H, Yaqoob Z, Javaid FZ, Esmail F, Wiley E, Latif A (2019) '*I decided not to go into surgery due to dress code*': A cross-sectional study within the UK investigating experiences of female Muslim medical health professionals on bare below the elbows (BBE) policy and wearing headscarves (hijabs) in theatre. *BMJ Open* **9**, e019954.
[57] Isa NM (2016) Darurah (necessity) and its application in Islamic ethical assessment of medical applications: A review on Malaysian Fatwa. *Sci Eng Ethics* **22**, 1319-1332.
[58] Khan S, Eldoma M, Malick A, Najeeb U, Furqan Z (2022) Dismantling gendered Islamophobia in medicine. *Can Med Assoc J* **194**, E748-E750.
[59] Alqufly AE, Alharbi BM, Alhatlany KK, Alhajjaj FS (2019) Muslim female gender preference in delaying the medical care at emergency department in Qassim Region, Saudi Arabia. *J Family Med Prim Care* **8**, 1658-1663.
[60] Attum B, Hafiz S, Malik A, Shamoon Z (2023) Cultural competence in the care of Muslim patients and their families. In *StatPearls*. StatPearls Publishing, Treasure Island (FL).
[61] Hossain MZ, Stores R, Hakak Y, Crossland J, Dewey A (2019) Dementia knowledge and attitudes of the general public among the Bangladeshi community in England: A focus group study. *Dement Geriatr Cogn Disord* **48**, 290-296.
[62] Hossain MZ, Stores R, Hakak Y, Dewey A (2019) Traditional gender roles and effects of dementia caregiving within a South Asian ethnic group in England. *Dement Geriatr Cogn Disord* **48**, 330-336.
[63] Merrell J, Kinsella F, Murphy F, Philpin S, Ali A (2005) Support needs of carers of dependent adults from a Bangladeshi community. *J Adv Nurs* **51**, 549-557.
[64] Poole C, Harrison J, Hill J (2021) Understanding dementia in South Asian populations: An exploration of knowledge and awareness. *Br J Neurosci Nurs* **17**, 156-159.
[65] Hossain MZ, Mughal F (2021) Dementia and revivalist Islam: New perspectives to understanding dementia and tackling stigma. *J Eval Clin Pract* **27**, 213-217.
[66] Hossain MZ, Khan HTA (2020) Barriers to access and ways to improve dementia services for a minority ethnic group in England. *J Eval Clin Pract* **26**, 1629-1637.
[67] Hossain MZ, Khan HTA (2019) Dementia in the Bangladeshi diaspora in England: A qualitative study of the myths and stigmas about dementia. *J Eval Clin Pract* **25**, 769-778.
[68] Padela AI (2020) Islamic bioethical positions on organ donation and transplantation: Stressing rigor and caution in Fatwa reviews. *Transplant Direct* **6**, e586.
[69] Khoshravesh S (2023) Organ donation in Islam. In *Current Challenges and Advances in Organ Donation and Transplantation*. IntechOpen.
[70] Goral M, Conner PS (2013) Language disorders in multilingual and multicultural populations. *Annu Rev Appl Linguist* **33**, 128-161.
[71] Casas R, Guzmán-Vélez E, Cardona-Rodriguez J, Rodriguez N, Quiñones G, Izaguirre B, Tranel D (2012) Interpreter-mediated neuropsychological testing of monolingual Spanish speakers. *Clin Neuropsychol* **26**, 88-101.
[72] Pearce EI, Walsh G, Dutton GN (2008) Does the niqab (veil) wearer satisfy the minimal visual field for driving? *Ophthalmic Physiol Opt* **28**, 310-312.
[73] Mittendorff L, Young A, Sim J (2022) A narrative review of current and emerging MRI safety issues: What every MRI technologist (radiographer) needs to know. *J Med Radiat Sci* **69**, 250-260.
[74] Butler L, Mai T, Santanello C (2018) Assessing pharmacists' knowledge of Halal medications to support the health beliefs of patients. *Innov Pharm* **9**, 18.
[75] Chapleau M, Iaccarino L, Soleimani-Meigooni D, Rabinovici GD (2022) The role of amyloid PET in imaging neurodegenerative disorders: A review. *J Nucl Med* **63**, 13S-19S.
[76] Pople CB, Meng Y, Li DZ, Bigioni L, Davidson B, Vecchio LM, Hamani C, Rabin JS, Lipsman N (2020) Neuromodulation in the treatment of Alzheimer's disease: Current and emerging approaches. *J Alzheimers Dis* **78**, 1299-1313.
[77] Vecchio F (2022) Cognitive training and neuromodulation for Alzheimer treatment. *Aging* **14**, 3722-3723.
[78] Yunus RM, Duivenbode R, Padela AI (2024) American muslim engagement with advance care planning: Insights from a community survey. *Am J Hosp Palliat Care* **41**, 405-413.
[79] *Quran 46:15*.
[80] *Quran 16:70*.
[81] *Quran 12:94-95*.
[82] *Sahih al-Bukhari, Vol. 4, Book 52, Hadith 77*.
[83] Irfan B, Yaqoob A, Yasin I, Kirschner D (2024) Ramadan fasting. *Infect Dis Clin Pract* **32**, e1321.

[84] Abolaban H, Moujahed A Al (2017) Muslim patients in Ramadan: A review for primary care physicians. *Avicenna J Med* **07**, 81-87.

[85] Saunders M, Quinn M, Duivenbode R, Zasadzinski L, Padela AI (2024) A pilot efficacy trial to educate Muslim Americans about the islamic bioethical perspectives in end-of-life healthcare. *J Immigr Minor Health* **26**, 133-139.

[86] Piracha NZ, Nickel LB, Quryshi A, Salah R, Padela AI (2024) Muslims and end-of-life healthcare in non-Muslim majority nations: A systematic literature review. *J Pain Symptom Manage* **67**, e299-e312.