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Alzheimer's Disease and its Related Dementias among Asian Americans, Native Hawaiians, and Pacific Islanders: A Scoping Review

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Abstract

Background: The Asian American, Native Hawaiian, and Pacific Islander (AANHPI) aging population is rapidly growing and the burden of Alzheimer's disease and its related dementias (ADRD) will likely mirror this demographic growth. AANHPIs face significant barriers in obtaining timely ADRD diagnosis and services; yet little is known about ADRD in this population.

Objective: The study objective is to conduct a systematic review on the published literature on ADRD among AANHPIs to identify gaps and priorities to inform future research and action plans.

Methods: The systematic review was conducted following the PRISMA Protocol for Systematic Reviews. Co-author (TR), an experienced Medical Librarian, searched PubMed, EMBASE, PsycINFO, Cochrane Central of Clinical Trials, Ageline and Web of Science for peer-reviewed articles describing ADRD among AANHPIs. The search was not limited by language or publication date. Each citation was reviewed by two trained independent reviewers. Conflicts were resolved through consensus.

Results: The title/abstract and full texts of 1,447 unique articles were screened for inclusion, yielding 168 articles for analysis. Major research topics included prevalence, risk factors, comorbidities, interventions and outreach, knowledge and attitudes, caregiving, and detection tools. A limited number of studies reported on national data, on NHPI communities generally, and on efficacy of interventions targeting AANHPI communities.

Conclusion: To our knowledge, this is the first systematic review on ADRD among AANHPI populations. Our review provides a first step in mapping the extant literature on ADRD among this underserved and under-researched population and will serve as a guide for future research, policy and intervention.

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Conflict of interest
The authors have no conflict of interest to report.

Keywords

Race; Inequalities; Dementia; Review

Introduction

The U.S. population aged 65 years and older represented 15.2% of the total population in 2016 [1, 2]. According to U.S. Census projections, the share for this age group is expected to increase to 23.4% by 2060 [1, 2]. In light of these population changes, the United States is poised to see growth in the number of older adults experiencing cognitive impairment including progressive brain disorders such as Alzheimer's disease and its related dementias (ADRD). Recent estimates predict ADRD diagnoses among U.S. adults aged 65 years and older to be 13.9 million in 2060, up from 5.0 million in 2014, or 3.3% from 1.6% of the total population, respectively [3]. While dementia is not a normal part of aging, older age is the primary risk factor for ADRD, and a public health challenge impacting patients, families, and caregivers, as well as communities and healthcare systems.

Not only is the U.S. population aging considerably, but it is also becoming increasingly diverse. Projections point to racial and ethnic minorities emerging as the new majority [2]. Asian American, Native Hawaiian, and Pacific Islanders (AANHPIs) are the fastest growing racial and ethnic minority group in the United States. AANHPIs comprise an older adult population that is expected to surge by 145% between 2010 and 2030 [4]. Asian Americans (AAs) are at especially high risk for under-detection of cognitive impairment in addition to delayed diagnosis and suboptimal management of dementia [5, 6]. Moreover, AAs, relative to their non-Hispanic White counterparts, are less knowledgeable [7–10] about risk factors for Alzheimer's disease (AD) and face significant barriers including cultural misperceptions and stigma [10–14] surrounding ADRD that impede timely screening and services. Yet, there is a lack both of reliable prevalence data and understanding of the factors that influence ADRD among AANHPIs [15].

Findings from a systematic review of dementia prevalence and incidence across racial and ethnic minority populations in the United States demonstrate data gaps for most Asian American and Pacific Islander groups [15]. Limited disaggregated research reveal variations in ADRD prevalence rates among AANHPIs: 7.0% [6] for probable dementia in Korean Americans aged 60 years and older, between 6.3% [15, 16] and 7.6%[17] for dementia in Japanese Americans aged 65 years and older, and 12.2% [15, 18] for dementia in Chamorro (Guam) adults aged 65 years and older. These subgroup-level differences call for further research as well as the employment of thoughtfully tailored and culturally adapted strategies concerning ADRD education and resources to facilitate early detection and management in the groups that make up the heterogeneous AANHPI population.

The current knowledge base remains sparse in the context of ADRD among AANHPIs. An increased and more nuanced understanding of ADRD in this community is critical for developing appropriate interventions. Accordingly, we conducted a scoping review on the extant literature on ADRD among AANHPIs to characterize knowledge gaps and identify research priorities with the purpose of informing actionable steps toward addressing the rising burden faced by this under-researched population.

Methods

Inclusion and exclusion criteria

This scoping review on ADRD included all peer-reviewed and grey literature reporting on ADRD among AANHPI populations. The inclusion criteria for the larger study included articles that reported on AANH populations residing in the United States and Pacific Islanders residing in the United States or Pacific Islands and published after 1990. Exclusion criteria included dissertations, articles not in English, non-research articles (e.g., letters to the editor), and articles not considered applied or translational (e.g. articles focused on genotyping, neurotoxicology, etc.).

Search strategy

The literature search was conducted in December 2018 following the PRISMA Protocol for Scoping Reviews [19]. Co-author (TR), an experienced Medical Librarian, searched PubMed, EMBASE, PsycINFO, Cochrane Central of Clinical Trials, Ageline and Web of Science for peer-reviewed articles describing ADRD among AANHPIs. The PubMed Search Strategy is included as an appendix to this article (See Appendix A). In addition, results were supplemented from a search of the grey literature including book chapters and reports.

Review process

Duplicate articles were identified and removed from the database prior to and during screening. Each citation was reviewed by two trained independent reviewers (SM, YS, JW, RS) and conflicts were resolved through consensus. Citations were managed using Covidence [20]. Thematic synthesis was guided by an approach outlined by Arksey and Omalley [21], which involved description of data by themes identified a-priori (i.e., see key categories outlined in Table 2).

Results

Description of Studies

The preliminary search of the electronic databases identified 2,436 potentially relevant articles. After removal of duplicates, 1,477 articles remained. Screening by title and abstract resulted in 588 articles for full-text review. Most common reasons for exclusion were: 1) Wrong study population; 2) Article did not disaggregate results specifically for AANHPI individuals; 3) Article not in English. Full-text review resulted in 244 articles. Because of the large number of studies (n=61) focused on caregivers of ADRD patients, we further excluded studies whose primary focus was on caregivers for separate analysis. Because of the specific nature of articles related to ADRD measurement, we also excluded those studies (n=15) whose primary focus was on ADRD screening and diagnostic tools for publication in a separate manuscript. After removal of caregiver and screening/diagnostic tool articles, 168 articles remained and were analyzed for the current manuscript. Figure 1 is a consort diagram outlining of the search process including reasons for excluding studies at each stage.

Table 1 shows the characteristics of the included studies. Most notably, the majority of studies were conducted among East Asian populations, in part owing to the two sister cohort studies of older Japanese American men investigating rates, risk factors, and neuropatholic abnormalities associated with cognitive decline and dementia: 1. The Honolulu-Asia Aging Study (HAAS) began in 1991 and ended in 2012 and was comprised of a community-based sample [22]; 2. The KAME project was a population-based study out of Seattle and was conducted between 1992 and 2003. The majority of the studies were probability-based in their sampling and also quantitative in their methods.

Table 2 summarizes the key categories identified in the literature and include the following: prevalence; risk factors and co-morbidities; symptoms and clinical functioning; knowledge; attitudes; interventions; and ADRD in Guam. A large number of studies focused on ADRD in Guam due to its unique etiology; accordingly, results on Guam are presented separately in this manuscript. Table 3 summarizes the key gaps identified in the literature and corresponding priorities for action.

Prevalence

Overall we found 26 studies that include prevalence and incidence information on ADRD [6, 15–17, 23–44]. Six of these studies were national in scope [23, 25, 26, 28, 29, 35]. These datasets include: Compressed Mortality database by CDC WONDER [23]; Women’s Health Initiative Memory Study [26]; US National Mortality Records from the National Center for Health Statistics [28, 29]; the National Alzheimer’s Coordinating Center [35] and; the Current Resident Survey of the 1999 National Nursing Home Survey [25]. Four of these six datasets [23, 28, 29, 35] were based on retrospective analysis of mortality data. These national datasets included NH or NHPI individuals, but were aggregated with AA individuals [23, 25, 26, 28, 29] with the exception of the National Alzheimer’s Coordinating Center dataset [35].

Based on these six national studies, data showed that AANHPIs have similar rates of AD compared to Non-Hispanic Whites (NHWs) and lower rates compared to Non-Hispanic Blacks (NHBs) and Hispanics. Similarly, one study examining dementia incidence [33] reported highest rates for African Americans (26.6/1000 person-years) and American Indian and Alaskan Natives (22.2/1000 person-years), followed by Latinos (19.6/1000 person-years), PIs (19.6/1000 person-years), NWWs (19.3/1000 person-years), and AAs (15.2/1000 person-years). At the same time, a couple of population-based studies found that API are at greater risk for specific types of dementia compared to NHW, such as vascular dementia [40, 44]. Clinic-based samples show similar racial/ethnic patterns in prevalence, with AAs having similar rates of AD compared to NHWs and lower rates compared to African Americans and Hispanics [24]. Some studies found gender disparities with women showing a higher burden of AD compared to men [23, 28, 29], which could potentially be attributed to higher levels of estrogen among women [26].

Prevalence data examining AANHPI subgroup differences were sparse and inconclusive. Based on national mortality data from 2003 to 2011, Japanese Americans had the highest AD prevalence compared to other Asian subgroups in the United States: Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese [28, 29]. Data from the two largest cohort studies comprised of Japanese American men indicate that AD prevalence ranged from 6.3% (HASS study) to 7.6% (KAME study) [6, 16]. Studies using community-based samples showed conflicting information. One study found that rate of cognitive deficit is highest among older Korean Americans in Los Angeles compared to other AA subgroups [45]. Another study conducted using the Kaiser Permanente Northern California (KPNC) sample reported highest dementia incidence among Filipino Americans compared to Chinese, Japanese, South Asian, Other/Unknown Asian groups [34]. One community-based study reported lower prevalence of cognitive impairment and dementia among NHPI populations compared to AAs [38].

Risk factors and Co-morbidities

Overall, there were 51 studies focused on ADRD risk factors [22, 27, 33, 34, 41, 46–91]. The majority of the data on risk factors came from the large cohort studies of Japanese American men mentioned previously.

Sociodemographic Risk Factors—Older age, low education and income, and occupational factors (e.g., workplace safety/conditions, physical labor) have been associated with ADRD [33, 34, 48, 49, 80, 91]. While the relationship between education and ADRD have an inverse relationship in most studies, one population-based study conducted in California found that Filipino Americans had the highest levels of education as well as the highest rates of dementia incidence compared to Chinese, Japanese, South Asian, and White subgroups [34, 82].

Physiological Risk Factors—A large number of retrospective studies showed a relationship between mid-life vascular conditions (e.g., high systolic blood pressure) and late-life dementia [33, 41, 58, 70, 72, 73, 77, 80, 83, 88, 91], with the impact of vascular conditions observed roughly 25 years later [68, 73, 82, 88]. Lower body mass index (BMI) and slower decline in BMI were associated with reduced risk of dementia [59, 66]. Physiological risk factors for ADRD included higher free throxine levels [54], protein in urine (proteinuria) [65], and low cholesterol levels [87]. Prenatal characteristics and early life nutrition such as smaller head circumference [62] and height (61 inches or shorter) [46] were associated with longer duration of AD and more rapid progression of AD, respectively). Symptoms of sleep apnea were also considered a predictor of onset dementia [55, 57, 67]. Lastly, both low and high levels of insulin [76], and impaired glucose tolerance [52] were associated with an increased risk of developing dementia and vascular dementia, respectively.

Genetic Risk Factors—A few cohort studies have demonstrated the association between the apolipoprotein epsilon 4 (APOE-e4) gene and AD [41, 48, 49, 73, 78, 81], but not vascular dementia [41]. Some studies have indicated lower levels of this genotype among Asian populations worldwide [41] and among subgroups such as Japanese and Chinese

Americans compared to the general U.S. population [34], potentially contributing to the overall lower levels of AD among Asian Americans. One study also found that Japanese American men at mid-life with large concentrations of high-sensitivity C-reactive protein (hs-CRP), a nonspecific marker of inflammation, to be at increased risk for all dementias [82].

Underlying Co-morbid Conditions—Co-morbid conditions associated with ADRD included: cancer [61], type 2 diabetes [71], and various other chronic diseases including cardiovascular diseases and depression. For example, Chao et al (2014) found that the prevalence of depressive symptoms and diabetes was significantly higher among Chinese-Americans with cognitive impairment compared with their White counterparts (35% and 15% for depressive symptoms; 22% and 2% for diabetes) [92]. In a cross-sectional study looking at data records from nine Alzheimer’s Disease Diagnostic and Treatment Centers in California, API dementia patients experienced higher rates of vascular dementia, but lower rates of heart disease and chronic obstructive pulmonary disease and similar hypertension rates compared to White, Hispanic, and Black patients [44]. One study that looked at inflammatory responses as a risk factor for developing dementia among Japanese-American men concluded that those with dementia had a higher prevalence of vascular factors, such as coronary heart disease and diabetes, compared to those without dementia [82]. In another study comparing presence of cardiovascular diseases among those who developed dementia, AAs with the average age of 75.1 years old had the lowest percentage of cardiovascular disease, including heart failure, ischemic heart disease, and peripheral arterial disease, compared to Latino, African American, American Indian/Alaskan Native, and White subjects [93].

Behavioral and Psychosocial Risk Factors—Lack of physical activity, smoking, and low social engagement have been found to be risk factors for ADRD [27, 34, 81, 85, 89, 90]. Some studies suggest that frequent intake of fruit and vegetable juices containing high polyphenols were found to be protective of ADRD [53]. Data was inconclusive around the protective value of intake of vitamin E and C, with some studies suggesting an inverse relationship between intake and incident ADRD [75, 80]and others showing no relationship [74]. A community-based study of Japanese Americans showed that moderate alcohol consumption had beneficial effects on cognitive performance over time compared to those with no consumption [47].

Symptoms and Clinical Functioning

Five studies in our review examined symptoms and clinical functioning of ADRD, with four out of the five studies stemming from the HAAS dataset [27, 67, 86, 94, 95]. Stewart et al. (2005) found that dementia-associated weight loss began before the onset of the clinical symptoms and accelerated by the time of diagnosis [86]. The prevalence of driving – an indicator of functioning -- declined dramatically with level of cognitive functioning [27]. Cognitive deficits and awareness of memory problems were present years prior to diagnosis or onset of dementia [67, 94]. A study on frontotemporal dementia in Chinese Americans found that symptoms of the disease in this group were similar to those in Caucasians [95].

In a large cross-sectional study on behavioral symptoms in (MCI) and AD, Asian Americans were found to have the lowest prevalence of affective behaviors, such as depression, anxiety, and apathy, among African Americans and Caucasians and also lower prevalence of distress/tension disorders, such as agitation and irritability, compared to African Americans [96]. Among different impulse control behaviors, the only significant associations were found for disinhibition, where Asians Americans had the lowest prevalence in MCI, but highest prevalence in AD.

Knowledge

A total of 41 articles discussed ADRD knowledge [7–10, 31, 97–132]. Several studies identified that AAs are less knowledgeable about risk factors for AD compared to NHWs [7–9]. Early symptoms of dementia were misunderstood as a normal part of aging, and late stage symptoms were falsely identified as early symptoms of dementia [7, 31, 97, 98, 103, 104]. Pathological forgetfulness was viewed as a normal process of aging among different AA subgroups (i.e., Korean Americans, Vietnamese Americans, Chinese Americans, Filipino Americans, Vietnamese Americans and Asian Indians) [10, 31, 97–100, 103, 104, 106, 108–122, 124, 127–130, 132]. Additionally, Chinese Americans and Korean Americans (along with other minority groups such as African Americans and Latino Americans) attributed AD to psychosocial factors whereas Whites attribute AD to biomedical factors such as brain, body, disease and genetics [8, 126]. One important consideration was access to quality information on ADRD; one study evaluated the quality of dementia-related information that is available online (e.g., signs and symptoms) and determined that quality is lower in simplified Chinese compared to information in English [123].

When looking at different sub-types of knowledge, Asian Americans were most knowledgeable about the course of AD, were able to recognize AD, and at least have seen or heard of AD [7, 98, 103, 105, 107, 125]. Awareness of AD related services increased when individuals were married, had a higher level of acculturation, or had a family member who has AD, but awareness of services or having a family member with AD was not associated with better knowledge of AD [10, 102, 103, 132]. Duration of residence in the United States did not affect dementia literacy and younger people had less concern for developing AD [101, 102].With the exception of a single study on Asian Indian Americans, no studies have examined AD knowledge among South Asian Americans, Native Hawaiians and Pacific Islanders [31].

Attitudes and Perceptions

A total of 48 articles discussed attitudes related to ADRD [9, 11, 24, 31, 37, 78, 100, 103, 104, 106–110, 112, 113, 115, 116, 118–120, 124, 127, 128, 131, 133–154]. Numerous studies have shown that older AAs have non-favorable attitudes towards AD compared to NHWs [11]. AD is generally perceived as a mental illness and a form of insanity which is considered shameful amongst East Asian American subgroups, leading to a profound level of stigma surrounding AD [9, 24, 103, 104, 106, 108, 110, 115, 119, 124, 131, 138–144, 149, 150, 152–154]. Such stigma has been associated with increasing levels of stress among those with AD [109, 128]. Chinese Americans exhibited similar levels of AD stigma compared to other minority ethnic groups (Hispanic Latinos and African Americans) but less than NHWs [11, 112]. The perception that AD is an embarrassment was highest in Chinese Americans compared to Vietnamese Americans, Korean Americans, Filipino Americans and Asian Indian Americans [31]. Negative attitudes towards AD were not limited to uninformed members of the community but also included individuals who have relatives with AD [137]. One study among Chinese Americans showed that participants were still interested in increasing their knowledge of dementia and other mental illnesses despite stigmatized attitudes towards dementia [147].

Many AAs had not heard of and were not familiar with the English term, “Alzheimers” [31, 151]. Reflecting the lack of knowledge and stigmatized nature of the disease, several terms used to describe dementia in Asian languages have negative connotations. The term for dementia in Chinese is *chi dai zheng*, which translates to, “crazy and catatonic/insane and idiotic” [100, 113, 120, 136]. Similarly in Japanese, the term *kichigai*, is used which means crazy or insane [134]. In Korean, the term for dementia is *chi-mae*, which translates to stupidity or insanity [37, 136]. In Vietnamese, the term *lu lan* is used which describes a condition of confusion or memory impairment associated with old age, which may contribute to the normalization of AD as a part of aging in this specific subgroup [107, 118, 135].

Perceptions on causes of AD were linked to cultural, religious and spiritual beliefs such as retribution for individual or family sins, bad karma, imbalance in forms of energy (*yin and yang*) and improper alignment of the house – known as *feng shui* [78, 116, 133, 134, 141, 145]. However, a more recent study conducted with Chinese, Filipino and Japanese Americans found that the majority of the participants were aware that dementia is not a result of evil spirits nor related to bad actions or behaviors in the past, and may reflect growing awareness of AD overtime [127]. Research that examines perceptions of AD in South Asian Americans is limited, and nonexistent for NH and PI populations.

Interventions and Barriers to Recruitment

A total of 18 articles discussed ADRD interventions and potential barriers to recruitment of AANHPI participants [37, 111, 113, 124, 125, 133, 135, 139, 148, 149, 151, 155–161]. Interventions within the AANHPI communities are lacking, with four out of the five interventions focused solely on Chinese American populations, one focused on API communities, and no interventions focused on South Asian American or NH communities.

Education Based-Interventions—A total of five articles discussed AD-related interventions; two described intervention protocols, one presented process and some outcome measures, and two provided descriptive data from the interventions [113, 124, 158, 159, 161]. Interventions were primarily centered on educating individuals on ADRD, and connecting individuals to ADRD community resources. Out of five educational interventions, three were technology-based interventions in which ADRD education was delivered through a web-based (YouTube) and computer-based platform (CD-ROM) [124, 159, 161]. Two studies showed potential efficacy in delivering dementia education via Youtube among Chinese-Americans; however, the analyses were based on limited descriptive data [159, 161].

Other interventions focused on connecting community members to ADRD resources to help with community awareness and capacity building [113, 158]. One was the Asian Pacific Islander Dementia Care Network (DCN) which helped connect communities to existing dementia care services while also creating new services by using an inter organizational community-based collaborative model [158]. Another dementia care program, the Chinese Dementia Awareness and Intervention Project (CDAIP), focused on reaching out to the Boston Chinese community to raise awareness about dementia and caregiving resources in order to enhance the knowledge of dementia for both those affected and their caregivers [113].

Barriers to Recruitment—Literature showed several barriers to recruitment and participation of AANHPI participants in research studies, which may also explain the low number of intervention studies. The main barriers to recruitment were stigma and negative beliefs associated with ADRD in AA communities along with the lack of access to participation in studies. In one study, the stigma associated with ADRD led to difficulties in recruiting both dementia affected Chinese American elders and their caregivers [111]. Additionally, one study stated that it was not the lack of willingness from potential participants, but rather the lack of bilingual researchers and research team members in community settings [155]. Furthermore, studies show that due to these barriers in recruitment, a major time effort is required on the study team’s end [157].

Guam

In our review, there were 19 studies that focused on ADRD in Guam [162–180]. Until recently, the prevalence of dementia among the Chamorros, the indigenous population of Guam, was disproportionately high compared to other AANHPI populations and other racial/ethnic groups [167]. Based on a national, population-based survey of Chamorros, the point prevalence of all-cause dementia in 2004 was 12.2% [167] with subtype prevalence of Guam dementia (AD equivalent) at 8.8%, Parkinsonism-dementia complex at 1.5%, and pure vascular dementia at 1.3% [167]. Risk factors for ADRD included older age and low education. In contrast to other AANHPI populations, the APOE e4 allele gene was not associated with dementia for this population [167]. Many studies attribute this difference to dietary and environment factors. In particular, the Chamorros’ diet used to consist of cycad, which is an indigenous plant that has been linked to elevated levels of ADRD in this population [174, 178].

Discussion

This systematic scoping review is the first effort to map the extant literature on ADRD among AANHPI populations. Overall, the review identified a lack of studies that presented disaggregated data by AANHPI subgroups as well as any data specifically for NHPI and South Asian populations. In order to assess prevalence, risk factors, and clinical functioning across subgroups, larger studies with adequate sub-group sample sizes are needed in order to produce reliable estimates. Lack of ADRD data and lack of data disaggregation among

AANHPIs is a broader and persistent issue documented across other health topics and one that needs to be sorely addressed [181, 182].

In addition, our review demonstrated that ADRD knowledge is low and stigmatizing attitudes are prevalent, leading to a delay in care and treatment as well as participation in research studies. ADRD-related interventions are sparse and none have evaluated efficacy or effectiveness. Taken together, it is imperative that culturally and linguistically tailored interventions be developed and tested in order to increase knowledge and dispel negative attitudes and stigma around ADRD. Stigma exists at the individual-, family-, and community-level and will require targeted and innovative multi-level strategies to address it. In particular, family-level stigma often drives from Confucian concepts of preserving family honor and reputation – the idea that every family member should do their best for the family and avoid negative appraisal by others [183]. Accordingly, family-centered approaches that build on cultural assets such as family harmony and filial piety may be particularly effective in addressing ADRD-related stigma and increasing acceptability. Community-based approaches and peer-led approaches have also demonstrated efficacy in increasing other chronic disease outcomes among AAs and could serve as models for ADRD interventions [182, 184–186]. Innovative approaches, such as those leveraging technology and story-telling, should continue to be explored.

This study was characterized by some limitations. First, this review did not assess the methodological quality of the included studies, which was beyond the scope of this review. Second, there is a rich caregiving literature focusing on AANHPIs but was excluded for analysis in this current manuscript. The caregiving literature may have been more inclusive of other Asian subgroups and included studies on evaluation of interventions.

The AANHPI population in the United States, including the older AANHPI population, is rapidly growing. The gaps identified in this review hold potential to guide future research, policy, and programs. There has been increasing interest from federal and other funding agencies in supporting ADRD research, but only through targeted research and advocacy efforts will the aging AANHPI population benefit equitably.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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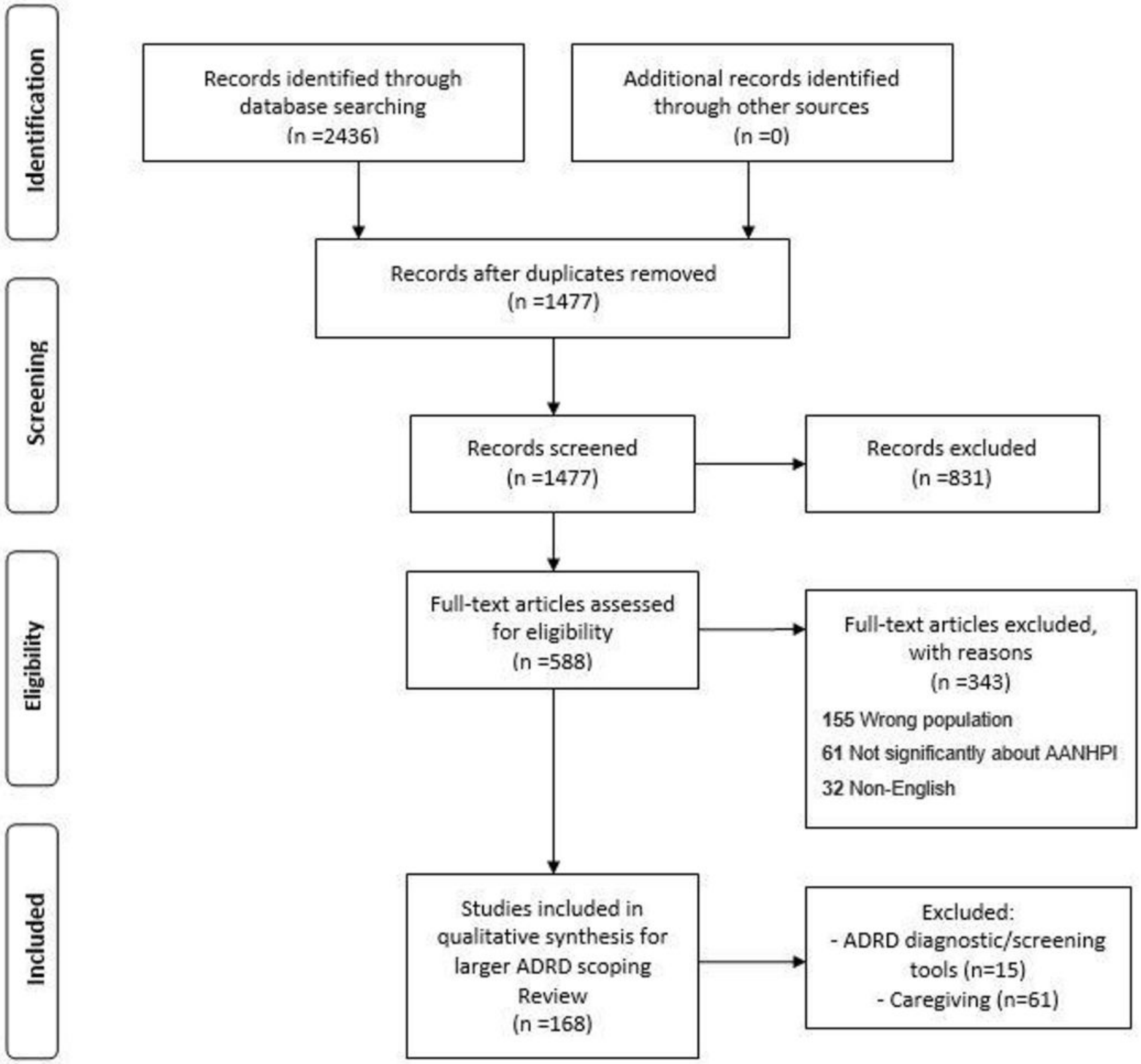

Figure 1.
Consort Diagram

Table 1.

Characteristics of Included Literature

Characteristics	**Number of References**
Ethnic group (Location)	
AA	15
NH	3
PI	1
AAPI	3
NHPI	1
AANHPI	0
	Total: 23
AANHPI [*] subgroups [**]	
Japanese	60
Chinese	58
Korean	13
Filipino	8
Vietnamese	13
Chamarro	20
Hmong	1
Asian Indian	4
	Total: 177
Study design	
Cross-sectional	67
Cohort study	68
Case control	3
Not applicable	30
	Total: 168
Sampling	
Random	85
Non-random	58
Not applicable	25
	Total: 168
Type of article/study	
Qualitative studies	19
Quantitative studies	95
Mixed methods	10
Reviews	15
Non-research peer-reviewed articles	14
Book chapters	13

Characteristics	Number of References
Case study	2
	Total: 168

[*] AANHPI: Asian American, Native Hawaiian, and Pacific Islanders

[**] Not mutually exclusive

Table 2.

Key Categories

Key categories	**Number of Articles**[**]
Prevalence	26
Risk Factors and Co-morbidities	56
Symptoms and Clinical Functioning	7
Knowledge	41
Attitudes	47
Interventions	18
Guam	19
	Total: 214

[**] Not mutually exclusive

Table 3.

Key Gaps and Priorities for Action

Gaps	Priorities for Action
National datasets assessing prevalence of ADRD often aggregate AANHPI groups together. Prevalence data are lacking for AANHPI subgroups.	Conduct studies with adequate sub-group sample sizes and analyze/report differences by sub-group.
Most data on risk factors, co-morbidities, and clinical functioning drew from the large cohort studies of Japanese American men.	Collect these data among specifically among underrepresented sub-groups.
Early symptoms of dementia were misunderstood as a normal part of aging and ADRD was highly stigmatized. No studies examined ADRD knowledge among South Asian Americans or Native Hawaiians and Pacific Islanders.	Develop and rigorously test culturally and linguistically tailored interventions in order to increase knowledge and dispel negative attitudes and stigma around ADRD. Incorporate community-based and family-centered approaches in interventions. Innovative approaches (e.g., via technology and story-telling) should continue to be explored.
Interventions are lacking, with majority of interventions focused on Chinese Americans and no interventions focused on South Asian American or NH communities. No studies have evaluated their efficacy or effectiveness.	