Impact of Chronic Conditions on COVID-19 Vaccine Hesitancy in Individuals with Alzheimer's Disease

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Introduction

- COVID-19 vaccination helps prevent severe illness, especially in Alzheimer's disease and related dementia (ADRD) populations.
- Despite its effectiveness, vaccine hesitancy remains a major challenge, influenced by:
  - Safety concerns & side effects (Radomyslsky et al. 2023).
  - Misinformation & fear of neurological complications (Rakusa et al. 2022).
  - Inconsistent guidance from healthcare providers.
- While studies explore vaccine hesitancy in neurological conditions, little is known about how chronic illnesses, such as diabetes and hypertension, influence vaccine acceptance in ADRD individuals.
- This study aims to address the intersection of ADRD, chronic illness, and vaccine hesitancy and examine how chronic health conditions impact COVID-19 vaccine hesitancy in individuals with ADRD

Methods

- The study design is a secondary data analysis using the *All of Us* research program database
- The sample included a total of 41, 982 participants
- The ADRD group had 4, 729 individuals who were diagnosed with Alzheimer's disease and related dementias (ADRD)
- The non-ADRD group was 37, 253 individuals without ADRD
- The independent variable in this study is the presence of chronic conditions such as diabetes, hypertension, heart failure, etc.
- The dependent variable in this study is vaccine hesitancy, which was measured through responses on protection duration categories
- Chi-square tests were conducted to assess associations between chronic conditions and vaccine hesitancy in ADRD vs. non-ADRD groups
- The statistical significance was determined at $p < 0.05$.

Results

- The results indicate that all tested chronic conditions were significantly associated with ADRD status and vaccine hesitancy ($p < 0.00001$) for all conditions
- Key findings include:
  - Cerebrovascular disease ($x^2 = 2479.49$) and stroke ($x^2 = 1380.02$) exhibited the strongest associated with ADRD status
  - Cerebral infarction ($x^2 = 1164.61$), hypertension ($x^2 = 1008.56$), coronary artery disease $x^2 = 862.79$ also had strong statistical relationships
  - Overweight ($x^2 = 2479.49$) had the weakest association among the conditions but remained statistically significant

Age Group	ADRD Cohort	Non-ADRD Cohort
18-44	314	7780
45-64	1055	11137
>65	3360	18336
Total	4729	37253

Table 1. Age Distribution of ADRD and Non-ADRD Cohorts. This table shows the distribution of individuals across different age groups, comparing individuals with ADRD to those without ADRD.

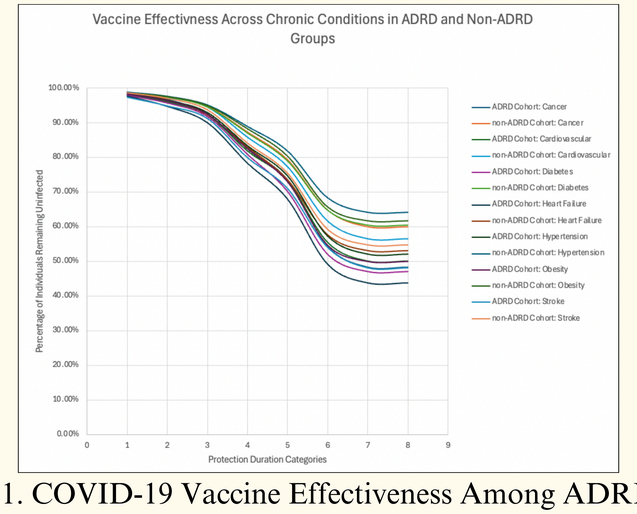

Figure 1. COVID-19 Vaccine Effectiveness Among ADRD and Non-ADRD Individuals Across Chronic Conditions.

Discussion

- Chronic conditions, particularly cerebrovascular disease, stroke, and hypertension, are significantly linked to higher vaccine hesitancy in individuals with ADRD.
- Vaccine hesitancy in ADRD populations may stem from medical mistrust, social disadvantage, and lower socioeconomic status, consistent with prior research (Benkert et al., 2019).
- ADRD individuals with chronic conditions seemed to experience a faster decline in vaccine protection than their non-ADRD counterparts, reinforcing concerns about long-term immunity.
- Without targeted interventions, vaccine-hesitant attitudes in ADRD populations may persist over time, potentially reducing booster uptake and increasing infection risks.
- In the future, longitudinal studies are needed to determine whether vaccine hesitancy evolves and to identify specific barriers preventing ADRD individuals from receiving vaccines.
- Additionally, qualitative studies could help identify specific barriers preventing ADRD individuals from receiving vaccines, such as accessibility issues, misinformation, or concerns from caregivers.

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