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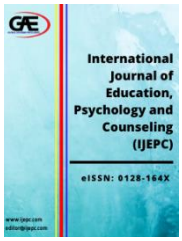

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BRIDGING KNOWLEDGE GAPS IN ALZHEIMER'S DISEASE: AN AWARENESS CAMPAIGN AMONG UNIVERSITY STUDENTS

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Abstract:

Alzheimer's disease (AD) is a progressive neurodegenerative disorder that significantly impacts individuals, their families, and broader communities. Despite increasing global prevalence, misconceptions and limited awareness—particularly among younger populations—often hinder timely detection and intervention. This study aimed to address knowledge gaps and enhance awareness of AD among university students through a tailored campaign. The methodology comprised three phases. First, a site visit to an Alzheimer's centre facilitated in-depth interviews with care staff and caregivers, providing qualitative insights into daily challenges and priorities for effective intervention. Second, an intervention campaign was devised to address the core issue of inadequate awareness. Infographics focusing on early onset symptoms, prevention strategies, and caregiver support were disseminated both physically on campus and online via social media platforms. Third, the campaign was executed and evaluated using a mixed-methods approach. A closed-ended Google Forms question ("Do you find the information helpful?") collected quantitative data on campaign usefulness, while an open-ended prompt captured qualitative feedback. The results revealed uniformly positive feedback on the campaign's clarity and relevance, alongside constructive suggestions for further improvement. The findings underscore the importance of culturally sensitive, multi-format outreach efforts in raising awareness among younger audiences and highlight the potential for scaling similar initiatives to other communities.

Keywords:

Alzheimer's Disease, Awareness Campaign, Early Detection, Intervention

Introduction

Alzheimer's disease (AD) is a progressive and irreversible neurodegenerative disorder that affects cognitive functions, behaviour, and memory (Alzheimer's Association, 2022). It is the most prevalent cause of dementia worldwide, accounting for up to 60–70% of all dementia cases (World Health Organization [WHO], 2021). As the disease advances, individuals typically experience a decline in their ability to perform basic tasks, which can drastically affect their quality of life, as well as those who take care of them. Furthermore, Alzheimer's disease poses significant economic and societal burdens, particularly with the ageing population on the rise in many countries (Brookmeyer et al., 2018; Prince et al., 2016).

Alzheimer's disease commonly manifests as a late-onset condition in individuals from their mid-60s onward. This late-onset variant constitutes the majority of AD cases (Alzheimer's Association, 2022; WHO, 2021). However, early-onset Alzheimer's disease, which occurs in middle age or even earlier (i.e., in one's 30s or 40s), is relatively rare, accounting for approximately 5% of all AD cases (Sosa-Ortiz et al., 2012). In very unusual instances, symptoms may manifest in individuals in their 20s, especially in certain hereditary forms of Alzheimer's disease (Campion et al., 1999). Although genetic predisposition—often involving mutations in the APP, PSEN1, or PSEN2 genes—is a well-recognised risk factor for early-onset familial AD, researchers have yet to isolate a specific cause for non-familial, younger cases (De Strooper & Karran, 2016).

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Pathophysiological Overview

Two hallmark protein abnormalities underlie the pathogenesis of Alzheimer's disease: neurofibrillary tangles and amyloid plaques (Hardy & Selkoe, 2002). Neurofibrillary tangles derive from a dysfunctional form of tau, a microtubule-associated protein that typically helps maintain neuronal microtubule stability under normal physiological conditions (Wenk, 2003). When tau proteins misfold and aggregate as insoluble filaments, they form neurofibrillary tangles that disrupt neuronal function, contributing to the tauopathies observed in AD (Sanders et al., 2020).

Amyloid plaques, by contrast, primarily consist of beta-amyloid peptides (Aβ), produced by the sequential cleavage of amyloid precursor protein (APP) (Hardy & Higgins, 1992). When these peptides aggregate abnormally, they form extracellular plaques in the brain, activating inflammatory responses and resulting in neuronal toxicity (DeTure & Dickson, 2019). According to the amyloid cascade hypothesis, this pathological build-up of beta-amyloid is an early event that initiates a cascade culminating in synaptic dysfunction, neuronal death, and eventually the clinical manifestations of Alzheimer's disease (Hardy & Selkoe, 2002; Hardy & Higgins, 1992).

Rationale for the Present Study

Despite advances in understanding the molecular underpinnings of AD, early detection and timely intervention remain key challenges in disease management (Scheltens et al., 2021). Many individuals seek professional help only when symptoms have become clearly debilitating. Such delays may be due to a lack of public awareness concerning the early signs and risk factors of AD, as well as misconceptions surrounding dementia as a 'normal part of ageing' (International Medical University Malaysia, 2017). In Malaysia, for instance, limited awareness leads many people to present late for medical assessment, by which point the disease has often progressed significantly. As a result, they miss the critical window during which certain treatments or supportive strategies might slow the disease's progression or enhance quality of life (Prince et al., 2016).

Accordingly, this paper aims not only to highlight the complexity of Alzheimer's disease—from its pathophysiological basis to its clinical manifestations—but also to emphasise the importance of community engagement as part of an awareness campaign. By shedding light on early detection methods and the importance of initiating interventions swiftly, the study seeks to develop a framework capable of educating the public and reducing the strain on healthcare services.

Theoretical Framework of Past Studies

The theoretical framework for this study on Alzheimer's disease (AD) awareness and early detection is grounded in the Health Belief Model (HBM) and the Social Cognitive Theory (SCT). These frameworks have been extensively used in past studies to understand health-related behaviours and the adoption of preventive measures.

Health Belief Model (HBM)

The Health Belief Model (HBM) is a psychological model that explains and predicts health behaviours by focusing on the attitudes and beliefs of individuals. It posits that individuals are more likely to engage in health-promoting behaviours if they perceive a high level of threat from a health condition and believe that taking specific actions will reduce that threat

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(Rosenstock, 1974). The HBM has been widely applied in studies related to Alzheimer's disease and other chronic conditions.

1. **Perceived Susceptibility**: Past studies have shown that increasing awareness about the risk factors and early signs of AD can enhance perceived susceptibility among the public (Rosenstock, 1974; Scheltens et al., 2021).
2. **Perceived Severity**: Research has demonstrated that educating individuals about the progressive nature and consequences of AD can heighten perceived severity (Rosenstock, 1974; Prince et al., 2016).
3. **Perceived Benefits**: Studies have highlighted the benefits of early diagnosis, such as improved treatment outcomes and better quality of life, which can encourage proactive health behaviours (Rosenstock, 1974; Rasmussen & Langerman, 2019).
4. **Perceived Barriers**: Addressing barriers such as stigma, lack of awareness, or misconceptions about dementia through public education and awareness campaigns has been shown to facilitate early detection and intervention (Rosenstock, 1974; International Medical University Malaysia, 2017).
5. **Cues to Action**: External triggers such as awareness campaigns, educational materials, and community outreach programs have been effective in motivating individuals to seek medical evaluation and support (Rosenstock, 1974; Alzheimer's Disease International, 2024).
6. **Self-Efficacy**: Empowering individuals with knowledge and resources has been shown to enhance self-efficacy and encourage proactive health behaviours (Rosenstock, 1974; Bandura, 1986).

Social Cognitive Theory (SCT)

Social Cognitive Theory (SCT) emphasizes the role of observational learning, social influence, and self-efficacy in shaping health behaviours (Bandura, 1986). SCT has been applied in numerous studies to understand health behaviours related to Alzheimer's disease and other chronic conditions.

1. **Observational Learning**: Past studies have shown that individuals learn about Alzheimer's disease and the importance of early detection by observing others, such as family members, peers, and community leaders, who advocate for proactive health behaviours (Bandura, 1986; Scheltens et al., 2021).
2. **Social Influence**: Research has demonstrated that social norms and peer support play a crucial role in shaping health behaviours. Creating a supportive community environment that encourages early detection and intervention can positively influence individuals' attitudes and actions (Bandura, 1986; Prince et al., 2016).
3. **Self-Efficacy**: Similar to the HBM, SCT emphasizes the importance of self-efficacy in adopting health behaviours. Providing individuals with the knowledge, skills, and resources needed to recognize early signs of AD and seek medical evaluation can enhance their confidence in taking action (Bandura, 1986; Ngandu et al., 2015).
4. **Reciprocal Determinism**: The dynamic interaction between individuals, their environment, and their behaviours has been highlighted in past studies. This concept underscores the importance of creating an environment that supports and reinforces health-promoting behaviours, such as early detection and intervention for Alzheimer's disease (Bandura, 1986; Rasmussen & Langerman, 2019).

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By integrating the Health Belief Model and Social Cognitive Theory, this study aims to develop a comprehensive framework for understanding and promoting early detection and awareness of Alzheimer's disease. These theoretical frameworks, supported by past studies, provide valuable insights into the factors influencing health behaviours and guide the design of effective awareness campaigns and interventions.

Methodology

This study employed a mixed-methods approach, incorporating both qualitative and quantitative data collection and analysis techniques. The research was conducted in three distinct phases:

Phase 1: Site Visit to the Alzheimer's Centre

To gain firsthand knowledge and insights into the challenges associated with Alzheimer's disease, a site visit was conducted at an Alzheimer's centre in Petaling Jaya. This location was selected due to its proximity to the university and accessibility via public transportation. Prior to the visit, ethical considerations were addressed by obtaining permission from the centre's administration via email and telephone correspondence. A suitable time and date were negotiated with the head nurse, ensuring minimal disruption to the centre's daily operations.

During the visit, the research team, consisting of six members who travelled in two groups of three, engaged in semi-structured interviews with the head nurse and caretakers. These interviews focused on gathering information about the centre's daily routines, interventions employed, and challenges faced in caring for individuals with Alzheimer's. Observations of the centre's environment and interactions between staff and residents were also conducted. Additionally, informal conversations with residents were held, with careful consideration given to their cognitive abilities and communication needs. This qualitative data provided valuable context for the development of the intervention campaign.

Phase 2: Development of the Awareness Campaign

Based on the insights gained from the site visit, particularly the discussions with the head nurse highlighting the lack of awareness about Alzheimer's disease among the general public, the research team developed an intervention campaign focused on raising awareness.

The primary medium for the campaign was an infographic designed to be disseminated both physically and online. The infographic content focused on the early onset symptoms of Alzheimer's, addressing a knowledge gap identified by the head nurse. The decision to utilise infographics was based on their ability to convey complex information in a concise and visually appealing manner, suitable for both physical posters and online platforms.

Phase 3: Execution and Data Collection

The campaign was executed using a dual approach:

- **Physical Distribution:** Printed copies of the infographic were strategically placed around the university campus to maximise visibility and reach a diverse student population.
- **Online Dissemination:** The infographic was shared on various social media platforms and university online forums to reach a wider audience. A Google Form was

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incorporated into the online campaign to gather feedback on the intervention. The form consisted of two questions: (1) a closed-ended question asking participants to rate the helpfulness of the information ("Do you find the information helpful?" with "yes" or "no" response options), and (2) an open-ended question prompting participants to share their thoughts on the project ("Write your thoughts on our project").

To ensure adequate participation, research team members actively promoted the campaign and encouraged fellow students to engage with the infographic and complete the Google Form. Data collection continued until a sample size of 32 participants was achieved. This sample size, while acknowledging the limitations of convenience sampling, was deemed sufficient to provide initial insights into the campaign's effectiveness.

Data Analysis

This study employed a mixed-methods approach to data analysis:

- **Quantitative Analysis:** Responses to the closed-ended question in the Google Form were analysed using descriptive statistics to determine the proportion of participants who found the campaign information helpful.
- **Qualitative Analysis:** Responses to the open-ended question in the Google Form were analysed using thematic analysis. This involved the following steps:
    1. **Familiarisation:** Researchers carefully read and reread the participant responses to gain a thorough understanding of the data.
    2. **Coding:** Initial codes were generated to identify key concepts and ideas emerging from the data.
    3. **Theme Development:** Codes were grouped and organised into broader themes that captured the essence of the participants' feedback.
    4. **Theme Review and Refinement:** Themes were reviewed and refined through discussion and consensus among the research team.

Theme Definition and Naming: Clear definitions and names were assigned to each theme to ensure accurate representation of the data.

Literature Review and Synthesis

The past literature includes the explaining mechanisms leading to disease onset, the evolution of diagnostic frameworks, and the significance of early detection (Scheltens et al., 2021). It also discusses current AD management strategies, encompassing both pharmacological and non-pharmacological interventions, and stresses the necessity of continuous care and support for carers (Ulep et al., 2018).

In a notable study, Wenk (2003) investigates ‘Neuropathologic Changes in Alzheimer’s Disease’, concentrating on alterations in neural systems, viable therapeutic strategies, and potential mechanisms involving chronic inflammation. The study highlights how genetic factors, identifiable through family histories or specific gene mutations, may predispose individuals to Alzheimer’s disease. It also addresses neuroinflammation, arising from cellular damage, which can subsequently disrupt neuronal communication and nutrient transfer in the brain. The degeneration of neurons may be intensified by excessive stimulation of the N-methyl-D-aspartate (NMDA) receptor by glutamate, linking excitotoxicity to the deterioration

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of cholinergic neurons. Wenk's (2003) study concludes by arguing that amyloid accumulation and inflammation are inextricably linked, emphasising the disease's multifactorial nature.

Similarly, Querfurth and LaFerla (2010) provide an extensive discussion about the interplay between genetics and neuroinflammation, describing how both familial and sporadic AD forms may converge on similar inflammatory pathways. Their work underscores the interplay of genetic predispositions—incorporating various mutations and polymorphisms—in exacerbating the inflammatory processes that drive neurodegeneration. This genetic-inflammation nexus expands the existing AD literature, illuminating new directions for both therapeutic and preventative measures.

Hardy and Higgins (1992) delve into the molecular basis of AD, particularly the key role of beta-amyloid in the disease's pathogenesis. Their amyloid cascade hypothesis emphasises the necessity of interventions targeting beta-amyloid accumulation early in the disease course, with the aim of mitigating or delaying the pathological processes that form plaques.

Recent research has continued to build on these foundational studies. For instance, the 2024 NIH Alzheimer's and Related Dementias Research Progress Report highlights significant advancements in understanding the disease mechanisms, including the role of amyloid and tau proteins, and the development of new diagnostic tools and therapeutic strategies (National Institute on Aging, 2024). The approval of disease-modifying therapies such as lecanemab and donanemab marks a significant milestone in AD treatment, although further research is needed to understand their long-term effects and potential side effects (National Institute on Aging, 2024).

The World Alzheimer Report 2024 explores global changes in attitudes towards dementia, highlighting the importance of addressing stigma and improving public awareness (Alzheimer's Disease International, 2024). This report underscores the need for comprehensive public health strategies to support early diagnosis and intervention, which can significantly improve outcomes for individuals with AD and their caregivers.

Diagnosis and Early Detection

Over time, the diagnosis of Alzheimer's disease has undergone significant evolution (Scheltens et al., 2021). Initially confirmed exclusively via autopsy-based neuropathological studies, the diagnostic process has shifted towards clinical and biomarker-centred methods. Following the introduction of the ATN framework—emphasising amyloid (A), tau (T), and neurodegeneration (N)—it became feasible to detect AD prior to the onset of clinical dementia. While some critics question this biomarker-focused approach, it is undeniably crucial for enabling earlier interventions, producing personalised risk profiles, and expediting clinical trials aimed at finding disease-modifying treatments (Scheltens et al., 2021).

Recent advancements in diagnostic technologies have further refined early detection methods. For instance, the development of amyloid PET imaging and cerebrospinal fluid (CSF) biomarkers has significantly improved the accuracy of AD diagnosis (National Institute on Aging, 2024). Additionally, blood-based biomarkers are emerging as a promising tool for early detection, offering a less invasive and more accessible option for screening (Alzheimer's Disease International, 2024).

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Early detection also yields significant benefits for patients, healthcare systems, and society (Rasmussen & Langerman, 2019). By diagnosing AD at a relatively early stage, healthcare professionals can initiate timely therapeutic interventions, offer better patient education, and potentially reduce the rate of disease progression (Rasmussen & Langerman, 2019). In addition, this can contribute to diminished healthcare costs and improved coping mechanisms for families and informal carers.

Management Approaches

In the absence of definitive disease-modifying therapies, current AD management focuses on alleviating symptoms and decelerating cognitive decline (Ulep et al., 2018). Pharmacological interventions targeting cognitive dysfunction primarily revolve around cholinesterase inhibitors—donepezil, galantamine, rivastigmine—and the NMDA receptor antagonist memantine (McKhann et al., 2011). These drugs work to correct neurotransmitter imbalances and can yield modest improvements in memory, communication, and broad cognitive function, particularly in mild to moderate stages of AD. In contrast, non-cognitive symptoms—encompassing agitation, depression, psychosis, and insomnia—are managed with antidepressants, antipsychotics, and sedative-hypnotics, tailored to each patient's unique clinical presentation (Ulep et al., 2018).

Recent research has highlighted the potential of disease-modifying therapies such as lecanemab and donanemab, which target amyloid plaques and have shown promise in slowing disease progression (National Institute on Aging, 2024). However, further studies are needed to understand their long-term effects and potential side effects.

Additionally, non-pharmacological strategies like cognitive stimulation, physical exercise, social engagement, and adequate sleep have been discussed in the literature for their potential to delay disease onset or slow progression (Ngandu et al., 2015). Carer support and education are just as important; well-informed carers can better address challenging behaviours, plan for safety issues such as wandering, and engage in discussions about palliative care for those in more advanced stages of the disease (Brodaty & Donkin, 2009).

The Importance of Public Awareness and Early Intervention

Despite progress in diagnostic techniques and treatment protocols, a widespread lack of awareness continues to impede early diagnosis. Many individuals and families only perceive memory lapses or other cognitive problems as critical warning signs once the disease has markedly advanced (International Medical University Malaysia, 2017). In Malaysia, for example, pervasive misconceptions equating dementia with normal ageing deter people from promptly seeking professional advice, which in turn delays appropriate interventions (Prince et al., 2016).

Awareness campaigns are vital in this respect. By educating the public about the initial, often subtle signs of early-stage Alzheimer's disease—such as mild memory issues, slight personality changes, and minor struggles with everyday tasks—communities can be encouraged to pursue medical evaluations more promptly (Rasmussen & Langerman, 2019). Earlier detection aligns with extensive research suggesting that lifestyle adjustments, therapeutic measures, and carer education can considerably improve patient outcomes (Ngandu et al., 2015).

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Objectives and Rationale for the Alzheimer's Disease Awareness Campaign

The principal objective of the Alzheimer's disease awareness campaign discussed in this study is to bolster knowledge among university students regarding AD, focusing on core aspects such as symptom identification, disease trajectory, and the experiences of those affected. Consistent with emerging evidence highlighting the value of early detection in bolstering long-term outcomes (Scheltens et al., 2021), this campaign concentrates on recognising early warning signs. By dispensing accessible information, the campaign aims to foster a culture where the public is both compassionate and well-informed, thereby diminishing stigma and encouraging conversations about preventive measures and available support services.

These objectives were further substantiated during a visit to the Alzheimer's Disease Centre in Petaling Jaya, Malaysia. Nurse Cheng, the head nurse, observed that many families only seek professional help when the disease is already in its advanced stages, rendering early intervention efforts significantly less effective. She also noted that common misconceptions perpetuate the belief that AD is effectively a hopeless diagnosis, prompting families to place loved ones in care facilities without exploring management strategies that could slow the disease's progression. These observations underscore the necessity for improved public education to correct misunderstandings, encourage proactive healthcare-seeking behaviour, and alleviate the societal and economic challenges of late-stage AD (Prince et al., 2016).

By implementing awareness campaigns and soliciting feedback via surveys or interactive sessions, this study aims to assess the extent to which such initiatives can improve public understanding and attitudes related to Alzheimer's disease. Ultimately, the goal is to design effective strategies and interventions that can be scaled up, thereby facilitating earlier diagnosis, improving management, and enhancing the lives of both individuals affected by AD and their families.

Although significant advances have been made in revealing the intricate pathology of Alzheimer's disease, effectively translating these insights into robust public health strategies remains an ongoing challenge. Through a combination of comprehensive literature analysis, community outreach, and targeted awareness programmes, this study seeks to address the knowledge gaps hindering early detection and optimal management. In doing so, it aims to make a meaningful contribution to existing research and public health interventions, ultimately reducing the burden of Alzheimer's disease on individuals, families, and wider society.

Results

This mixed-methods study aimed to evaluate the effectiveness of an Alzheimer's disease awareness campaign conducted within the IIUM community. Data collection involved both quantitative and qualitative approaches, as detailed in the methods section.

Quantitative Results

Following the execution of the awareness campaign, feedback was gathered from 32 respondents who interacted with the campaign materials and completed a Google Form. The first question in the form, "Do you find the information helpful?", yielded a 100% "Yes" response rate. This indicates that all participants perceived the information presented in the campaign to be helpful in raising awareness about Alzheimer's disease.

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Qualitative Results

The second question in the Google Form, "Write your thoughts on our project", elicited open-ended responses from 27 out of the 32 participants (84%). These responses were analysed using thematic analysis, which involved identifying, coding, and categorising recurring patterns and ideas. The following themes emerged from the analysis:

- **Enhanced Awareness:** Participants expressed an increased understanding of Alzheimer's disease, including its early signs and the importance of early detection.
- **Acknowledge Alzheimer's:** The campaign fostered a greater recognition of the impact of Alzheimer's on individuals, families, and society.
- **Promotion of Early Detection:** Participants highlighted the value of the campaign in promoting awareness of early signs and encouraging early detection of Alzheimer's disease.
- **Positive Feedback on Design:** The design of the infographic campaign poster was well-received, with participants appreciating its clarity, user-friendliness, and effective organisation of information.
- **Benefits and Interests:** Participants acknowledged the potential benefits of the campaign and expressed interest in learning more about Alzheimer's disease.
- **Mental Health Advocacy:** The campaign's role in advocating for mental health awareness was recognised and appreciated.
- **Connectedness:** The campaign prompted participants to reflect on personal experiences and consider the potential impact of Alzheimer's on their own families.
- **Expansion of Awareness:** Suggestions were made for expanding the campaign's scope to include information about Alzheimer's caregivers and support resources.

Integration of Qualitative and Quantitative Findings

The quantitative findings, demonstrating a 100% positive response rate to the helpfulness of the information, align with the qualitative themes highlighting increased awareness, understanding, and appreciation for the campaign's design and content. This convergence of findings suggests that the campaign effectively achieved its objective of raising awareness about Alzheimer's disease within the IIUM community.

Table 1: Summary of Main Findings

Theme	Category
Enhanced Awareness	Early prevention is key; Everyday health appreciation; Understanding Alzheimer's is not a result of normal ageing.
Acknowledge Alzheimer's	Recognition of Alzheimer's impact on memory and daily routine.
Promotion of Early Detection	Awareness of early Alzheimer's and dementia signs.
Positive Feedback on Design	Appreciation for helpful, user-friendly and organised design of the campaign poster.

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Benefits and Interests	Recognition of potential benefits and interest in the topic.
Mental Health Advocacy	Mental health campaign role acknowledged.
Connectedness	Family members' signs and personal stories are realised.
Expansion of Awareness	Information about Alzheimer's caregivers is suggested.
Overall Effectiveness	The campaign successfully raised awareness about Alzheimer's disease within the IIUM community, as evidenced by the 100% positive response rate to the perceived helpfulness of the information and the qualitative themes identified.

Discussion

This study investigated the effectiveness of an Alzheimer's disease awareness campaign within the IIUM community, drawing upon the Health Belief Model (HBM) and Social Cognitive Theory (SCT) to understand the factors influencing knowledge, attitudes, and behavioural intentions related to AD. The findings suggest that the campaign successfully engaged the community and enhanced their understanding of Alzheimer's disease, aligning with the principles of both the HBM and SCT.

The overwhelmingly positive response to the campaign, with all 32 respondents indicating that they found the information helpful, reflects its effectiveness in disseminating key information and promoting perceived benefits of early detection (HBM). This aligns with earlier research emphasizing the importance of well-structured and accessible awareness materials in fostering community engagement and boosting health literacy (Sørensen et al., 2012; Rasmussen & Langerman, 2019). By providing clear and concise information about Alzheimer's disease, the campaign likely contributed to increasing participants' perceived susceptibility to the disease and the perceived severity of its consequences, key components of the HBM (Rosenstock, 1974).

Thematic analysis of the open-ended responses revealed several salient themes that further illuminate the campaign's impact. The prominent theme of enhanced awareness, encompassing early prevention, health appreciation, and understanding that Alzheimer's is not a normal part of aging, resonates with the HBM's emphasis on addressing misconceptions and perceived barriers to early detection (International Medical University Malaysia, 2017). This finding is consistent with previous research indicating that correcting misunderstandings about dementia can encourage proactive healthcare-seeking behaviour (Scheltens et al., 2021).

Furthermore, the acknowledgement of Alzheimer's impact on memory, daily functioning, and quality of life, coupled with the emphasis on early detection, reflects a shift in participants' attitudes and beliefs about the disease, aligning with the SCT's focus on observational learning

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and social influence. By presenting information about the benefits of early intervention, the campaign likely contributed to enhancing participants' self-efficacy in taking action against AD, a crucial element of both the HBM and SCT (Bandura, 1986; Ngandu et al., 2015).

The positive feedback on the campaign's design, highlighting its user-friendliness and clarity, underscores the importance of effectively communicating complex medical information (Mayer, 2017). This aligns with the SCT's emphasis on reciprocal determinism, where the environment, in this case, the design of the infographic, influences individuals' interaction with the information and subsequent behavioural intentions.

Interestingly, the emergence of the "connectedness" theme, reflecting participants' personal engagement and reflection on familial signs and personal stories, highlights the campaign's potential to foster social support and community engagement, further reinforcing the principles of SCT (Bandura, 1986). This finding aligns with studies advocating for person-centred and community-oriented approaches in public health campaigns (Ngandu et al., 2015).

While the campaign was generally well-received, the suggestion to shorten the infographic and emphasize prevention strategies provides valuable insight for future iterations. This feedback can be interpreted within the framework of cognitive load theory, which suggests that concise and well-organized information is crucial for effective learning and retention (Kalyuga, 2009). Future campaigns could incorporate multimedia elements or interactive designs to cater to diverse learning preferences and minimize cognitive overload, thereby enhancing knowledge acquisition and retention.

This study thus demonstrates the effectiveness of a theory-driven awareness campaign in enhancing knowledge and promoting positive attitudes towards Alzheimer's disease within a university community. By integrating the principles of the HBM and SCT, the campaign successfully addressed misconceptions, promoted perceived benefits of early detection, and fostered a sense of self-efficacy among participants. The findings underscore the importance of clear communication, accessible information, and community engagement in raising awareness about Alzheimer's disease and encouraging proactive health behaviours. Future research should focus on expanding the reach of such campaigns, exploring diverse intervention modalities, and evaluating long-term impact on knowledge retention and healthcare-seeking behaviour.

Conclusion

This study sought to develop and evaluate an Alzheimer's disease awareness campaign aimed at increasing knowledge and understanding of AD amongst university students. Through a mixed-methods approach, incorporating a site visit to an Alzheimer's centre, the development of an infographic, and the collection of both quantitative and qualitative feedback, the campaign successfully achieved its primary objectives. This study demonstrates the potential of targeted awareness campaigns to increase knowledge and understanding of Alzheimer's disease within university communities. By addressing knowledge gaps, challenging misconceptions, and promoting early detection, such campaigns can empower individuals to take a proactive approach to their health and well-being. While further research is needed to assess the long-term impact and generalisability of these findings, this study provides a valuable contribution to the ongoing efforts to raise awareness and promote early detection of Alzheimer's disease.

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The study successfully achieved its objectives by increasing awareness of Alzheimer's disease, its early symptoms, and the importance of early detection, as evidenced by the positive response rate and qualitative themes highlighting increased understanding. Additionally, the campaign successfully challenged misconceptions surrounding Alzheimer's disease and fostered a greater appreciation for its impact on individuals, families, and society. Furthermore, by emphasizing early detection and intervention, the campaign encouraged a proactive approach to health and well-being among participants.

However, the study acknowledges certain limitations. The sample size of 32 participants, while sufficient for an initial assessment, was relatively small and drawn exclusively from the IIUM community, limiting the generalisability of findings to other populations. The reliance on convenience sampling may have introduced bias and limited the representativeness of the sample. Finally, the study focused on a single intervention, an infographic.

Future research could address these limitations by conducting larger-scale studies with more diverse participant pools, employing longitudinal designs to assess long-term impact, and exploring the effectiveness of diverse interventions such as workshops and interactive sessions. Furthermore, future campaigns should incorporate a stronger emphasis on preventative measures and risk reduction strategies, addressing the feedback received in this study.

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