

**UNIVERSITI TEKNOLOGI MARA**

**DEMENSIA KITA<sup>®</sup> MOBILE APP:  
DEVELOPMENT, VALIDATION,  
USABILITY ASSESSMENT AND  
FACTORS ASSOCIATED WITH  
USABILITY FOR SUPPORTING  
DEMENTIA CAREGIVERS IN  
MALAYSIA**

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## ABSTRACT

Dementia has profound impact on both patients and their caregivers, often leading to mental health challenges. Caregivers especially, need diverse skills and support which are frequently underestimated. Technology, such as mobile apps, can help alleviate caregiver anxiety by providing information and access to services, improve caregiving skills, and increase confidence. However, there were lack of culturally tailored and affordable mobile app that target caregivers of people living with dementia (PLwD) in the Malaysian context. The objective of this research is to i) develop culturally tailored mobile app content in Bahasa Malaysia for PLwD caregivers; ii) develop the mobile app and evaluate its content validity, and iii) assess the apps' usability and the associated factors. This cross-sectional study consisted of three stages. Phase I centred on content development through Nominal Group Technique (NGT) with five dementia caregivers and Focus Group Discussions (FGD) with eight multidisciplinary expert panel. In Phase II, the mobile app was developed, and its content validity was assessed. Phase III evaluated the app's usability among ninety-two dementia caregivers at University Malaya Medical Centre and Kuala Lumpur Hospital using the Malay Version of the mHealth App Usability Questionnaire (M-MAUQ). The sociodemographic data and their relationship with M-MAUQ total and domain average scores (ease of use, interface and satisfaction, and usefulness) were evaluated using descriptive and inferential statistics – Simple and Multiple Linear Regression analyses by SPSS. Pairwise associations among variables were assessed and the coefficient of determination ( $R^2$ ) measured the variance explained by the independent variable. All continuous variables were expressed as means and standard deviations, with a *P*-value of  $\leq 0.05$  considered statistically significant. The NGT revealed three main themes: Knowledge, Services, and Support, leading to modules on 'Patient Care for Caregivers' and 'Caregivers' Wellbeing', with twelve sub-modules identified by FGD. Key topics included dementia basic knowledge, behaviour management, patient care, nutrition, oral care, exercises, memory rehab, services, support groups, stress management, welfare, and motivation. All respondents (100%) reported a usability score of  $\geq 72$  on the M-MAUQ, with a mean usability score of 6.00 (SD  $\pm$  0.61), indicating high usability. The highest mean scores were in ease of use, followed by interface and satisfaction, and usefulness [6.25 (SD  $\pm$  0.71), 6.04 (SD  $\pm$  0.67), and 5.75 (SD  $\pm$  0.66)] respectively. Data had a normal distribution. SLR showed usability was significantly associated with ethnicity, religion, marital status, environment, and caregiver's relationship with PLwD. MLR revealed that only marital status, environment, and caregiver's relationship with PLwD were significantly associated with app usability. Being single (95% CI: -0.96, -0.28), and being a spouse caregiver (95%CI: -0.89, -0.18) were associated with lower usability, while living in rural environment was associated with higher usability. The MLR, with an  $R^2$  value of 0.264, explained 26.4% of the variation in usability scores. The research findings could promote digital health adoption in caregiving and aging, supporting the National Dementia Plan. They may drive app improvements and attract interest from researchers, healthcare providers, and policymakers. Future studies should assess caregivers' knowledge, attitudes, practices, and app acceptance to address the needs of Malaysian dementia caregivers. A randomized controlled trial is needed to evaluate Demensia KITA's effectiveness in reducing caregiver burden, particularly in urban and rural settings.

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Research Background

Dementia is a syndrome characterised by a decline in cognitive function as well as other mental abilities above and beyond what might be expected from the normal consequences of biological ageing. Dementia affects as many as seven percent of adults aged sixty years and older (Health in Aging, 2021; WHO, 2021). Globally, there will be 1.4 billion people aged sixty years and older by 2030, and almost 2.1 billion by 2050 (United Nation, 2015, 2019). Predictions suggest that by 2050, low- and middle-income countries (LMICs) will be home to 1.7 billion people aged sixty or older (WHO, 2021), representing eighty percent of the global elderly population, with sixty percent of dementia cases already found in these regions (United Nation, 2015). Currently in Asia, the pooled prevalence of all-type dementia for people over sixty years old has reached up to 3,299 per 10,000 people (Q. Cao et al., 2020) and the number is expected to increase further by the year 2030 (WHO, 2021).

The United Nations and most researchers have traditionally used population ageing measures and indicators that are mostly or entirely based on people's chronological age, defining older people as those aged sixty or sixty-five years or over to provide a simple, clear, and easily replicable way to measure and track various population ageing indicators (United Nation, 2019). Malaysia itself, has defined older adults as those aged sixty or more and is predicted to have an ageing population of approximately fifteen percent of the population by 2030 (DOSM, 2015; KPWK, 2017; MOH, 2015). Given the established connection between aging and dementia, these projections are particularly alarming. Currently in Malaysia, the prevalence of dementia among older adults is 8.5 percent (Ganapathy et al., 2020).

Frequently, there is a lack of awareness and understanding regarding dementia, resulting in stigma and barriers to diagnosis, care and treatment (WHO, 2021). Individuals with dementia frequently have concurrent health conditions, which complicates their care. Dementia brings physical, psychological, social, and economic consequences that affect not only people living with dementia (PLwD), but also their caregivers, families, and society as a whole. Recent studies estimate that the global