PROPORTION AND ASSOCIATED FACTORS FOR DELAYED DISCHARGE IN DOMICILIARY PATIENTS IN KELANTAN

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UNIVERSITI SAINS MALAYSIA

2025

PROPORTION AND ASSOCIATED FACTORS FOR DELAYED DISCHARGE IN DOMICILIARY PATIENTS IN KELANTAN

by

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Research Project Report submitted in partial fulfilment of the requirement for the degree of Master of Public Health

JUNE 2025

ACKNOWLEDGEMENT

Bismillahirrahmanirrahim.

In the name of Allah, the Most Gracious, the Most Merciful. Peace and blessings be upon His Messenger Muhammad (peace be upon him), his family, and his companions. Alhamdulillah, with Allah's guidance and blessings, I have successfully completed this dissertation. I wish to express my deepest gratitude and appreciation to those who have supported and contributed to this study in numerous ways.

My heartfelt thanks go to my supervisor, Prof Dr. Aziah binti Daud, from the Department of Community Medicine, School of Medical Sciences, Universiti Sains Malaysia. Her expertise, kindness, and patience were instrumental in making this research possible. I am deeply grateful to my co-researcher, Dr. Anees binti Abdul Hamid, Senior Principal Assistant Director of the Primary Care Unit, Kelantan State Health Department, for her unwavering support and willingness to assist throughout this research journey.

I extend my appreciation to all my colleagues and lecturers in the Department of Community Medicine who have indirectly contributed to this research project. Finally, to my beloved wife, Dr. Nur Aminah binti Mohmad Amin, whose love and support have been the cornerstone of my success, I owe my greatest thanks. Last but not least, my profound gratitude to all.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

Adj OR	Adjusted Odds Ratio
ADL	Activities of Daily Living
CI	Confidence Interval
DHC	Domiciliary Health Care Services
IADL	Instrumental Activities of Daily Living
LTC	Long-Term Care
MBI	Modified Barthel Index
MOH	Ministry of Health Malaysia
NCD	Non-Communicable Diseases
NHMS	National Health and Morbidity Survey
OR	Odds Ratio
PPD	Perkhidmatan Perawatan Domisiliari (Domiciliary Care Services)
PPD101	Domiciliary Care Patient's Registry
PWD	Persons with Disabilities
SD	Standard Deviation
SPSS	Statistical Package for the Social Sciences
TBI	Traumatic Brain Injury
UNDP	United Nations Development Programme

LIST OF SYMBOLS

Symbol	Meaning
=	Equal to
≥	More than and equal to
<	Less than
α	Alpha
β	Beta
%	Percentage
Δ	Precision / Delta

LIST OF APPENDICES

ABSTRAK

KADAR DAN FAKTOR-FAKTOR BERKAITAN DENGAN KELEWATAN DISCAJ DI KALANGAN PESAKIT DOMISILIARI DI KELANTAN

Latar Belakang: Kelewatan discaj daripada perkhidmatan penjagaan domisiliari boleh menghalang peralihan pesakit dan membebankan sumber kesihatan, terutamanya dalam sistem kesihatan primer Malaysia. Oleh itu, dengan memahami kadar dan faktor penyumbang kepada isu kelewatan discaj adalah penting untuk mengoptimumkan penyampaian penjagaan di Malaysia.

Objektif: Untuk menentukan kadar kelewatan discaj dan mengenal pasti faktor demografi dan klinikal yang berkaitan di kalangan pesakit penjagaan domisiliari di Kelantan.

Kaedah: Satu kajian keratan rentas dijalankan menggunakan data retrospektif daripada Daftar Pesakit Penjagaan Domisiliari (PPD101) Jabatan Kesihatan Negeri Kelantan, meliputi pesakit yang didaftarkan dari Januari 2023 hingga Disember 2024. Daripada 1494 pesakit berdaftar, 828 memenuhi kriteria kemasukan. Statistik deskriptif, regresi logistik mudah, dan regresi logistik berganda digunakan untuk menganalisis faktor-faktor yang berkaitan dengan kelewatan discaj.

Keputusan: Kadar kelewatan discaj adalah 4.0%. Faktor signifikan termasuk rujukan dari klinik kesihatan (Nisbah Odds Terlaras: 2.15; 95% CI: 1.32,3.50; p = 0.002), skor Indeks Barthel Terubah Suai pra-domisiliari yang rendah (Nisbah Odds Terlaras: 0.98; 95% CI: 0.97,0.99; p < 0.001), keperluan penjagaan klinikal yang tinggi (Nisbah Odds Terlaras: 1.45; 95% CI: 1.20,1.75; p < 0.001), dan kekerapan lawatan domisiliari yang meningkat (Nisbah Odds Terlaras: 1.12, 95% CI: 1.05,1.20; p = 0.001).

Kesimpulan: Kelewatan discaj mempengaruhi sebahagian kecil tetapi ketara pesakit domisiliari di Kelantan. Intervensi bersasar, termasuk penyelarasan penjagaan yang dipertingkat dan penilaian fungsi awal serta permulaan awal penjagaan pemulihan yang disesuaikan, diperlukan untuk menangani faktor-faktor ini dan meningkatkan kecekapan penjagaan.

Kata Kunci: Penjagaan domisiliari, kelewatan discaj, Kelantan, Indeks Barthel Terubah Suai, kesihatan primer, regresi logistik

ABSTRACT

PROPORTION AND ASSOCIATED FACTORS FOR DELAYED DISCHARGE IN DOMICILIARY PATIENTS IN KELANTAN

Background: Delayed discharge from domiciliary care services can impede patient transitions and strain healthcare resources, particularly in Malaysia's primary healthcare system. Understanding its prevalence and contributing factors is crucial for optimizing care delivery in Malaysia.

Objectives: To determine the proportion of delayed discharges and identify associated demographic and clinical factors among domiciliary care services patients in Kelantan.

Methods: A cross-sectional study was conducted using retrospective data from the Domiciliary Care Patient's Registry (PPD101) of the Kelantan State Health Department, covering patients registered from January 2023 to December 2024. Of 1494 registered patients, 828 met the inclusion criteria. Descriptive statistics, simple logistic regression, and multiple logistic regression were used to analyze and find significant factors associated with delayed discharge.

Results: The proportion of delayed discharge was 4.0%. Significant factors included health clinic referrals (Adjusted OR: 2.15; 95% CI: 1.32,3.50; p = 0.002), low pre-domiciliary Modified Barthel Index scores (Adjusted OR: 0.98; 95% CI: 0.97,0.99; p < 0.001), higher clinical care needs (Adjusted OR: 1.45; 95% CI: 1.20,1.75; p < 0.001), and increased domiciliary visit frequency (Adjusted OR: 1.12; 95% CI: 1.05,1.20; p = 0.001).

Conclusion: Delayed discharge affects a small but notable proportion of domiciliary patients in Kelantan. Targeted interventions, including enhanced care coordination and early functional assessment and early initialisation of tailored rehabilitation care are needed to address these factors and improve care efficiency.

Keywords: Domiciliary care, delayed discharge, Kelantan, Modified Barthel Index, primary healthcare, logistic regression

CHAPTER 1

INTRODUCTION

Introduction to domiciliary services in Malaysia

In Malaysia, one of the main goals of healthcare is to bring services closer to people's homes, empowering them with the knowledge and tools to access care without leaving their familiar surroundings. In responding to evolving healthcare demands and the strategic agenda of health system transformation, the Ministry of Health Malaysia (MOH) introduced the Domiciliary Health Care Services (DHC) in 2016 as part of primary healthcare enhancement initiatives. This program was designed to extend comprehensive and holistic healthcare directly to patients within their community settings, particularly targeting individuals with limited mobility or chronic conditions. The DHC initiative aligns with the broader goal of decentralizing health services, aiming to provide accessible, continuous, and patient-centred care that transcends conventional facility-based models (Goverment Malaysia, 2024).

Domiciliary care refers to medical support provided at a patient's home, allowing them to receive treatment while staying comfortable and at ease (NIH, 2019). The purpose of this care is to prepare the patient's family or caretaker to take on the primary caregiving role, ensuring the patient's health and well-being are maintained (Kong *et al.*, 2021). To make this shift from healthcare professionals to family caretakers smooth, a transition period is set up with a clear plan that includes training, support, and regular check-ins to address any challenges (Allan, 2022). The plan is not only aim equips the caretaker with the skills they need but also builds a strong partnership between the healthcare team and the family. This teamwork ensures the patient gets consistent, personalized care that meets their unique needs (Abdelhalim *et al.*,

2024). It also fosters trust and open communication, helping caretakers feel confident in managing care while staying connected with healthcare providers for guidance (BPKK, 2020).

In government health facilities such as primary health clinics and hospitals, domiciliary services are not equally registered under their care. There is variation of criteria between domiciliary patients under primary health clinics and the hospitals. This is due to difference referral points, types of cases and diagnosis as well as type of service required by the patients. These variations also differed between states or even between different districts due to variation of offered services available at the facilities. However, quality of care is not abandoned by the established referral system between facilities to ensure patients transfer of care are done properly.

This study will focus on domiciliary patients under the care of MOH primary health clinics. This service delivers continuous and comprehensive care to patients within their home environment, with the overarching aim of improving patient outcomes, reducing unnecessary hospital readmissions, and empowering caretakers through targeted training and support. Functioning as an extension of hospital-based treatment, domiciliary care is administered by trained healthcare personnel who provide both direct clinical interventions and caretaker education. This dual approach ensures that after a designated period, patient care can be sustainably continued by the caretaker at home. The scope of domiciliary services encompasses a broad range of medical and rehabilitative activities. These include prevention and management of pressure injuries, wound care, hygiene education, replacement of feeding or urinary catheters, basic diagnostic procedures such as blood glucose monitoring and blood pressure measurement, as well as the provision of emotional support.

For patients requiring rehabilitative interventions, the service also includes guided exercises to promote active and passive mobility and training in activities of daily living

(ADL). Eligibility for enrolment into the program is restricted to Malaysian citizens referred from public healthcare facilities who reside within the operational coverage area, have a clear residential address, and are supported by a suitable caretaker who provides written consent. Discharge from the program typically occurs after a maximum duration of three months or once the caretaker is deemed competent to independently manage the patient's care ,whichever occurs earlier (BPKK, 2020).

This initiative is particularly relevant in the context of rising demands for community-based health services amidst an aging population and increasing prevalence of non-communicable diseases. Despite the potential benefits of PPD in facilitating smooth transitions from hospital to home care, delayed discharge from this program remains a concern. Understanding the magnitude and contributing factors of delayed discharge is therefore essential for optimizing resource allocation, ensuring care continuity, and improving the overall effectiveness of domiciliary care services (BPKK, 2020).

Delayed discharge of domiciliary patients

The concept of delayed discharge is well-established in hospital environments, typically referring to a situation where a patient is deemed medically fit for discharge but remains in the hospital because subsequent care arrangements, such as placement in a long-term care (LTC) facility or initiation of home care services, are not yet available. This delay often occurs after acute care services are no longer medically necessary. The primary concern in the hospital context is often the inefficient use of acute care beds, leading to "bed blocking," increased costs, and reduced capacity for new admissions requiring hospital care (Rojas-Garcia *et al.*, 2018). Delayed home care discharges will also affect our primary healthcare system. Overwhelmed teams can’t provide adequate care for new patients while continuing extended care for ineligible patients, which will impair care for all patients.

While the Ministry of Health Malaysia has demonstrated commendable dedication to patient care through the development of comprehensive guidelines for domiciliary services in primary healthcare especially with the official released of the second edition of "Garis Panduan Perkhidmatan Perawatan Domisiliari di Kesihatan Primer" in 2020, noting the proactive measures taken by the ministry to provide better and updated guideline aimed for improvement of the domiciliary patient's outcome (BPKK, 2020).

The guidelines clearly outline the service duration for every domiciliary patient under the care of a domiciliary team operated under a primary health clinic. The maximum duration for patient discharge to a primary caretaker, which is typically family members or caretakers, is clearly specified as three months. This provision ensures that patients are discharged when they are deemed competent to take over the care of themselves. During the three-month duration of services, the primary caregivers are not only assisted by the domiciliary team to provide care for the patient but will also receive training as per the admission criteria that must be fulfilled. Among these criteria is that the patient must have caregivers or family members who are willing to take care of them and willing to learn the basic procedures needed for the patient's care process (BPKK, 2020; Goverment Malaysia, 2024). Therefore for this study, delayed discharge was defined as ineligibility for discharge after the 3-month reassessment due to primary caretaker inability or unimproved patient condition.

The domiciliary care utilisation and the perceived needs of the population

The need for domiciliary care in Malaysia is evident given the aging population and the increasing prevalence of chronic conditions among the elderly. According to the National Health and Morbidity Survey (NHMS) 2019, approximately 17% of individuals aged 60 and above require assistance with activities of daily living (ADL), while 42.9% need support for instrumental activities of daily living (IADL). This data highlights the substantial proportion

of the elderly population who depend on caregiving for their everyday functions, emphasizing the importance of domiciliary care services to support aging in place (NIH, 2019).

Moreover, the escalating demand for domiciliary care in Malaysia is further supported by the findings from the Khazanah Research Institute (2024), which indicates that demographic shifts, including an increasingly aging population and evolving family structures, have created an urgent need for elderly care services. The report emphasizes that as more families rely on external support due to changing sex roles and work patterns, the demand for domiciliary care is expected to grow significantly, particularly for the elderly and persons with disabilities (PWDs) (Ilyana Mukhriz, 2024).

The United Nations Development Programme (UNDP) further outlines that the Malaysian care economy must adapt to meet the increasing demands posed by aging and dependent populations. It identifies a spectrum of care needs, from healthy aging initiatives to specialized domiciliary services, suggesting that a holistic approach to care delivery is essential to accommodate the varying levels of dependency among the elderly (UNDP, 2024).

Additionally, a study on caretaker burden in the largest palliative care unit in Malaysia projects that by 2030, approximately 239,713 Malaysians will require palliative care, with only about 10% of these needs currently being met. This projection underscores the critical shortfall in domiciliary care services, particularly in providing palliative and long-term care to those with severe health conditions, further highlighting the urgent need to expand domiciliary care facilities and services to address this gap (Ahmad Zubaidi *et al.*, 2020).

Delayed discharge domiciliary case effects on Malaysian health system

Malaysia has an ageing population, with elderly individuals generally being less healthy compared to the younger population. This rise in the proportion of older adults is associated

with an increased prevalence of chronic diseases, such as heart disease, diabetes, hypertension, and others (Rashidah Idris *et al.*, 2023).

Chronic diseases such as diabetes, heart disease, and stroke often occur together, forming a triad with compounding effects. Individuals with diabetes are two to four times more likely to develop heart disease or experience a stroke compared to those without diabetes (Lin, 2023). This triad is increasingly prevalent in Malaysia, as indicated by the 2023 National Health and Morbidity Survey (NHMS) findings, which reveal a concerning prevalence of Non-Communicable Diseases (NCDs). Nearly 2.3 million adults are living with three NCDs, including combinations of diabetes, hypertension, high cholesterol, and obesity. (Health, 2023).

Stroke significantly increases the risk of both physical disability and dementia in older adults. Stroke survivors were over six times more likely to be disabled compared to stroke-free individuals, and it is quantified in population of elderly (Prencipe *et al.*, 1997). This highlights the severe post-stroke burden in aging population and reinforcing the need for effective rehabilitation and domiciliary services as long term care planning. As developing country with limited resources and a high prevalence of non-communicable diseases, Malaysia faces the risk of straining its healthcare system. (*Health White Paper For Malaysia*, 2023).

Rationale of Study

This study explores the reasons behind delayed discharges for patients receiving domiciliary care, looking at both medical and social factors that affect their transition of care from healthcare team to their primary caretaker. Albeit having established guidelines and comprehensive multidisciplinary domiciliary team, there are still delayed discharge cases that constrained primary health care resources especially the human resource limitations in primary health care settings. Understanding these issues is key to improving patient outcomes and making better use of healthcare resources, as timely discharges can greatly improve patients'

quality of life and ease the strain on the healthcare system (McGilton *et al.*, 2021). Studies have shown that implementing domiciliary care services effectively reduces healthcare costs. For instance, a study note that training care personnel to provide continuous medical care and support at home can significantly improve outcomes and reduce hospital readmission rates, emphasizing the effectiveness of domiciliary services will ease the burden on health system (Marshall *et al.*, 2024). With the rise of non-communicable diseases in Malaysia, the demand for home-based care has grown significantly (NIH, 2019). To tackle this, the Ministry of Health Malaysia launched Strategy 1 under its Strategic Plan 2021-2025, focusing on strengthening primary healthcare services to make domiciliary care more accessible and effective (Bahagian Perancang, 2021).

Research on delayed discharge among domiciliary patients in Malaysia, particularly in Kelantan, remains limited. This study aims to explore the factors associated with delayed discharge in domiciliary care settings within primary healthcare. Identifying these factors will provide valuable insights into the operational and systemic barriers that may hinder timely discharge, allowing healthcare providers and policymakers to address these challenges effectively (NIH, 2019). The findings from this study will assist in allocation of resources, anticipate patients with higher risk of delayed discharge outcomes as well as assisting in planning more specific rehabilitation and care plan for every patient, enable more patients to get the benefits of this service and finally supporting the Ministry's objectives by contributing to the refinement of existing guidelines and improving health outcome for every patient.

Research Questions

1. What is the proportion of delayed discharges among patients enrolled in the domiciliary service in Kelantan?
2. What are the factors associated with delayed discharge in patients receiving domiciliary care in Kelantan?

Objectives

General Objective

To study the proportion and associated factors for delayed discharge among patients enrolled in domiciliary care services in Kelantan.

Specific Objectives

1. To determine the proportion of delayed discharge from domiciliary service in Kelantan.
2. To determine the associated factor with delayed discharge in patients enrolled in domiciliary service in Kelantan.

Research Hypotheses

Ho: There is no significant associated factors with delayed discharge among patients enrolled in domiciliary care services in Kelantan.

CHAPTER 2

LITERATURE REVIEW

2.1 Domiciliary Care Services

Home-based domiciliary care services play a crucial role in assisting patients transitioning from hospital to the community. These services can significantly impact patient outcomes post-discharge, particularly in enhancing the quality of life for those receiving care at home.

The demand for domiciliary care services has risen as healthcare systems increasingly recognize the benefits of home-based assistance for post-acute patients. Studies show that a significant proportion of older adults prefer receiving care in their own homes rather than institutional settings (Sefcik *et al.*, 2017; Werner *et al.*, 2019). This preference for home-centric care aligns with a broader movement towards patient-centered care models, which promote autonomy and personal choice (Sefcik *et al.*, 2017). Furthermore, evidence suggests that timely initiation of domiciliary care after discharge is crucial for preventing health deterioration, especially for vulnerable populations like stroke patients who frequently experience declines in functional mobility without adequate home support (Vela *et al.*, 2022).

However, the effectiveness of domiciliary care services can be influenced by several critical factors. Firstly, the quality of communication and coordination among healthcare providers, social services, and patients significantly impacts the discharge process. Muhammad Umair Majeed (2012) emphasize how poor interdisciplinary communication can lead to prolonged patient stays, underscoring the importance of cohesive operational practices within healthcare service. Additionally, financial and resource constraints commonly encountered in the delivery of domiciliary care can lead to challenges in service provision, potentially limiting access for those in need (King and Young, 2021). Studies have emphasized

that inadequate funding and support structures can contribute to gaps in the care continuum, further complicating the discharge process and subsequent recovery experiences for patients (Butfield *et al.*, 2025).

Moreover, the characteristics of patients receiving domiciliary care can also impact discharge outcomes. Research shows that the complexity of care needs, particularly those resulting from chronic conditions or mental health concerns, can hinder service allocation and timing. For example, Salmi *et al.* (2023) explore how factors associated with oral health and comprehensive care in domiciliary settings can affect the overall well-being of older adults, further complicating their health management after discharge. Additionally, experiences during the initial post-discharge period can influence whether patients continue to accept domiciliary care, as comfort levels with home healthcare providers can vary significantly (Houghton *et al.*, 2016).

2.2 Demographic Factors Associated with Delayed Discharge in Domiciliary Patients.

Demographic factors significantly influence delayed discharge among patients receiving domiciliary care services. Key elements such as age, sex, and the relationship between patients and their caretakers contribute to understanding the complexity of delays in discharge processes.

2.2.1 Patient Age

Exploring the role of age in delayed discharge among domiciliary patients offers valuable insights into the intricacies of healthcare transitions. Older patients frequently encounter higher rates of delayed discharge, influenced by a complex interplay of factors such as clinical complexity, comorbidities, and the requirement for post-discharge support services.

Several studies have shown a link between elderly patients and increased delays. Older patients are more likely to experience discharge delays due to their greater clinical complexity and the difficulties of arranging appropriate post-discharge care (Houghton *et al.*, 2016). This is echoed in an observation indicating that older age is linked with a higher prevalence of factors such as reduced mobility and high dependence in activities of daily living (ADL), which are significant predictors of prolonged hospital stays (Binda *et al.*, 2025).

Additionally, it was noted that recovery following acute illness and surgical interventions may be prolonged in the elderly due to their loss of strength and mobility, which directly impacts their discharge timelines (Bass *et al*., 2021). Furthermore, cultural expectations can lead to delayed discharge especially in collectivist societies where families often prefer patients to remain in a safe environment of health care professionals until fully stable (Touloumis *et al*., 2024). This complexity suggests that while older patients are typically associated with delayed discharges due to their medical and functional status, younger cohorts face their own set of challenges which can result in extended hospitalization (Pellico-Lopez *et al*., 2022).

A study also pointed out the paradox where, while age-related factors are widely acknowledged, their study found only a weak correlation between age and delay. This suggests that other socioeconomic or institutional factors may be more predictive (Elabbassy *et al.*, 2020). Landeiro *et al.* (2019) highlight the multifaceted nature of discharge delays, emphasizing that healthcare professionals' characteristics and systemic policies significantly impact reported discharge outcomes.

The interplay of age and discharge delays suggests a comprehensive landscape where age-related factors converge with institutional and social realities. Arthur *et al.* (2021) illustrate those cognitive impairments which tend to increase with age, further complicate the discharge

planning process, suggesting that healthcare providers must account for such factors when strategizing for timely discharges.

2.2.2 Patient Sex

The influence of patient sex on delayed discharge in domiciliary patients is a complex issue that highlights discrepancies within healthcare systems. Numerous studies have shown that patient sex can significantly impact the likelihood of delayed discharge, with notable differences between male and female patients regarding their discharge pathways and outcomes. A systematic review by Rojas-Garcia *et al.* (2018) revealed that patient experiences of delayed discharge can vary significantly based on demographic factors, particularly sex. Their findings suggest that biases in discharge planning processes may contribute to these disparities. Furthermore, a study argued that male patients often face delayed discharges due to the greater clinical complexity associated with emergency admissions (DeVolder *et al.*, 2020).

Additionally, older women experience longer hospitalization periods, potentially due to a combination of higher rates of comorbid conditions and complexities involved in arranging suitable discharge destinations (Bo *et al.*, 2015). Patients' mobility, physical capacity, and cognitive status have been suggested as contributing factors to discharge delays, influencing length of stay for both sexes. Cognitive (OR = 1.57; 95% CI: 1.03,2.39) and physical impairments (OR = 1.12; 95% CI: 1.05,1.19) are significant risk factors for prolonged stays, particularly for older patients, who often include a larger proportion of women in certain healthcare settings (Bo *et al.*, 2015; Landeiro *et al.*, 2019). In another study examining predictors of length of stay in a ward for demented elderly, Ono *et al.* (2010) identified significant sex differences, noting that complications, cognitive status, and functional abilities

influenced men's duration of delayed discharge, while age, complications, and discharge destination were key predictors for women.

Conversely, other studies have reported results indicating that sex may not significantly affect discharge delays. For instance, Challis *et al.* (2014) found that sex, along with the presence of a caretaker, did not significantly impact discharge delays in older patients. This divergence suggests that the relationship between sex and discharge timing is nuanced and may be influenced by other confounding factors, such as age and comorbidity status.

2.2.3 Caretaker Age

The relationship between primary caretakers' age and sex and the phenomenon of delayed discharge in domiciliary patients is an area of growing interest in healthcare research. Understanding how these demographic factors can influence discharge trajectories is vital for improving patient outcomes and optimizing care delivery.

Research has shown significant disparities in discharge outcomes based on the sex of primary caretakers. Ingram *et al.* (2022) reported that female primary caretakers, particularly single, widowed, or living alone individuals, are often more inclined to seek long-term care for patients rather than facilitating home recovery. This reflects traditional sex roles and potentially limited social support networks. A lack of emotional and practical support can directly impact a patient’s ability to recover in a home environment, leading to delays in discharge from healthcare facilities. Rojas-Garcia *et al.* (2018) conducted a systematic review that outlined how these delays can result in bed-blocking within healthcare systems, further complicating the timely transfer of patients. Their analysis highlights that women and patients with less support are more likely to experience adverse effects from systemic issues, further complicating discharge planning.

The age of primary caretakers also plays a crucial role in discharge outcomes. Older caretakers may face challenges in influencing discharge timing. For example, Sorensen *et al.* (2020) demonstrate that delays in patient placement can occur when primary caretakers have mobility issues or physical limitations in providing post-discharge care. Furthermore, a study by Gudila Valentine *et al.* (2021) shows correlation between extreme ages and delayed care, they primarily focus on paediatric and elderly populations, indicating a need for further exploration into how these age-related factors uniquely impact older adults' discharge processes. Evidence suggests that younger caretakers might lack the experience necessary to manage complex discharge planning, leading to avoidable delays. While Gudila Valentine *et al.* (2021) examined cognitive developmental delays in infants with caretakers outside the optimal age range, parallels can be drawn to adult care situations where caretakers may similarly struggle with their associated life stage skills. Conversely, older caretakers might deal with physical limitations that hinder their ability to support patient transitions effectively.

2.2.4 Caretaker Sex

Literature often emphasizes the importance of addressing both social support systems and psychological readiness in optimizing discharge processes. By meeting the emotional and psychological needs of both patients and carers, potential barriers to discharge can be alleviated, leading to a smoother transition of care. (Hendy *et al.*, 2012).

Traditional sex roles often place a higher burden of caretaking on women, which can lead to prolonged stress and fatigue, potentially hindering their ability to provide effective care (Farahani *et al.*, 2020; Lange *et al.*, 2023). Consequently, female caregivers may experience more challenges that could lead to delayed discharge, as they might not feel adequately prepared or supported to manage their responsibilities post-discharge (Slatyer *et al.*, 2019; Farahani *et al.*, 2020).

Furthermore, the complexity of patients' needs requires substantial emotional and physical support, which can be taxing for the caregiver (Hahn-Goldberg *et al.*, 2018). Women, who are frequently the primary caregivers, may struggle with this emotional load, especially if they are balancing work or other family obligations (Pedrosa *et al.*, 2022). The emotional and psychological readiness of caregivers is crucial, as research shows that when caregivers do not feel prepared for the demands of post-hospital care, it can directly affect the patient's transition of care, thereby lead to delayed discharge (Hesselink *et al.*, 2012; Shih *et al.*, 2020).

Sex-based expectations often exacerbate these emotional burdens, as female caregivers may have less access to community resources that can mitigate their assistance roles (Farahani *et al*., 2020; Huang *et al*., 2022). Therefore, health professionals must critically assess these sex dynamics and strive for a more balanced support system that addresses the unique needs of all caregivers, regardless of sex (Callister *et al*., 2019; Dossa *et al*., 2012).

2.2.3 Patient Relationship

The type of relationship between the patients and their primary caretakers is expected to be significant for the outcomes of delayed discharge in domiciliary patients. The dynamics of these relationships can impact discharge processes and patient outcomes. Caretaker characteristics, such as their relationship to the patient, greatly influence discharge planning, readiness, and the support systems available for patients.

Research by Ince *et al.* (2022) suggests that the nature of the caretaker's relationship with the patient, whether familial, professional, or informal, significantly impacts discharge outcomes. Their study reveals that caretakers with a deeper emotional connection to patients, particularly parents or spouses, are more likely to advocate for timely discharges and facilitate necessary post-discharge care. However, it is important to note that the emotional distress

associated with caregiving can also complicate discharge processes, particularly in cases involving patients with complex health needs (Aggarwal *et al.*, 2024). In contrast, a lack of family support has been associated with longer LOS, particularly among psychiatric patients, highlighting the critical role familial involvement plays in expediting discharge processes (Yoneyama *et al.*, 2016).

In a different context, the reliance on relatives as primary caregivers can create additional barriers. A study by Gaughan *et al.* (2017) suggests that areas with a higher supply of care home facilities experience reduced rates of delayed discharge. This indicates that the availability and types of care provided by caregivers directly influence discharge outcomes. Caretakers, particularly those unfamiliar with health management or who themselves face logistical constraints, may inadvertently contribute to delays.

2.3 Clinical Factors Associated with Delayed Discharge in Domiciliary Patients.

The association of clinical factors such as source of admission, main diagnosis, pre-domiciliary Barthel Index, number of clinical and rehabilitation care needed, and frequency of domiciliary team visits with delayed discharge in domiciliary patients is a multifaceted issue that affects healthcare delivery and hospital resource optimization. Each of these factors contributes uniquely to the likelihood of delayed discharges, impacting patient outcomes and hospital efficiency.

2.3.1 Source of Admission

The source of admission is a critical determinant of delayed discharge in domiciliary patients, as it shapes the clinical pathways and post-discharge needs for these patients. Two primary sources of admission are typically observed: (1) patients discharged from the hospital and (2) patients referred directly from health clinics. Understanding the implications of these sources is vital for effective discharge planning and minimizing delays.

Patients discharged from hospital settings often have complex medical histories, which can complicate their transition to home care. Rojas-Garcia *et al.* (2018) highlight that delayed discharge from hospitals can significantly impact hospital services and patient outcomes, suggesting that policies need to be in place to streamline discharge processes for patients moving from acute care to home. Furthermore, Demiralp *et al.* (2021) emphasize that patients who experience stays in acute care often require coordinated follow-up services based on their post-discharge health needs, which can lead to extended stays if such services are not efficiently arranged. The intricate nature of care required for these patients makes them more susceptible to experiencing delays in discharge.

In contrast, patients referred directly from health clinics may present different challenges, particularly in terms of urgency and the type of care required. Direct referrals can facilitate smoother transitions because these patients might already have established care plans and support systems in place. For example, a study observed that patients discharged directly home from intensive care units (ICUs) showed no significant differences in post-hospital healthcare utilization compared to those discharged through standard hospital processes. This suggests that direct referrals can reduce discharge delays if adequately supported by community health services (Stelfox *et al.*, 2018). This indicates that effective coordination and readiness for home care facilitated by direct referrals can enhance the discharge experience and minimize delays.

2.3.2 Main Diagnosis

The association between the main diagnosis of patients and the likelihood of delayed discharge in domiciliary care is a crucial area of investigation within healthcare. Different medical conditions can significantly influence the need for post-discharge support, the complexity of care required, and the overall readiness for transitioning from a medical facility to home care.

Research has shown that the primary diagnosis of patients plays a crucial role in determining discharge delays. Rojas-Garcia *et al.* (2018) noted that various medical conditions can lead to delayed discharge; patients with complex diagnoses often face additional barriers that delay their discharge, but their study primarily focused on factors impacting the experiences of delayed discharge rather than making direct claims about specific diagnoses. Chronic illnesses or severe acute conditions may typically require comprehensive assessment processes and post-discharge planning, which lead to delayed discharge.

Conditions such as neurological impairments or orthopedic injuries present unique challenges. For instance, those recovering from strokes can have varying rehabilitation needs that significantly influence discharge planning. Bai *et al.* (2019) highlighted that patients with cerebrovascular accidents require substantial rehabilitation, complicating discharge processes and potentially leading to increased delays in discharge. These complexities necessitate tailored discharge plans addressing specific rehabilitation needs and required prolonged home support systems.

2.3.3 Pre-Domiciliary Modified Barthel Index (Pre-Domiciliary MBI)

The pre-domiciliary Barthel Index scores are a significant clinical factor in determining the likelihood of delayed discharge in domiciliary patients. The Barthel Index, a widely used tool for assessing independence in performing activities of daily living (ADLs), plays a crucial role in evaluating a patient's functional status before they transition to home care.

Research has consistently demonstrated that lower Barthel Index scores are associated with increased delays in discharge. For instance, Aljinovic *et al.* (2024) found that patients with a Barthel Index score of less than 60 had an increased risk of complications post-discharge and poorer overall functional outcomes. This suggests that patients who are less independent in

their daily activities require more extensive post-discharge support and may not be ready for safe home management, resulting in prolonged stays in acute care settings.

In another study, Pan *et al.* (2023) highlighted that a higher Barthel Index score at discharge correlated with lower one-year mortality after hip fracture surgery. This finding underscores the importance of assessing functional independence as a vital part of discharge planning; patients with higher functional capacity are more likely to be discharged swiftly and successfully than those whose mobility and self-care abilities are compromised.

2.3.4 Number of Clinical Care Needed

The number of clinical cares needed such as needs for urinary catheter or nasogastric (NG) tube exchange significantly impacts the likelihood of delayed discharge in domiciliary patients. This association stems from the complexity of care requirements that directly influence a patient's ability to transition from a hospital or institutional setting to home care. A higher number of clinical cares needed often correlates with extended lengths of stay and difficulties in arranging suitable discharge plans.

Research indicates that as the number of clinical cares needed increases, patients face heightened risks of discharge delays. Toles *et al.* (2014) emphasize that patients with multiple clinical needs often require extensive coordination among healthcare providers, which can lead to delayed discharge. Each additional care requirement translates into the necessity for more comprehensive discharge planning to ensure that patients receive appropriate post-discharge support, whether from home health services or community healthcare systems.

Certain clinical conditions inherently require heightened care needs and may subsequently lead to delayed discharges. For example, patients with chronic illnesses such as heart failure frequently need ongoing assistance with day-to-day tasks (e.g., monitoring medications, diet management, and symptom management). Rorth *et al.* (2018) highlight that

patients with heart failure often struggle to perform activities of daily living independently, necessitating domiciliary support that can further complicate discharge processes.

2.3.5 Number of Rehabilitation Care Needed

The total number of rehabilitation care needs is a crucial clinical factor influencing delayed discharge in domiciliary patients. This relationship highlights the complexity of care required for patients exiting healthcare facilities and the importance of adequately assessing rehabilitation needs to facilitate timely transitions to home care.

Research indicates that patients with a higher number of rehabilitation care needs often experience prolonged stays. Cook *et al.* (2018) reported that older adults requiring extensive rehabilitation after lumbar spinal fusion surgery faced increased rates of readmission due to insufficient post-discharge rehabilitation management, which subsequently extended their length of stay. This study highlights a direct correlation between the intensity of rehabilitation needs and the timeliness of discharge.

Similarly, a study noted that early initiation of rehabilitation treatment positively influenced the functional recovery of patients, as measured by the Barthel Index (Ikeda *et al.*, 2021). Delays in starting rehabilitation can lead to complications that affect discharge timing. This emphasizes the critical role of planning and executing timely rehabilitation interventions to facilitate quicker recoveries and discharges.

The establishment of rehabilitation needs serves as a critical indicator for predicting discharge success. Studies have highlighted that inadequate responses to rehabilitation requirements can lead to poorer health outcomes, impacting the recovery trajectory for patients (Pucciarelli *et al.*, 2019). Individuals recovering from stroke or injury often face extensive rehabilitation processes that, if not properly addressed, can translate to delayed discharges and

re-hospitalizations, highlighting the need for effective post-discharge support (Major *et al.*, 2016).

2.3.6 Frequency of Domiciliary Visit

The frequency of domiciliary team visits is a significant clinical factor that influences the likelihood of delayed discharge in domiciliary patients. Effective domiciliary care, characterized by regular visits from health professionals, plays a critical role in facilitating transitions from hospital to home, ultimately impacting patient outcomes and discharge timelines.

Increased frequency of domiciliary team visits is correlated with reduced delays in discharge. For instance, Naseer *et al.* (2024) demonstrated that follow-up home visits are pivotal in supporting the transition of care for elderly patients, helping to identify barriers to compliance with post-discharge care plans. More visits ensure that potential obstacles to patient recovery-like medication non-adherence-are addressed promptly, fostering a more conducive environment for discharge.

Additionally, a study found that more visit of follow-up interventions significantly reduce readmissions among older adults, indicating that regular interactions with healthcare teams facilitate patient recovery and prevent complications that could lead to delayed discharge (Thomsen *et al.*, 2021). This relationship suggests that frequent domiciliary visits can mitigate risks associated with readmission and support timely discharge.

However, according to another study, an increase in domiciliary team visits typically signifies higher clinical complexity and more extensive rehabilitation needs among patients. Vallet *et al.* (2024) emphasize that patients who require frequent visits often have complex health conditions that necessitate ongoing assessments and interventions from healthcare

professionals. This complexity can contribute to delays in discharges as healthcare teams must ensure that all necessary care is in place before patients can safely transition to home care.

Furthermore, frequent visits can reflect inadequacies in the provision of care or indicate that patients are not yet medically stable for discharge. For instance, a study noted that an increased demand for specialist consultations can lead to delayed discharge due to the additional coordination required to finalize treatment plans (Badheeb *et al.*, 2024). Similarly, more frequent team visits in domiciliary settings may indicate that the patient is not meeting the required criteria for discharge, leading to delayed discharge.

2.4 Conceptual Framework

A conceptual framework was developed, based on a review of the literature and the variables in the secondary data, to examine the factors that influenced whether patients in domiciliary care in Kelantan were discharged on time or experienced delays. The study focused on three main groups of factors: patient characteristics, caretaker details, and clinical conditions. For patients, their age, sex, and relationship with their primary caretaker were analysed, as these aspects could have affected how well patients coped and recovered, potentially impacting the timing of their discharge. Details about the primary caretaker, such as their age and sex, were also considered, as these might have influenced the quality and consistency of care provided to the patient at home. Additionally, clinical factors were evaluated, including the patient's primary diagnosis, their level of independence prior to starting domiciliary care (measured by the Modified Barthel Index), and the types and frequency of care required. The frequency of healthcare team visits and the occurrence of any new complications during domiciliary care were also assessed. Discharge outcomes were categorized as either "Delayed Discharge" or "On Time Discharge." By analysing the impact of these factors, the study aimed to identify what contributed to timely discharges, with the goal of improving discharge processes and supporting efficient transitions for future patients. Figure 2.1 illustrates the conceptual framework of this study.

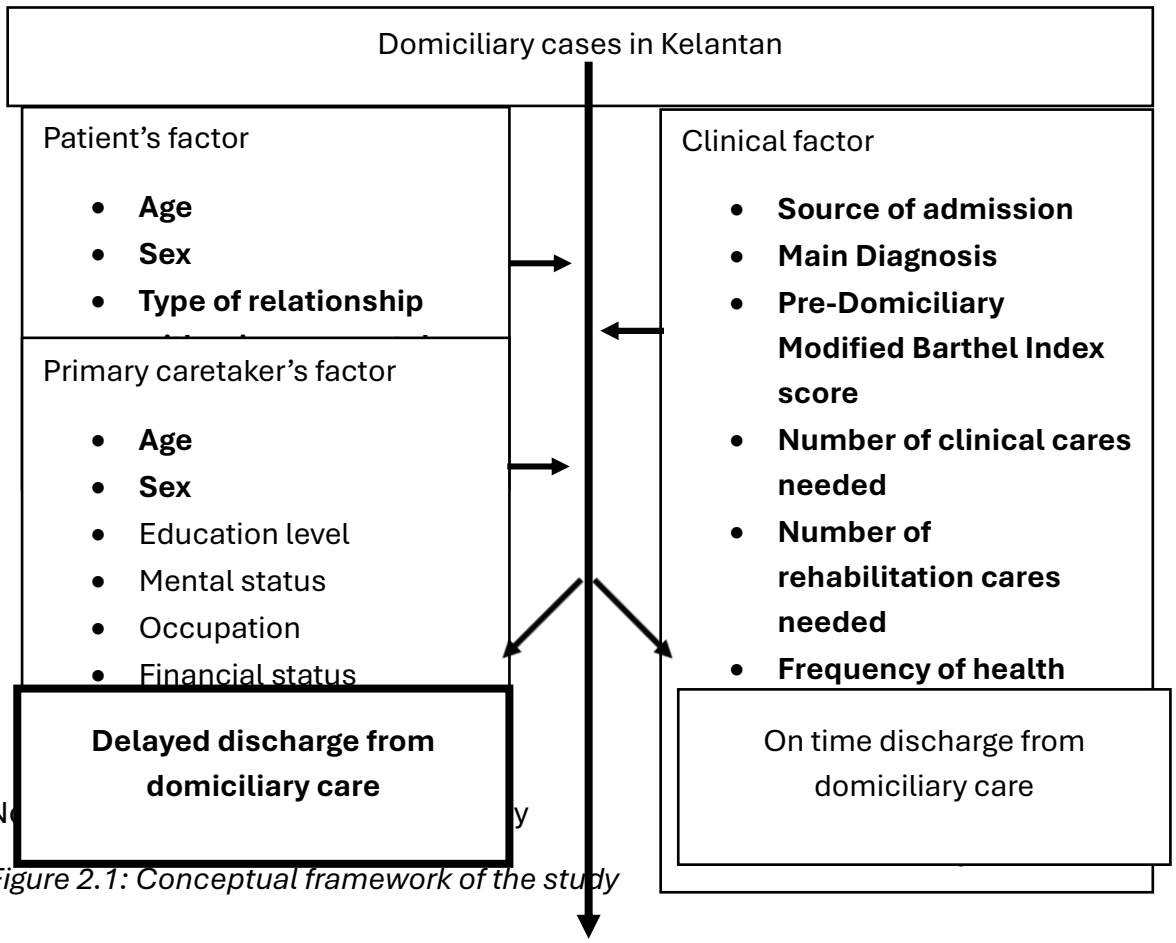

Figure 2.1: Conceptual framework of the study

CHAPTER 3

METHODOLOGY

3.1 Study Design

This was a cross-sectional study based on retrospective record review.

3.2 Study Duration

This study was conducted between January 2023 and December 2024.

3.3 Study Location

Kelantan is a state in the northeast part of Peninsular Malaysia, which is divided into a total of 10 districts, namely Kota Bharu, Tumpat, Pasir Mas, Pasir Puteh, Machang, Kuala Krai, Gua Musang, Bachok, Tanah Merah and Jeli. Domiciliary services are home domiciliary services operated under government primary health facilities for the people in Kelantan. Domiciliary care services in primary health facilities in Kelantan operated initially in 2014 in 42 primary health clinics and currently expanded to all 60 primary health clinics, which covers all districts in Kelantan. A domiciliary care service by a primary health clinic includes an integrated care team that comprises medical and rehabilitation professionals. The medical team consists of a medical officer, assistant medical officer, nurses, a nutritionist, and a pharmacist. The rehabilitation team includes an occupational therapist and physiotherapist. Table 3.1 summarizes the primary health clinics with domiciliary care services in 10 districts in Kelantan.