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Knowledge, Attitude and Practice of Conventional Medicine Among Thalassaemia In Malaysia: Conceptual paper

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Abstract
Thalassaemia, a worldwide chronic hereditary blood disorder, necessitates lifelong treatment due to its inability to produce enough haemoglobin, which can lead to severe anaemia. Medication extends patients' lifespans, but it also comes with complications and side effects that may reduce medication adherence. This conceptual paper investigates the factors, specifically knowledge, attitudes, and practice (KAP), influencing adherence to conventional medicine. The findings will highlight the patients' knowledge, attitudes, and practices of conventional medicine to reduce disease complications and side effects. It will also provide further opportunities to explore the literature gap.

Keywords: KAP; Thalassaemia; Questionnaire; Conventional-medicine

DOI:

1.0 Introduction

Thalassaemia refers to hereditary disorders marked by reduced or absent globin chain production. Patients diagnosed with thalassaemia exhibit an inability to produce enough red blood cells with desirable qualities, leading to ineffective erythropoiesis, anaemia, and insufficient oxygen delivery. The genetic abnormality may affect the haemoglobin (Hb) subunit at the α or β globin chains. Thalassaemia (α, β, γ, δ, δβ, and εγδβ) are the most common genetic disorders worldwide and represent a heterogeneous group of inherited disorders leading to α-thalassaemia, β-thalassaemia, or H disease (Fucharoen & Viprakasit, 2009). All types of thalassemia disease result from an imbalanced production of haemoglobin subunits. So, this makes erythroid cells build up unstable groups of chains that don't match. The clumps of non-thalassaemic Hb chains hurt the cell membrane, which destroys erythroid progenitor cells inside the medullary cavity and causes circulating red blood cells to break down too soon (De Simone et al., 2022). Risks for complications include infections, bone disorders, splenomegaly, slowed growth rates, cardiomyopathy, venous thrombosis, pulmonary hypertension, and hypothyroidism (Fucharoen & Viprakasit, 2009; Geneen LJ & Estcourt, 2023).

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Thalassaemia is widespread among people from the Mediterranean, the Middle East, Southeast Asia, the Indian subcontinent, and Africa. Nevertheless, thalassaemias continue to pose a global health challenge due to population movement, growth, and improved survival rates, which have led to a higher frequency of the illness. Thalassaemia poses a significant health issue, with approximately 1–5% of the global population carrying a mutation that causes the condition (Fucharoen & Viprakasit, 2009; Geneen LJ & Estcourt, 2023; Taher et al., 2018). In Malaysia, thalassaemia is the most common hereditary blood disease (Alwi & Syed-Hassan, 2022; Mohd Ibrahim et al., 2020). Approximately 4.5% to 6.8 % of the Malaysian population are thalassaemia carriers (Alwi & Syed-Hassan, 2022; Mohd Ibrahim et al., 2020), requiring lifelong blood transfusions (Geneen et al., 2023).

Thalassaemia patients necessitate lifelong treatment due to their inability to produce enough haemoglobin, which results in severe anaemia. They necessitate extensive monitoring and medication to enhance red blood cell production, reduce complications, and improve survival rates for severe thalassaemia (Chapin et al., 2022).Malaysia's healthcare system, which included free access to three iron chelation agents for thalassaemia treatment, ranked among the top countries globally in 2019. The Malaysian National Programme for Thalassaemia Prevention and Control, initiated in 2004, includes extensive public education campaigns, awareness initiatives, health education, the establishment of the Malaysian Thalassaemia Registry, population screening, laboratory diagnostics, and comprehensive patient management (Alwi & Syed-Hassan, 2022). However, the rigorous requirements and potential adverse effects of iron chelation therapy may negatively impact on daily activities and overall health, thereby compromising treatment adherence (Geneen et al., 2023).

The complications, treatments and Knowledge, Attitudes, and Practices (KAP) of thalassaemia disease have been extensively studied. KAP studies have become increasingly significant in contemporary healthcare research, particularly in contacts of nutrition, disease prevention, hygiene, and smoking cessation, as they focus on communities or healthcare professionals (Tariq et al., 2022). However, there is a lack of specific research examining the knowledge, attitudes, and practices among thalassaemia patients regarding prescribed medicine. This study addresses these gaps by (1) investigating thalassaemia patients' knowledge, attitudes, and practices concerning conventional medicine and (2) evaluating medication adherence and the extent to which adult patients follow recommended practices to improve their health. The goal is to develop best practices for disseminating and implementing thalassaemia risk reduction strategies.

2.0 Literature Review

2.1 Knowledge, Attitudes and Practice Theoretical Model

The KAP theory is a health behaviour change framework developed by Western scientists in the 1960s, delineating human behaviour changes into three sequential processes: knowledge acquisition, attitude formation, and behaviour development. The theory illustrates the interconnectedness of knowledge, attitudes, and practices, positing that knowledge underpins behavioural change, whereas beliefs and attitudes serve as the reason for such changes (Fan et al., 2018; Liu et al., 2024).

The Knowledge, Attitude, and Practice (KAP) theory model emphasizes the importance of knowledge and attitude in behavioural decision-making. It explains the development of health behaviours and predicts behaviour changes by examining the KAP of high-risk groups. According to KAP theory, health knowledge lays the foundation for a positive attitude and healthy behaviour. While attitude drives behaviour change. The ultimate goal is to promote healthy behaviour (Chen et al., 2022). The KAP theory outlines the steps of modifying human behaviour into three stages: information acquisition, belief formation, and behaviour development. These stages are crucial for effectively changing health behaviours (Wang et al., 2020).

Knowledge encompasses an individual's understanding of specific subject information. The KAP framework assesses a person's knowledge about a particular topic, including factual knowledge, awareness of risks or benefits, and comprehension of the results from specific behaviours or practices (Bahori et al., 2024). Understanding the medication's name, purpose, dosage, side effects, and storage instructions is essential, as outlined by the MyHealth Ministry of Health Malaysia (Che Pun Bujang et al., 2014).

Knowledge refers to what patients know about their disease, medication, and the adverse effects of therapy. Correct and adequate knowledge about the disease and its treatment, along with positive perceptions and attitudes towards disease therapy, is fundamental to safe medication use and persistent adherence (Shi et al., 2019). Attitudes encompass beliefs and behaviours related to the subject, while practice involves the actions taken in response to their understanding and attitude towards the subject (Tariq et al., 2022).

Attitude refers to an individual's beliefs, emotions, and views regarding a particular subject. It involves evaluating the individual's beliefs, values, and perceptions concerning the subject matter. Attitudes can alter behaviour by motivations and intentions by modification of specific practices. Practices or behaviours represent actions, habits, or behaviours that individuals exhibit. This concept refers to how people put their knowledge and attitudes into action. Such behaviours might include adopting certain practices, avoiding risky behaviours, or modifying existing habits based on new information or attitudes (Bahori et al., 2024).

According to Carl Hovland and his colleagues at Yale University, attitudes depend on information regarding the attitude, so attitudes can be influenced by providing new information through persuasive communication. The reception and acceptance of this new information can result in a change of attitude. People's attitudes spontaneously and consistently develop from beliefs recorded in memory, subsequently directing corresponding behaviour (Ajzen & Fishbein, 2000).

2.2 Thalassaemia treatment: benefits and side effects

Conventionally, thalassaemia patients require lifelong treatment to survive. They are unable to produce enough haemoglobin, which results in severe anaemia. The physician necessitates a comprehensive, modern approach and examination to track the patient's disease status and prescribe appropriate medication. The treatment a patient receives depends on the severity of their thalassaemia.

The severity of thalassaemia correlates with diminished haemoglobin levels in the body, resulting in increased anaemia severity. For thalassaemia patients, chelation and blood transfusions help control health issues. Haematologists must treat thalassaemia patients regularly to prevent severe anaemia and organ damage from iron overload.

Patients with beta thalassaemia major usually have transfusion-dependent thalassaemia (TDT). Typically, the initial two years of their life are when they experience severe anaemia and receive their diagnosis. These individuals may sustain their lives by receiving continuous, lifelong blood transfusions (Patterson et al., 2022). However, blood transfusions are associated with a range of potential risks and negative consequences. Patients diagnosed with thalassaemia who require frequent blood transfusions encounter a range of multiple risks, such as iron overload and subsequent endocrine disorders; erythrocyte alloimmunization; transfusion reactions; susceptibility to infections; and neurodegenerative diseases such as Alzheimer's and Parkinson's disease (Keikhaei et al., 2021; Patterson et al., 2022). Studies found that individuals with transfusion-dependent thalassaemia (TDT) have a significantly higher incidence of various problems, including iron overload (as indicated by serum ferritin levels), hepatic iron overload, hypothyroidism, and hypogonadism, compared to those with non-transfusion-dependent thalassaemia (NTDT) (Wanchaitanawong et al., 2021). This leads to the implementation of iron chelation therapy to reduce iron overload in organs.

The therapeutic management of iron overload employs iron chelators. Chelating medications, either alone or in combination, are prescribed to eliminate excessive iron acquired via blood transfusions, which can be indicated by low serum ferritin. Deferoxamine (DFO), deferiprone (DFP), and deferasirox (DFX) are the main iron chelation agents used by people with thalassaemia around the world. DFO must be administered subcutaneously or intravenously once daily due to its low oral bioavailability, while DFP and DFX can be taken orally up to three times daily (Reddy et al., 2022).

The DFO is a non-toxic intravenous iron chelator that has been granted for clinical use and is effective for long-term iron chelation therapy. The short span of action of DFO, along with the requirement for frequent injections and non-specific tissue distribution. The administration of DFO typically involves a consistent dosage range of 20-50 mg/kg/day, delivered subcutaneously by the use of a portable infusion pump (Entezari et al., 2022).

The DFP was the first oral iron chelator on the market. It was synthesised in 1981 at the University of Essex, England, and got approval from the Food and Drug Administration (FDA) in 2011 for treating patients with transfusional iron overload caused by thalassemia syndrome, when chelation therapy is not effective enough. The DFP is highly likely to be successful in removing iron from the heart. It decreases oxidative damage to the membrane of red blood cells and the production of lipid oxidation products. Gastrointestinal symptoms and agranulocytosis are the predominant side effects observed in patients who are administered DFP (Entezari et al., 2022).

The DFX is an orally administered tridentate iron chelating agent. The new film-coated tablet (FCT) formulation of DFX can be administered in a single step without any prior preparation and with less tight dietary limitations. Additionally, it is more pleasant to taste and has less gastrointestinal side effects compared to the traditional oral solution formulation (Entezari et al., 2022).

DFX is generally well-tolerated, however its most prevalent adverse effects are skin rashes and gastrointestinal problems. Elevated levels of blood ferritin above 2500 mg/L and liver iron content surpassing 15 mg/g dry weight have been associated with cardiovascular disease in individuals with DFX. Approximately 10% of individuals encountered unpleasant symptoms attributed to DFX, including dermatitis, diarrhoea, nausea, and stomach pain. The activities of the kidneys and liver may be unpredictable. It is recommended to conduct monthly tests of the function (Entezari et al., 2022).

Repeated injection of DFO and its nonspecific tissue distribution could lead to complications in multiple organs, including the brain, lungs, kidneys, and eyes. These effects can manifest as peripheral neuropathy, glandular dysfunction, and growth anomalies. Deferoxamine administration has also documented a range of visual disturbances, including lens opacity (cataracts), optic neuropathy, changes in the retinal pigment epithelium (RPE), night blindness, and visual field deficits (Keikhaei et al., 2021).However, Thalassaemia patients demonstrating poor adherence to deferoxamine (DFO) treatment had serum ferritin levels exceeding 3000 ng/mL (Demosthenous et al., 2019). In contrast, patients who regularly adhered to chelation therapy maintained serum ferritin levels below 3000 ng/mL. High serum ferritin indicates iron overload and leads to organ failure.

Recognised adverse effects include infusion reactions with DFO, agranulocytosis with DFP, and gastrointestinal distress and transaminitis with both DFP and DFX. People often fail to comply with iron chelation protocols due to these adverse effects, the need for intravenous DFO, and the frequent administration of DFP and DFX. This results in the build-up of iron in crucial organs, making proper control impossible. Studies suggest that different chelators may have varying causes of non-adherence due to differences in side effects and modes of administration (Reddy et al., 2022).

A study found the combination of DFP with a low dosage of DFX lead to adverse effects including arthralgia, nausea, vomiting, headaches, visual abnormalities, and mortality. Throughout DFP therapy, the body's iron load progressively escalated, posing a potential threat to patients' glucose tolerance, cardiovascular health, and overall mortality (Entezari et al., 2022).

Additionally, DFX is available in both dispersible tablet (DT) and film-coated tablet (FCT) forms; one study found that patients consistently preferred DFX (FCT) due to fewer gastrointestinal adverse events compared to DFX (DT). Patients with allergies to DFO and DFP can use DFX as a treatment (Entezari et al., 2022). Research also indicates variations in the efficacy of chelators in managing iron accumulation, with DFP showing greater effectiveness in reducing myocardial iron levels and DFO in lowering hepatic iron levels (Reddy et al., 2022).

2.3 Thalassaemia treatment and impact to Malaysia Government

Treatment for thalassaemia in Malaysia necessitates recurrent blood transfusions and continuous monitoring for potential adverse effects. Thalassaemia represents a significant public health concern in Malaysia, imposing a considerable financial burden on the health

ministry. The Malaysian government offers free access to blood transfusions in public hospitals nationwide. Government hospitals have been providing free chelating agents, such as subcutaneous deferoxamine (DFO) and oral deferiprone (DFP), to patients since 2005. Consequently, the majority of Malaysian thalassaemia patients opted for a treatment regimen that included regular blood transfusions and iron chelation through subcutaneous DFO. However, the government noted inadequate adherence to DFO among children with transfusion-dependent thalassaemia, which led to a decline in health due to the inability to maintain blood iron levels below 1000.0 mg/L. Failure to adhere with iron chelators results in iron accumulation, which can lead to end-organ dysfunction, particularly affecting the liver, heart, pancreas, and endocrine organs. The Malaysian government allocated an additional US$0.96 million to purchase oral iron chelators for children under the age of 7, to ensure improved overall compliance. Deferasirox (DFX), a contemporary oral chelator, has been available for younger patients since 2012 (Alwi & Syed-Hassan, 2022).

3.0 Methodology

Two phases will make up the study: the qualitative and the quantitative. The goal is to gather as much information as possible about the knowledge, attitudes, and practices of thalassaemia patients regarding the prescription of medicine, as well as the occurrence of complications or side effects. A summary of the method is shown in Figure 1.

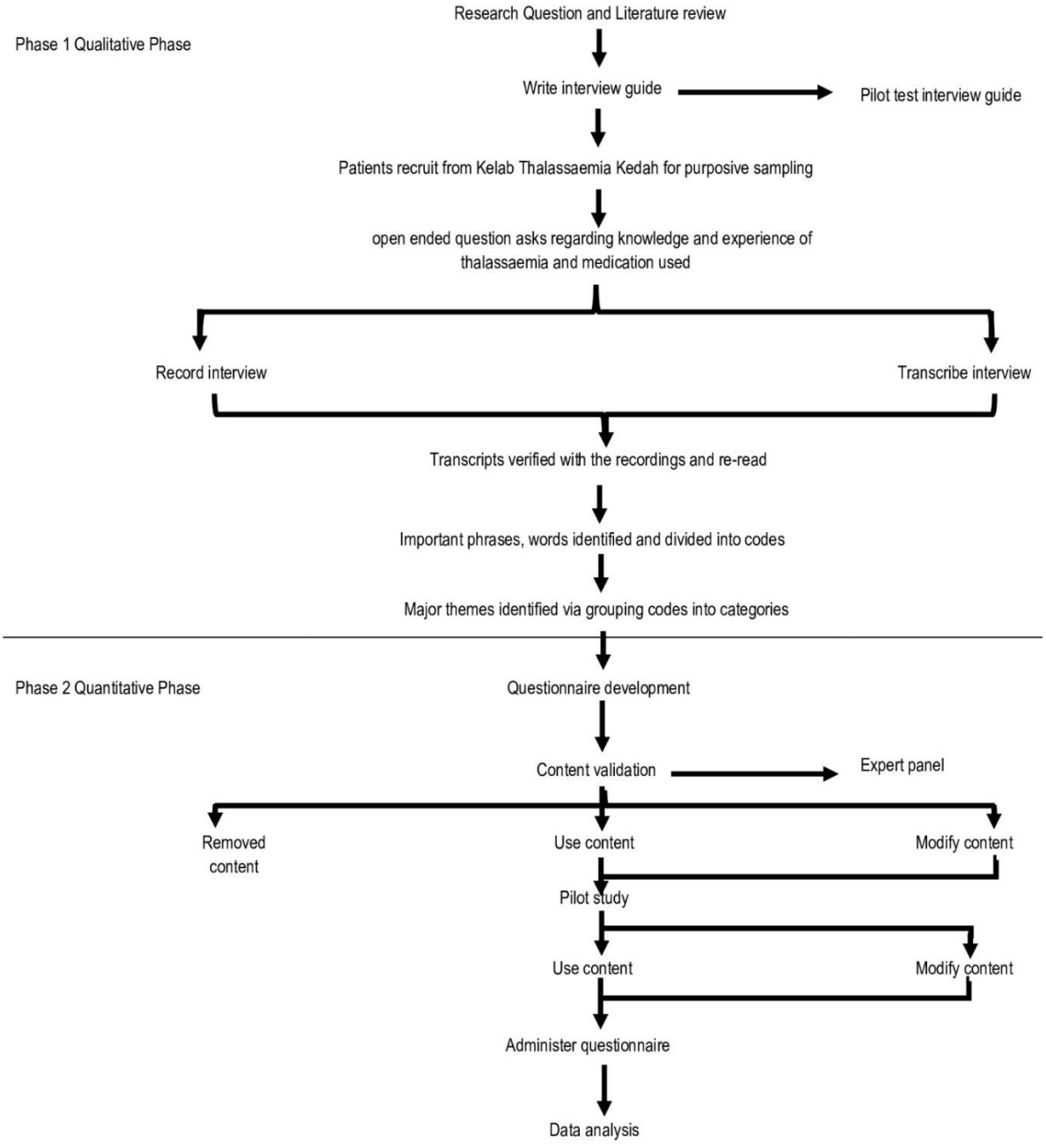

Figure 1: Flowchart of Qualitative and Quantitative phase

3.1 Qualitative phase (Phase I)

Objectives in the qualitative phase Explore patients' medical knowledge, attitudes, and practice. Identify items for a compliance instrument to measure patient compliance with prescribed medicine. Patients 18 years of age or older with any type of thalassaemia who have received conventional treatment for at least six months will undergo interviews. Participants must be able to speak, read, and write Malay or English and registered under "Kelab Thalassaemia Kedah". We will recruit until theoretical saturation, or when no new information emerges from subsequent interviews (Urquhart, 2013). We will exclude Thalassaemia patients who have physical or cognitive limitations that prevent meaningful participation. This study employs interpretive phenomenology (IP) as its research methodology to investigate the patients' knowledge, attitudes, practices, and perceptions regarding the hospital's medicine.

3.2 Quantitative Phase (Phase II)

We aim to ascertain the correlation between thalassaemia patients' knowledge, attitudes, and perceptions of conventional medicine and their disease complications. We will conduct an item analysis to ascertain the validity and reliability of the instrument. We will distribute the self-administered questionnaire to 424 thalassaemia patients aged 18 years or older with any type of thalassaemia who have received conventional treatment for at least six months. Participants must be able to speak, read, and write Malay or English and get treatment from any government hospital in Malaysia.

4.0 Concept proposal to reduce thalassaemia complications

Most studies focus on the thalassaemia prevention by evaluation of the knowledge, attitudes, and practice of the thalassaemia among public people; there are studies on specific medicine adherence among patients and carers, especially among children and and adolescents. Lack of knowledge about the disease and its treatment can negatively impact attitudes and behaviors related to treatment adherence, which in turn can lead to suboptimal treatment adherence. This inadequate adherence to chelation therapy results in insufficient iron removal, leading to iron overload and subsequent organ complications (Shaker et al., 2024). Figure 2 illustrates the proposed concept of reducing thalassaemia complications through good knowledge, attitude, and practice towards medicine, as well as the consequences of poor medical practice.

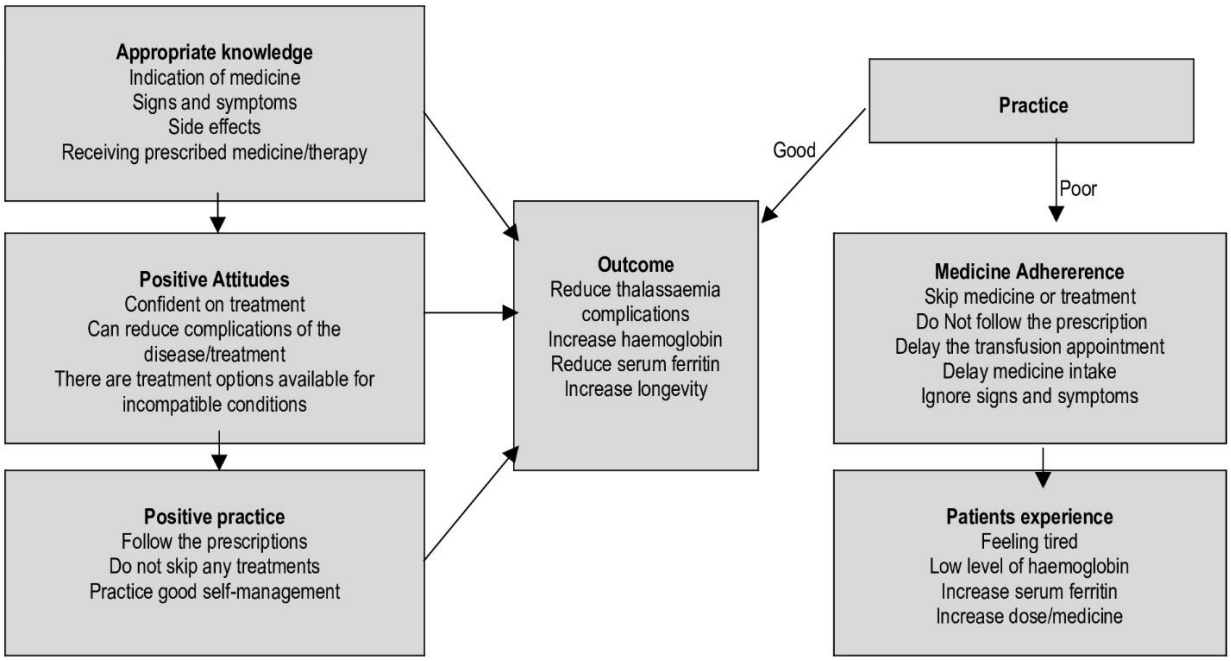

Figure 2: The conceptual framework of the study: The knowledge, attitudes, and practices of thalassaemia towards conventional medicine.

5.0 Discussion

Thalassaemia is a significant public health concern in Malaysia, imposing a substantial financial burden on the health ministry. Treatment requires repeated blood transfusions and ongoing monitoring for potential side effects. Health Minister Datuk Seri Dr. Dzulkefly Ahmad reported that more than half patients were categorised as critical, requiring ongoing treatment that included blood transfusions and high-cost speciality medications. In Malaysia, one in every 20 residents is a carrier of thalassaemia. The minister stated that an average expenditure of RM3 million (US$720,000) is incurred for each thalassaemia patient throughout their lifetime. The Malaysian Thalassaemia Registry documented 124 fatalities from 2006 to 2009, primarily attributed to cardiac, infectious, and endocrine complications. Studies conducted in Malaysia indicated a prevalence of endocrine complications at 68.0%, restrictive lung dysfunction at 33.3%, and diffusion impairment at 87.9% (Alwi & Syed-Hassan, 2022).

The studies on foundational knowledge and attitudes in a model suggest that accumulated knowledge regarding a health aspect facilitates changes in attitude, which subsequently leads to behaviour change, gradually integrating into routine practice. This model clearly indicates that possessing adequate knowledge is essential for fostering a positive attitude and effective practices (Tariq et al., 2022).

This study is aligned with Programme "Know Your Medicine" by Ministry of Health project under The National Project Quality Use of Medicine - Consumer is an initiative within the Pharmaceutical Services Programme of the Ministry of Health Malaysia. The program is implemented to enhance the fourth element of the Malaysian National Medicines Policy (Dasar Ubat Nasional, DUNas), which pertains to the quality use of medicines. The primary aim of this project is to guarantee the wise, appropriate, safe, and cost-effective use of medications to enhance health outcomes. Various strategies are employed to attain the objectives, including education, training, and the provision of accurate medicinal information to consumers. The responsible use of medications lies with both healthcare providers and consumers. Both parties play a crucial role in ensuring that medications are utilised optimally to enhance health outcomes.

6.0 Conclusion& Recommendations

This paper aims to construct a conceptual framework to promote better health among thalassaemia patients on medicine by enhance the patient's knowledge, attitude and practice toward medicine prescribed. This ongoing paper has explained the needs of medicine, complications and side effects of treatment. Discussion with the physician and pharmacist about the side effects of the treatment provided may improve the patient's adherence and better quality of health among thalassaemia patients. Measuring actual medication adherence objectively can be challenging, as it often relies on self-reporting rather than direct observation. Disclosing medication adherence and the side effects of treatments to physicians or pharmacists benefits patients. Alternative treatment options can then be prescribed to ensure the wise, appropriate, safe, and cost-effective use of medications, ultimately enhancing patient health outcomes. Gaps in levels of education among patients may result in different interpretations of the questions, thereby influencing the consistency of responses. The accuracy of patients' recollections regarding their medication adherence and experiences may influence the reliability of the data. The researcher also suggests future study conduct on other chronic diseases and their quality of life.

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Paper Contribution to Related Field of Study

Findings of this study will provide policymakers with recommendations that can be used to regulate the national policy of conventional medicine systems, which shall be a vital component of the healthcare system if not have an impact or effect on thalassaemia patients. It will coexist with modern medicine and contribute towards enhancing the health and quality of life of all Malaysians. The government will facilitate the development and safety of conventional medicine practices. It will support the identification of its health, economic, and social benefits, thus optimizing the healthcare system.

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