VALIDITY AND RELIABILITY OF QUESTIONNAIRE REGARDING KNOWLEDGE, ATTITUDE, AND PRACTICE ON THALASSAEMIA AMONG CAREGIVERS OF TRANSFUSION DEPENDENT THALASSAEMIA CHILDREN

BY

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DISCLAIMER

I declare that this dissertation records the results of the study performed by me and that it is of my own composition.

This research has been sent to Universiti Sains Malaysia for the degree of Master of Medicine in Transfusion Medicine. It is not to be sent to any other universities. This research might be used for consultation and can be photocopied as a reference.

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LIST OF ABBREVIATIONS

AMDI : Advanced Medical and Dental Institute

CATI : Computer-assisted telephone interview

CBS : Caregiver Burden Scale

CFA : Confirmatory Factor Analysis

CPG : Clinical Practice Guidelines

CVI : Content Validity Index

DFO : Desferrioxamine

DFP : Deferiprone

DFX : Deferasirox

DKTM : Disease Knowledge on Thalassaemia Major

DNA : Deoxyribonucleic Acid

EFA : Exploratory Factor Analysis

Hb : Haemoglobin

HREC : Human Research Ethics Committee

HRPZ II : Hospital Raja Perempuan Zainab II

HRQoL : Health-Related Quality of Life

HSCT : Haematopoietic stem cell transplantation

HSIP : Hospital Sultan Ismail Petra

HTM : Hospital Tanah Merah

ICC : Intraclass Correlation

IPPT : Institut Perubatan dan Pergigian Termaju

IRT : Item Response Theory

KAP : Knowledge, Attitude, and Practice

LIC : Liver Iron Concentration

MRI : Magnetic Resonance Imaging

MTR : Malaysian Thalassaemia Registry

NMRR : National Medical Research Register

PBF : Peripheral Blood Film

PIS : Patient Information Sheet

PSS : Parental Stress Scale

SES : Social-Economic Status

SF : Serum Ferritin

TAS : Treatment Adherence Scale

TDT : Transfusion Dependent Thalassaemia

TM : Thalassaemia Major

TOP : Termination of Pregnancy

USM : Universiti Sains Malaysia

WHO : World Health Organization

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ABSTRAK

Pengenalan: Talasemia merupakan penyakit kronik yang bermula dari usia muda dan menyebabkan beban kepada pesakit, penjaga, dan perkhidmatan kesihatan awam negara. Namun begitu, kajian tentang pengetahuan, sikap, dan tingkahlaku khususnya dalam kalangan penjaga atau ibubapa pesakit talasemia adalah kurang serta soal selidik tidak diuji kesahihan dan kebolehpercayaan.

Objektif: Untuk menghasilkan alat yang sahih dan boleh dipercayai untuk mengukur pengetahuan, sikap, dan tingkahlaku (KAP) dalam kalangan pengasuh kanak-kanak talasemia yang bergantung kepada transfusi darah (TDT). Kajian ini juga telah menguji kesahihan dan kebolehpercayaan alat tersebut.

Kaedah: Kaedah rentas silang digunakan untuk menguji pengetahuan, sikap, dan tingkahlaku dalam kalangan penjaga atau ibubapa pesakit talasemia yang bergantung kepada transfusi darah di empat buah hospital di negeri Kelantan. Fasa I adalah proses menghasilkan borang soal selidik yang baru. Fasa II adalah untuk menguji kesahihan dan kebolehpercayaan borang soal selidik tersebut. Analisis termasuk pengesahan kandungan dan *face validation*, *Item Response Theory* (IRT) dan *Exploratory Factor Analysis* (EFA) untuk menentukan kesahihan, serta konsistensi dalaman *(internal consistency)*. Soal selidik mengambil masa lebih kurang 30 minit untuk selesai dijawab oleh responden.

Keputusan: Dalam Fasa I, semua item dikumpulkan dari tinjauan kajian meluas dan diterjemahkan ke dalam Bahasa Malaysia. Pengesahan kandungan adalah memuaskan dan sebanyak 48 soalan telah dipilih. *Face validity* telah diuji pada sepuluh responden. Dalam Fasa II, sebanyak 107 penjaga kanak-kanak talasemia telah direkrut. Kesemua 27 item pengetahuan dipilih dan nilai *cronbach's alpha* adalah 0.82. Sebelas daripada 14 item sikap dipilih dan konsistensi dalamam adalah 0.79. Nilai *cronbach's alpha* adalah

tidak diterima untuk item tingkahlaku walaupun setelah menggugurkan item-item dengan *factor loading* serta *communnalities* yang rendah.

Kesimpulan: Soal selidik tentang pengetahuan, sikap, dan tingkahlaku dalam kalangan penjaga kanak-kanak talasemia yang bergantung kepada transfusi darah mempunyai kesahihah *(validity)* dan kebolehpercayaan *(reliability)* yang baik. Namun demikian, item tingkahlaku memerlukan penambahbaikan pada masa akan datang.

Kata kunci: Kesahihan, Kebolehpercayaan, Soal selidik, pengetahuan, sikap, tingkahlaku, talasemia

ABSTRACT

Introduction: Thalassaemia is a chronic disease that starts in early childhood and exerts significant pressure on the patient, their caregivers, and a country's public health service. However, knowledge, attitude, and practice (KAP) studies performed specifically among parents or caregivers of thalassaemia are lacking proper validity and reliability testing.

Objective: To develop a valid and reliable tool to assess KAP among caregivers of TDT children. This study also evaluated the validity and reliability of the aforementioned tool.

Methods: A cross-sectional design among caregivers or parents of TDT thalassaemia children in four hospitals in the state of Kelantan. This study consisted of Phase I for the development of a new questionnaire and Phase II involving the distribution of research tool to assess validity and reliability. Evaluation included content and face validation, Item Response Theory (IRT) and Exploratory Factor Analysis (EFA) for construct validation, as well as internal consistency. Respondents were requested to answer a self-administered questionnaire which took about 30 minutes to complete.

Results: In Phase I, items were explored through an extensive review of literature and translated into Bahasa Malaysia. Content Validity was found to be satisfactory and 48 items were chosen. Face Validity was performed on 10 participants. For Phase II, a total of 107 caregivers were recruited. All 27 knowledge items were retained and Cronbach's alpha was 0.82. Eleven out of the initial 14 attitude items were retained and internal consistency was 0.79. Cronbach's alpha value was unacceptable for practice items despite removing questions with both low factor loading and low commonalities.

Conclusion: The questionnaire regarding KAP among caregivers of TDT children generally has good validity and reliability. However, the practice domain requires revision in the future.

Keywords: Validity, Reliability,Questionnaire, transfusion dependent thalassaemia, KAP

CHAPTER ONE:

INTRODUCTION

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INTRODUCTION

1.1 Study Background

A chronic disease refers to a condition that disturbs the daily functions of people for at least three months out of a year. It can also be a condition that requires hospitalization for a month or more (1). These chronic conditions are debilitating, and thus, hinder people to live independently. They will need to turn to family caregivers for physical, emotional, and financial support. However, caregivers frequently aid without any proper training, without recognition or support for themselves, and without financial compensation (2).

Thalassaemia being one of the many chronic conditions no doubt exerts pressure on family members to care for the patient. When not handled with proper coping mechanisms, this “burden of care” will cause caregiver burnout, leading to poor psychological well-being, decreased satisfaction in relationships, and an overall decline in physical health (3).

Like many hereditary diseases, efforts are fittingly focused on screening and prevention. Notable conducts include the screening for carrier statuses in children and pre-marital couples, as well as options for pre-gestational genetic screening and therapeutic abortion in confirmed thalassaemia major pregnancies (4).

Managing families that are already affected by thalassaemia have their challenges. The responsibility of caregivers is even greater in thalassemia as this condition is inherited and symptoms surface early. Unless cured with a bone marrow transplant, children affected with thalassaemia major will depend on life-long blood transfusions and concurrent iron chelation therapy (3).

1.2 Justification of Study

There is much literature describing the prevalence and demographics of thalassaemia patients or carriers. As we are moving towards molecular diagnosis, there have also been attempts to discover the genetic mutations involved in the disease by geographical regions or ancestry/ethnicity (5).

There is also a vast literature addressing poor HRQoL in either the thalassaemic patients or their families. Because of the intricacy, this domain is usually reviewed independently and rarely elaborated as part of a KAP study (3).

Moreover, knowledge, attitude, and practice (KAP) regarding thalassaemia have been evaluated in different populations, such as the public, healthcare workers, medical students, thalassaemia patients themselves, or their family members. They can be assessed together or separately according to the researcher's objectives.

KAP studies performed specifically among parents or caregivers of thalassaemia children should include an assessment on intervention or management, rather than preventive strategies only. Although a questionnaire is a simple and reliable tool, the depth of the questions would differ when compared to other target populations.

We observed variable levels of parents' disease knowledge, relatively positive attitudes towards their thalassaemia children, and generally good practice or compliance with the management of the disease. However, there are few questionnaires which are properly validated or reliable.

To our knowledge, there is no validated questionnaire assessing KAP specifically among caregivers of thalassaemia children in Malaysia. Therefore, there is a benefit in developing a validated questionnaire as it can be utilized in many centres, evaluate areas needing improvement in managing thalassaemia, and contribute to filling the knowledge gap in the literature.

1.3 Literature Review

1.3.1 The Burden of Thalassaemia

Thalassaemia is one of the most common hereditary disorders of haemoglobin synthesis and is very prevalent in tropical as well as subtropical areas. At least 5.2% of the world population carries a significant variant of haemoglobin disorders, with over 332,000 conceptions or births affected each year. Around 56,000 are thalassaemia major, where at least 30,000 require regular transfusions (5).

Thalassaemia is a disorder that results in defective globin chain production, either alpha (α), beta (β), or a combination of both. Alpha thalassaemias tend to be of the deletional type, whereas beta thalassaemias are caused by a point mutation. Over 200 mutations are identified across various geographical regions and ethnicity (6).

According to the Malaysian Thalassaemia Registry (MTR), there are 8681 registered thalassaemia patients, 7984 (91.97%) alive and the remaining 697 are deceased. It was postulated that 3%–5% of our population carry the thalassaemia gene mutations (7).

Geographically, Sabah has the largest number of registered patients, with 1814 cases, followed by Selangor (14.64%), Kedah (8.69%), Johor (7.98%) and Perak (7.06%). There is a relatively equal ratio of male and female patients. The majority (5146) were aged between 5 to 25 years old. More than half were Malays (5106), followed by Chinese (938), and Kadazan-Dusuns (7).

The most frequent cause of death among 608 patients with available data were cardiac failures (254 cases) and infections. It has been observed that the age groups with high mortality are rather young in our populations, whereby patients aged between 15 and 30 years make up 72.62% (183 cases) of deaths from cardiac causes (8).

1.3.2 Screening Strategies

Vigorous efforts should be continued in health education, public awareness, and public screening for thalassaemia in Malaysia. This approach was, in part, due to our multicultural background that seems to be less aware of prenatal diagnosis, as well as being unsupportive of termination of pregnancies (TOP) of thalassaemia major babies. However, this might change as we see more positive attitudes in caregivers of thalassaemia patients towards these options (4).

Pre-marital screening is not yet mandatory in Malaysia. Additionally, the implementation of nationwide screening amongst 16-year-old students is still facing challenges such as logistics, healthcare reach, and even parental refusal to screen their children (9).

Poor awareness or knowledge about thalassaemia itself can be the cause of poor acceptance to screen for the condition or vice-versa. Mass public education campaigns would only work if the public were knowledgeable, and therefore, willing to undergo screening. Additionally, we should consider enhancing the three most frequently cited sources for information about thalassaemia in Malaysia, which were mass media (83.3%), family and friends (15.2%), as well as healthcare providers (8.9%) (10).

1.3.3 Treatment Modalities and Management

Recommendations from the Malaysian Clinical Practice Guidelines (CPG) include full red cell phenotyping at diagnosis or before the first transfusion, especially common antigens, such as ABO, Rh, Kell, Kidd, Duffy and MNSs. For adequate extramedullary suppression, a pre-transfusion haemoglobin (Hb) aim of 9 - 10 g/dL is required. Transfusion should be initiated when symptomatic, with failure to thrive, or with the presence of bony deformities (7, 11).

Infective screening consists of HBsAg, anti-HCV, and anti-HIV should be done at diagnosis or before initiating transfusion, and later every 6 months. Some patients may require splenectomy to reduce transfusion requirements secondary to hypersplenism, or when large organ causes discomfort, risk of infarction, or rupture (11).

Iron chelation therapy should be started on patients who have received more than 10 units of blood, and when serum ferritin (SF) is more than 1000 μg/L. Desferrioxamine (DFO) has been used since the1960s and can maintain serum ferritin levels < 2500 μg/L. Compliance is an issue with this somewhat unpleasant slow subcutaneous infusion. Since the introduction of Deferiprone (DFP), compliance was found to increase from around 79 to 98%. Oral Deferasirox (DFX) is the newest iron chelator used in children from 2 years old. Combination therapy is indicated in severe iron overload (11).

Haemopoietic Stem Cell Transplantation (HSCT) remains the only means for the cure of thalassaemia. Malaysia has 130 patients reported to be cured by stem cell transplantation. It is recommended to be done early as unsatisfactory iron chelation, the presence of liver fibrosis, and gross hepatomegaly have significant negative influences on post-transplant outcomes (7, 11).

1.3.4 Monitoring of Treatment Efficacy

Serum ferritin gives a good estimate of the risk of complications secondary to iron overload, and should be monitored every 3 to 6 months. However, it is an acute phase reactant and may not accurately reflect total body iron stores (11).

Total liver iron concentration (LIC) has been used in the past as the gold standard to reflect body iron load. Nowadays, Magnetic Resonance Imaging (MRI) T2* has been proven to be a useful, non-invasive method that is readily available, sensitive to iron levels, and reproducible to assess cardiac siderosis (11).

1.3.5 Caring for People with Chronic Disease

There are many difficulties for patients with chronic illnesses to live independently without family or close caregivers. On top of the disease affecting patients' symptoms, mood, and need for emotional and physical support; it also directly causes caregivers to experience changes in social, economic, physical, and mental health (1). Depending on the coping mechanisms, caregivers play a much greater role in fostering the patient's psychological adjustment towards adopting positive behaviour that influence recovery and functioning (2).

Parents of thalassaemia children have anxieties due to the need for continuous treatment, upon observing changes in the child's appearance, the misconception of early death, and the inability to reject the implications of therapy, such as the risk of transfusion transmissible infections. Caregiver burden also shifts dynamically during the different stages of a thalassaemic child's life, who are dependent on them from infancy until reaching adulthood (12).

1.3.6 Caregiver Burden and Quality of Life

Caregiver Burden was neatly summarized in a cross-sectional study among 249 caregivers of children with chronic diseases in Iran. Out of five sub-scales, the most affected caregiver burden was observed in general strain dimension, followed by environment, disappointment, social isolation, and emotional involvement. Expectedly, the most frequent chronic disease was thalassaemia (27.3%) followed by cancer (19.3%). They utilized the Persian version of the Caregiver Burden Scale (CBS) previously tested for content and face validities. They reported good reliability in their current study (1).

In line with the above research, a significantly negative correlation between stress levels and the quality of life among 372 mothers caring for thalassaemia children treated

in ten government centres in Malaysia was discovered. Interestingly, their study found no significant differences between working status with stress levels among these mothers. This has been attributed to adequate emotional support from their husband, families, parents, and friends (13).

However, this article also observed that the mean value for the quality of life among working mothers is statistically higher. It was discussed that this group were able to contribute to alleviate financial expenses, as most medical management of thalassaemia children is covered by government healthcare facilities (13).

Many studies may find slightly different ideas concerning the obstacles in providing care for thalassaemic children. An integrative review identified six common themes, which are psychological distress, frustration with treatment, absence of a support network, social death and stigmatization, the capability of applying good coping strategies, and constant worry about the future of their children (14).

All parents concur that caring is stressful and demanding but accepted that they must deal with the situation for the sake of the child. Moreover, parents implore that interaction with professional services is an especially important contributory factor to their ability to cope, in addition to family support (14).

1.3.7 KAP Studies Among Parents of Thalassaemia Children

As mentioned above, KAP studies that specifically target the caregivers of thalassaemic children are lacking in terms of proper validation and reliability. This is true for author-developed questionnaires used in other countries and our setting. Seven main KAP studies were found, while others may assess KAP separately or are conducted in a different group of subjects other than caregivers (15-21).

One out of the seven studies mentions face validity by pre-testing the questionnaire in a pilot study. Interviews were conducted with a large sample of 201 families with β-thalassaemia patients managed in Karachi, Pakistan. They reported superficial comprehension of thalassaemia. The main sources of knowledge regarding the disease were from counselling sessions in clinic, relatives, and the media (16).

In terms of practices, more than half were not screened premaritally or tested prenatally. Those who tested positive for thalassaemia fetuses were later confused regarding the option of abortion. This paper stated reasons for not getting screened were due to poverty (27.9%), religious beliefs (17.4%), and family influence (19.4%) (16).

The above research was most likely a follow-up to the one conducted in Rawalpindi and Islamabad, Pakistan, which evaluated KAP of 410 families with β-thalassaemia children. The study highlighted the change in the parent's overall KAP towards the disorder after having a child diagnosed with thalassaemia. This supports the importance of regular follow-up and reinforcing counselling sessions that were provided by thalassaemia centres (17).

In addition, there are another four parallel KAP studies conducted amongst parents of thalassaemia patients in separate districts in India. Unfortunately, evidence of validity and reliability was not mentioned in any of the studies (15-21).

The most recent was conducted in 2019 at a government Medical College/Hospital of Anantapuram district. This cross-sectional study assessed 260 parents of β-thalassaemia children with a structured questionnaire translated into their native language. They concluded that parents had enough knowledge about thalassaemia, had a positive attitude, and followed good practices. It was revealed that the education, age, and socioeconomic status (SES) of caregivers were contributing factors (15).

The three other KAP studies in India applied interview methods together with author-devised questionnaires (18-20).

In Patiala, disease knowledge differs significantly in parents from rural or urban regions. Areas of poor knowledge were disease inheritance, prenatal diagnosis, curability, the importance of monitoring ferritin levels, and the role of iron chelators. Attitude towards prenatal diagnosis was also found to be statistically significant with socioeconomic status (SES). There was a positive relationship between disease knowledge and treatment adherence. However, limitation was that the data analyzed were dated from year 2011 to 2012 (18).

On the other hand, there was a paradoxical finding of excellent knowledge levels but a lack of attitude and practice towards the prevention of thalassaemia in parents from Amritsar. They have a relatively small study sample of 50 participants (19).

In Mumbai, good practice, variable attitude, and inadequate knowledge were observed. This paper would help clinicians to focus on the lack of knowledge among parents on issues such as prenatal testing awareness, additional vaccines, the side effects of transfusion and iron chelators, as well discussion on possible cure for thalassaemia. Attitude-wise, 72.5% did not consider the children as a burden even when the majority agreed on the considerable family expenditure due to the disease. This study was also conducted on a relatively small sample of 40 parents (20).

A study conducted at the National Thalassaemia Center in Damascus, Syria applied a different approach by using a cross-sectional, descriptive analytical design. This was a complex research whereby multiple instruments were used to interview 238 parents and thalassaemia patients. They studied homegiver knowledge on thalassaemia, patient quality of life (QoL), and patient's self-image description of thalassaemia. Specific practices for preparing and administering subcutaneous desferral were also tested (21).