FACTORS PREDICTING DENGUE PREVENTION BEHAVIORS AMONG MOTHERS OF UNDER FIVE CHILDREN IN COMORO VILLAGE, DILI TIMOR LESTE

ELEONORA FERNANDES ALMEIDA

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR MASTER DEGREE OF NURSING SCIENCE
(INTERNATIONAL PROGRAM)
IN PEDIATRIC NURSING PATHWAY
FACULTY OF NURSING
BURAPHA UNIVERSITY
2024

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วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรพยาบาลศาสตรมหาบัณฑิต (หลักสูตรนานาชาติ)

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The Thesis of Eleonora Fernandes Almeida has been approved by the examining committee to be partial fulfillment of the requirements for the Master Degree of Nursing Science (International Program) in Pediatric Nursing Pathway of Burapha University

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19 JUL 2024

65910025: MAJOR: PEDIATRIC NURSING PATHWAY; M.N.S. (PEDIATRIC NURSING PATHWAY)
KEYWORDS: DENGUE, PREVENTION BEHAVIOR, PERCEIVED SUSCEPTIBILITY, PERCEIVED SEVERITY, SELF-EFFICACY

ELEONORA FERNANDES ALMEIDA : FACTORS PREDICTING DENGUE PREVENTION BEHAVIORS AMONG MOTHERS OF UNDER FIVE CHILDREN IN COMORO VILLAGE, DILI TIMOR LESTE. ADVISORY COMMITTEE: CHINTANA WACHARASIN, Ph.D. 2024.

Dengue prevention is the most effective way to reduce morbidity and mortality of dengue, especially for children. Many efforts from the Timor Leste Ministry of Health for dengue prevention. However, the Country's annual incidence continues to rise due to some factors related to prevention behaviors. This study aimed to describe dengue prevention behaviors among mothers of under five children and to examine factors predicting dengue prevention behaviors among mothers of under five children. A simple cluster random sampling method was used to recruit the sample of 264 mothers of under five children. Research instruments included the demographic questionnaire, knowledge regarding dengue questionnaire, perceived susceptibility questionnaire, perceived severity questionnaire, perceived benefits questionnaire, perceived barriers questionnaire, self-efficacy questionnaire, and dengue prevention behaviors questionnaires. Data were analyzed by descriptive statistics and standard multiple linear regression.

The results revealed that the mean score of dengue prevention was 58.28 out of possible score of 75 which showed poor dengue prevention behaviors. The regression analysis showed all the variables combined could explain 7.2 % of variance of dengue prevention behaviors among mothers of under five children. However, only knowledge ($\beta = .149$, $p < .001$) and self-efficacy ($\beta = .147$, $p < .001$) could significantly predict dengue prevention behaviors.

The findings highlighted significant evidence for future interventions that could enhance dengue prevention behaviors among mothers of under five children.

ACKNOWLEDGEMENTS

I would like to Gratitude all the people who gave me support and help so that I could complete the master's thesis successfully. First and foremost, I owe my deepest sincere appreciation to my Major Advisor Professor Dr. Chintana Wacharasin who gave me huge help and guided me step by step in the process of conducting research and the whole part of writing, her patience guidance, useful suggestions, and encouragement all the time. I would also like to thank Associate Professor Dr. Natchanan Chivanon, Assistant Professor Dr. Autchareeya Patoomwan, Associate Professor Dr. Pornnapa Homsin, and Associate Professor Dr. Tatirat Tachasukri for their input in this study. I am also very grateful to the Thailand International Cooperation Agency (TICA) for providing me with this scholarship to pursue my Master's degree.

I want to express gratitude to the Faculty of Nursing at Burapha University for giving me support and motivation to keep on learning and helping me achieve my goal. Thanks also go to the international affairs staff, Ms. Rungnapa Yodchot, who always provides timely help, and hard work in the progress of thesis completion. I would also like to show my sincere appreciation for the help rendered to me by the Research Institutional Board of Burapha University and Timor Leste Unit of Ethical Research and Development to ensure the ethical soundness of my thesis. I am deeply thankful to Comoro Local Authority and Comoro Community Health Center for the support they rendered to me. I express my heartful thanks to my husband Mok and my daughters, my parents, family, and friends for their continued support throughout the process of doing this study. Well, I could not forget others surrounding me who gave me a hand in my hard times, such as Samantha, Kanchana, Kornkanok, Mestre Domingos, Maun Janu, Professor Dr. Nelson who gave me direct and indirect support during the difficult course of the thesis.

Last but not least, I would like to thank all the study participants for kindly giving me their time and cooperating with me in completing this study. Thank you again for all of you helping me to complete my study successfully.

Eleonora fernandes Almeida

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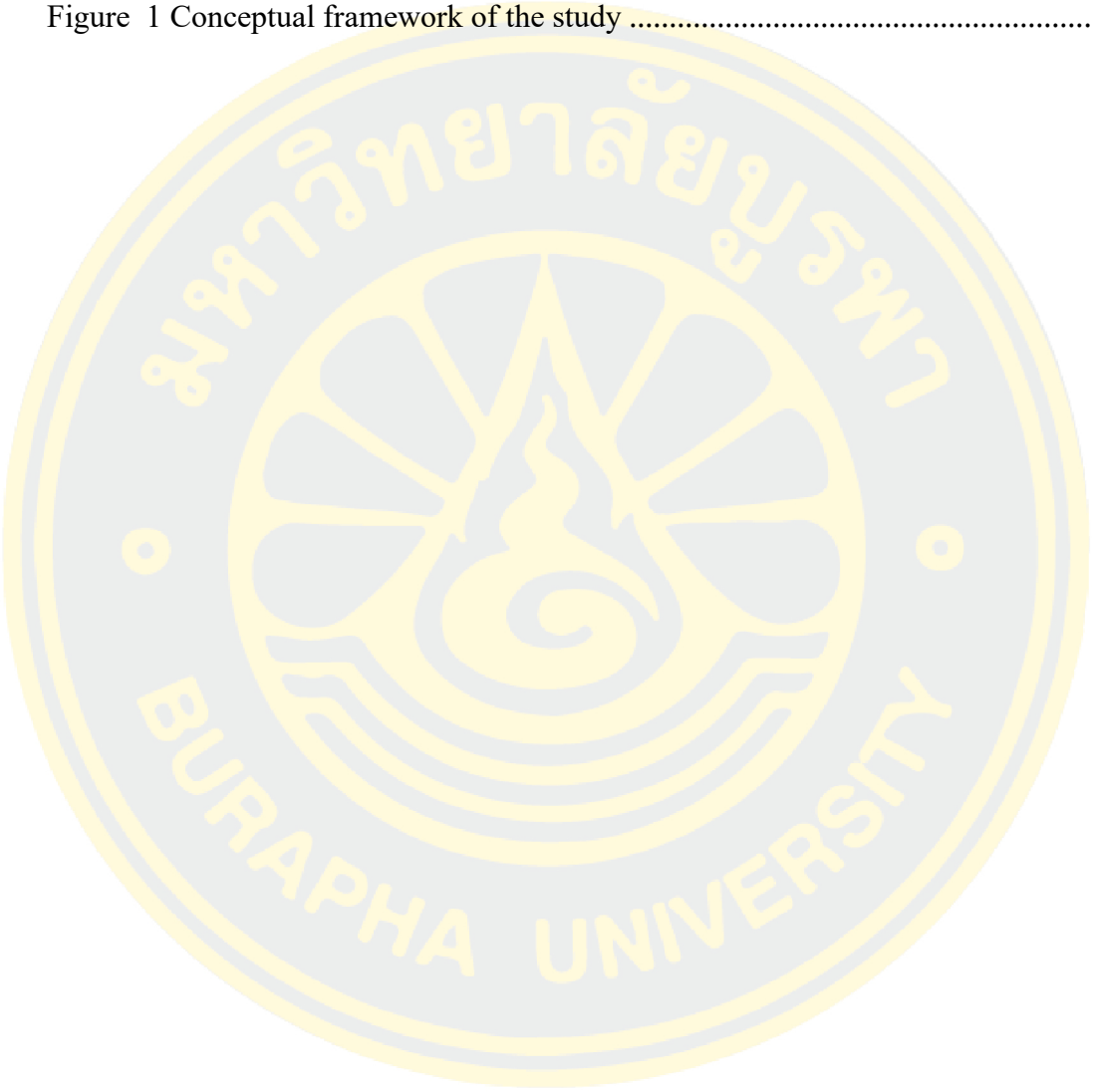

CHAPTER 1
INTRODUCTION

Background and significance of the problem

Dengue is now a threat to around half of the World's population, with an estimated 100–400 million infections occurring annually. In tropical and subtropical regions, dengue is a serious public health concern. Over 100 Nations are endemic for the disease in the WHO Regions of Africa, the Americas, the Eastern Mediterranean, South-East Asia and the Western Pacific. The America, South-East Asia and the Western Pacific are the region's most heavily impacted, with Asia accounting for more than 70% of the Worldwide disease burden. In addition, dengue cases reached their highest level in 2019. The incident of cases has continuously increased from 30,668,000 in 1990 to 56,879,000 in 2019 Worldwide (World Health Organization, 2023).

The Global incidence of dengue has grown dramatically and has impact on disability adjusted life years (DALYs). The disease burden caused by dengue has previously been calculated using DALYs in several previous studies. DALYs was seen in South-East Asia and South Asia, which had the highest number of disability-adjusted life years (DALYs). In the South East Asian region was 372 DALYs per million per year (Yang et al., 2021; Shrestha et al., 2022). Dengue also causes significant economic expenditures for hospital, ambulatory and non-medical admissions around the World (Shepard et al., 2016; Liu et al., 2021).

Dengue was common in children under the age of five because of immunological deficiencies, malnutrition, poverty, a lack of health-care infrastructure, illiteracy and a lack of knowledge, particularly among mothers about dengue. Major complication of dengue infection among under five children are dengue hemorrhagic fever with shock accompanied by respiratory and renal failure (Mercy, 2014). Thus, children under the age of five, are at greater risk of severe dengue. Children are more risk to contracting the dengue virus particularly if they already have experienced with a different dengue serotype (Id et al., 2023).

Additionally, dengue may have a consequence on individual lives both directly and indirectly. Direct consequences include illness, treatment and monetary

expenditures by patients and their parents. Life disruptions and psychological problems are the indirect factors (Zahir et al., 2018). Moreover, if a child gets dengue infection can also affect to another family members, caregiver and community.

Timor Leste is a small Country in Southeast Asia and considered a tropical country. Due to its hot and humid climate the conditions in Timor Leste allow the occurrence of various mosquito borne diseases, including dengue, as endemic disease. It is reported that dengue transmission peaks in Timor-Leste during the wettest and hottest months from December to April. The monsoon season may increase mosquito density and the likelihood of further transmission of dengue. Dengue has been reported predominantly in children age group in Timor-Leste. Age group of 1–4 years and age group of 5–14 years, respectively (National Institute of Public Health Timor Leste, 2024). The incidence of dengue has rapidly increased over the past few decades and has remained a serious public health issue. In 2020 and 2021 Ministry of Health Timor Leste (2022) reported an outbreak in Timor-Leste, when 1451 dengue cases with 10 deaths and 901 cases with 11 deaths were reported, respectively in both the years. In 2020, many countries reported a smaller number of dengue cases due to COVID-19 restrictions, but Timor-Leste reported an outbreak of dengue. In 2022 reported an unusually high level compared to previous years, 5658 dengue cases with 58 deaths with the case fatality rate has been reported as 1.0. In 2023 Ministry of health Timor Leste reported 1953 cases and 7 deaths and in 2024 reported 1106 cases and 8 deaths (only from January 1st to April 26th, 2024).

The Capital of Timor Leste, Dili has become the worst-affected city in Timor Leste regarding dengue, with most mortality rate related to delays in hospitalizing severe dengue patients. Many parents send their children to hospital when their children’s situation gets worse, making it difficult for the hospital to save them. Dengue cases have significantly increased, primarily due to population growth, low levels of hygiene, insufficient drinking water, inadequate garbage collection services and surface-water drainage systems that all worked together to create favorable habitats for the proliferation of communicable disease vectors and reservoirs. Comoro is a village in Dom Aleixo administrative post located in a little west of Dili and has higher population than other villages. The number of dengue

cases in Comoro Village continues to grow and reported highest number of dengue cases than other Village in Dili Municipality (Wangdi et al., 2018).

As there are no specific antiviral agents for dengue and vaccines for dengue are unavailable in Timor Leste, efforts must be made to reduce risk factors that can be fatal, especially for the children. Many efforts from Timor Leste Ministry of Health for dengue prevention and control activities include mass media messages, abate sand distribution and mosquito fogging. However, the Country's annual incidence of dengue infection is continuing to rise with some factors that related to people's preventive behaviors.

Dengue prevention is the most effective strategy to decrease the risk of dengue infection (Waewwab et al., 2020; Tian et al., 2022). Vector control and prevention strategies have helped minimize dengue morbidity and mortality rate. Evaluating Public awareness and health beliefs about dengue fever is crucial in creating disease management strategies. Preventive and vector control interventions can reduce the incidence of dengue infection and prevent outbreaks of the disease. Wearing protective clothing, use mosquito nets and coils, use mosquito repellents, covering well water storage containers, installing screens on doors and windows, disposing of containers or objects that can accumulate water and change the water in flower vases are all examples of prevention measures. Previous studies have revealed that many dengue preventive behaviors can be the most effective actions in dengue prevention and control (Udayanga et al., 2018; Waewwab et al., 2020; Mashudi et al., 2022). Unfortunately, so far in Timor Leste there is still lack of regular dengue campaign in the community health center for the community raise community awareness and lack of policy, strategy for the control of dengue and other vector-borne infectious disease.

In general, the mother is the primary caregiver in the family and responds to her child's care and need. With their function as housewives in the family, mothers play an important role such as responsibility in caring for family members especially their children. Therefore, it is important for mothers to prevent dengue in children by providing care to their children, such as controlling the environment, providing a healthy diet and close monitoring of their children. Mungall-Baldwin (2022) stated in efforts to eradicate dengue and their participation can significantly improve dengue control by implementing environmental management techniques through their role in

household chores (domestic waste management), daily household managing and maintaining clean water. Mungall-Baldwin (2022) also stated mother is the primary human resource for household and community-based prevention and their participation can help to contribute in reducing dengue rates. Involving mother in the management prevention of dengue and other mosquito-borne viral diseases (MBVD) using environmental management measures offers a major opportunity to improve dengue control and her participation is very strong in household activities and controlling dengue.

Dengue can cause high morbidity, as well as severe and life-threatening symptoms, if not handle properly, fatal complications of dengue fever can occur such as dengue shock syndrome (DSS) and dengue hemorrhagic fever or even death. Consequently, it requires those who care for family members to control and managing dengue through the dengue prevention behaviors. Furthermore, there is a need to examine and understand dengue prevention behaviors by the Public at large.

One of the models that can predict health behavior towards dengue prevention is the Health Belief Model (Siddiqui et al., 2016; Mashudi et al., 2022). Several factors have been postulated as contributing to dengue prevention behaviors. It has been shown that socio-demographic variables have a significant impact on dengue prevention and control practices. Some of modifying factors based on the model such as family income and gender are not included in this study as there are some findings that provide a clear explanation. In this study, some of the modifying factors and concepts from the theory still appear to be inconsistent. Therefore, the concept of HBM addressed in this study includes some modifying factors such age and education level (demographic variables), knowledge (structural variables), perceived susceptibility, perceived severity, perceived benefit, perceived barrier and self-efficacy.

Age is a demographic variable that may have an impact on a person's beliefs and subsequently have an indirect impact on health-related actions (Tarkang & Zotor, 2015). Rakhmani et al. (2018) in their study reported older participants (> 60 years and 41–60 years) were more likely perform better dengue prevention behavior than younger participants (21–40 years and < 21 years). Additionally, similar finding has

shown that age was found to be significantly associated with dengue prevention practices (p <.01) (Chanyasanha et al., 2015).

Education of person can contribute to the formation of ideas, thoughts and attitudes. A person with a high degree of education had more opportunity to learn about illness and health care in a variety of ways than a person with a low level of education (Huff et al., 2014). In a study performed by Paudel et al. (2023) reported educational status of respondents was associated with dengue prevention practices (p <.05). Similar finding from Sri Lanka among housewives has shown that education of housewives was significantly associated with preventive behaviors (p <.01) (Chanyasanha et al., 2015).

As caregivers in taking care for their children, mothers are required to have knowledge regarding dengue. Knowledge regarding dengue refers to mothers' understanding of dengue that can help them take measures to prevent or avoid the disease. Knowledge and beliefs regarding dengue may affect people's willingness to participate in the control of dengue and influence the further spread of the disease (Liu et al., 2021). A number of studies revealed that knowledge of dengue was associated with good practice towards dengue (Siddiqui et al., 2016; Othman et al., 2019; Rahman et al., 2022). The correlation test found a significant positive correlation between knowledge-practice (rs = 0.319, p < .01) (Selvarajoo et al., 2020). In addition, Hossain et al. (2021) found that there is significant positive association of knowledge with preventing ways and preventing practice of Aedes reproduction (p <.05).

Perceived susceptibility of dengue refers to the belief that all person is susceptible to dengue. According to Mashudi et al. (2022) in their study stated that perceived susceptibility was significantly linked to a good level of dengue prevention. Similar finding performed by Rakhmani et al. (2018) has shown that people with higher perceived susceptibility to dengue demonstrated better prevention behaviors than those with moderate perceptions (p <.01).

Perceived severity towards dengue defines as individual feeling regarding the seriousness of dengue. Siddiqui et al. (2016) stated perceived severity (perceived threat) significantly contributed as true predictor of dengue preventive practices (p <.05). Moreover, Tai & Yang (2022) suggested perceived severity was the factor

influencing preventive practices in Filipino workers and perceived severity was the factors that drove migrant workers to adopt preventive practices.

The perceived of benefit of changing individual's behavior in order to reduce the chance of developing dengue referred as perceived benefit. AlSahafi et al. (2021) in their study reported respondents with high perception of mosquito control benefits are more likely to have good dengue prevention practices by two times or 1.86 times (OR=1.864, p = 0.019). Furthermore, Mashudi et al. (2022) suggested perceived benefit was significantly associated with a good level of dengue preventive (p <.05).

Perceived barriers regarding dengue refer to any obstacles or impediments to the behavior's modification being assessed to reduce risk of contracting dengue. Previous studies showed perceived barriers to perform dengue prevention as significant factors associated to dengue prevention practices (Chandren et al., 2015). Similar finding from Mashudi et al., (2022) through simple logistics regression analysis found that perceived barrier was significantly associated with a good level of dengue preventive (p <.05).

Self-efficacy is a key factor to establish good health care behaviors (Bandura, 1977). Self-efficacy towards dengue as measures the confidence level engaging in ability to do protective practices regarding dengue (Wong et al., 2023). Mother self-efficacy in caring for children is an important issue which affects mother's performance of care. Previous study has shown that self-efficacy was a predictor of dengue preventive practices (Siddiqui et al., 2016). Moreover, Mashudi et al., (2022) indicated self-efficacy was significantly linked to a good level of dengue prevention.

For the purpose of improving dengue prevention and designing sustainable public health interventions, it is essential to recognize and understand the factors that predicting dengue prevention behavior among mothers. Some studies have been conducted in Timor Leste regarding dengue, however these only focus on dengue infected people, variables related to laboratory indexes and based on epidemiological approach. Additionally, there are limited studies conducted in the Community regarding dengue prevention behaviors. Thus, this present study aims to examine factors predicting dengue prevention behaviors among mothers of under five children

in Comoro village, Dili Municipality, Timor Leste. This finding can guide nurse and another health care professional to understand the factors predicting dengue prevention behaviors in order to develop nursing intervention programs which will be crucial in reducing morbidity and mortality of dengue especially in children. Moreover, the findings can assist health care professional, Governmental and non-Governmental organizations and social workers to develop a comprehensive dengue response and planning adequate interventions that are sustainable for public health.

Research questions

1. What are the dengue prevention behaviors among mothers of under five children in Comoro village, Dili Municipality, Timor Leste?

2. What are the predictive factors of dengue prevention behaviors among mothers of under five children in Comoro village, Dili Municipality, Timor Leste?

Research objectives

1. To describe the dengue prevention behaviors among mothers of under five children in Comoro village, Dili Municipality, Timor Leste.

2. To examine factors predicting dengue prevention behaviors among mothers of under five children in Comoro village, Dili Municipality, Timor Leste.

Research hypothesis

Age, education, knowledge regarding dengue, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy combined could predict dengue prevention behaviors among mothers of under five children in Comoro village, Dili Municipality, Timor Leste.

Research framework

The theoretical framework of this study was the Health Belief Model (HBM) was developed in the 1950s by social psychologists Hochbaum, Rosenstock and Kegeles from the United States. According to HBM, a person's commitment to a behavior that promotes health is determined by their beliefs of the benefits and risks

of the behavior, the severity of the health issue, their possibility of getting the disease, and other factors. In addition, HBM has been utilized in studies to predict and promote health-related behaviors, specifically regarding health service utilization (Siddiqui et al., 2016; Mashudi et al., 2022).

Perceived susceptibility refers to beliefs about the likelihood of getting a disease. People will be more motivated to do preventive behavior if they believe that they are potentially vulnerable to a particular negative health consequence. This is one aspect that can impact people's decisions to take action, such as the assumption that everyone will most likely contract dengue.

Perceived severity is a person’s perception of the severity of the disease and will determine how motivated he or she is to take action to avoid it. People are more likely to take dengue preventive measures to keep themselves safe when they understand how serious the dengue is.

Perceived benefit refers to individual’s belief about the advantages or value of preventive measures to reducing the risk or decrease illness. The individual must believe that the desired activity will result in significant favorable outcomes. This is a person’s opinion as to whether frequent environmental cleaning is beneficial in reducing the number of dengue-carrying mosquitoes in their home, hence reducing the risk of dengue.

Perceived barriers defined as any obstacles or impediment to adopting preventative behavior that may discourage adoption of that behavior. Beliefs about the costs (psychological or material) that limit a person's ability to carry out important preventive measure regarding dengue such as perceived not enough time to organize for environmental cleanup. To carry out the planned health-related interventions to reduce dengue effect, there must be more perceived benefits than perceived costs or barriers.

Self-efficacy refers to individual confidence in ability to successfully perform indicated action. This is usually carried out by performing step by step or incremental goals. It could refer to a step-by-step technique of gaining confidence to undertake dengue preventive action. This social learning/social cognitive theory model was proposed by Bandura and it was eventually incorporated into the HBM

(Simpson, 2015; Lennon, 2005; Carpenter, 2010; Thompson & Caltabiano, 2010; Rosenstock et al., 1988).

Based on the Model, modifying factors such as demographic factors (age, gender, race), socio-psychological factors (socio-economic factors, peers), and structural factors (knowledge of the disease, previous contact with the disease) can affect a person's perceptions by indirectly affecting the perception of susceptibility, severity, benefits, and barriers related to health-related behavior (Tarkang & Zotor, 2015; Glanz et al., 2008). Knowledge is one of the modifying factors (structural variables) on the health belief model. People knowledge may indirectly influence health-related behaviors by affecting perceptions of susceptibility, severity, benefits and barriers (Glanz et al., 2008).

Conceptual framework

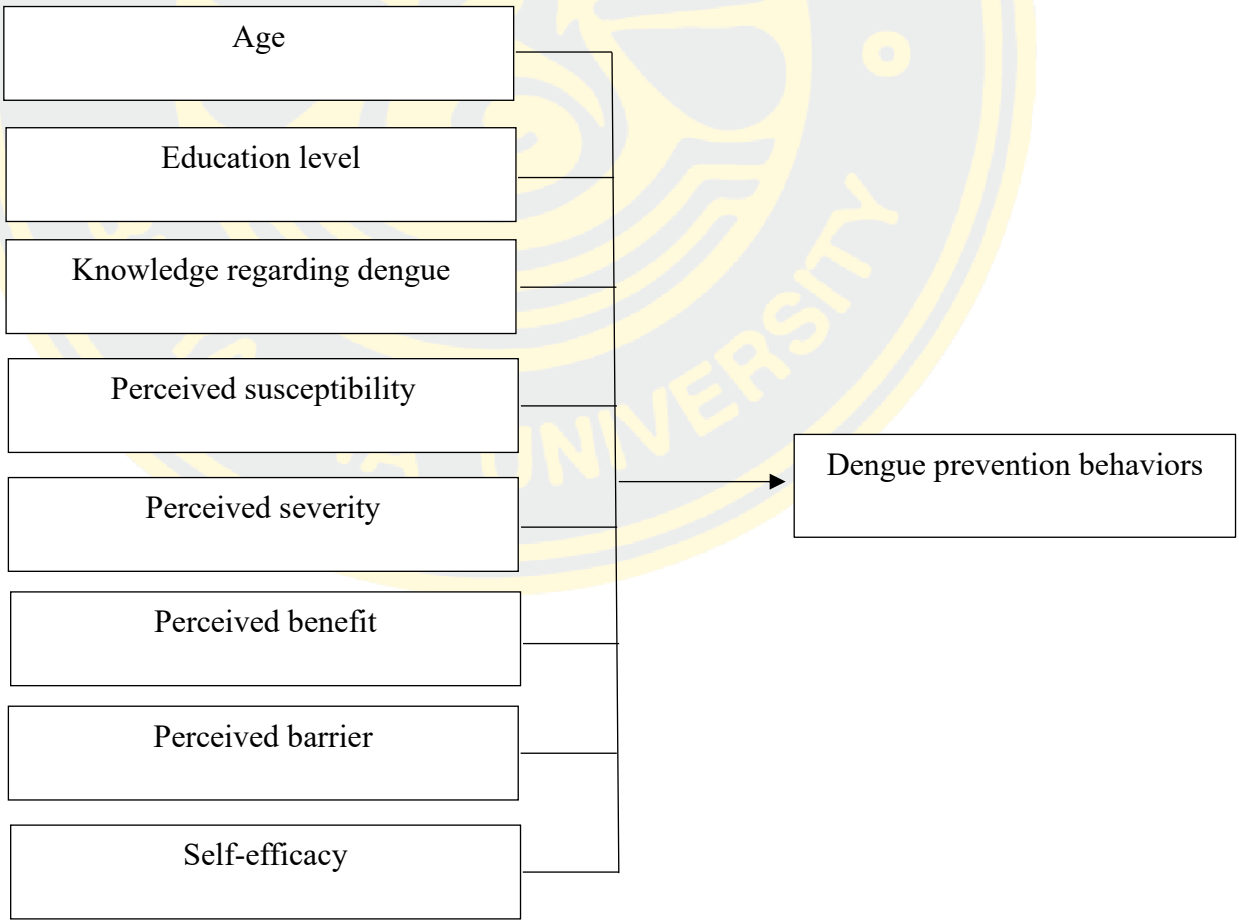

Figure 1 Conceptual framework of the study

Scope of study

This predictive correlational design was aimed to describe dengue prevention behaviors among mothers of under five children and to examine factors predicting dengue prevention behaviors among mothers of under-five children in Comoro village, Dili Municipality, Timor Leste. The study was conducted with 264 mothers in Comoro village Dili Municipality, during February to March 2024 and the population of this study are mothers of under five children that living in Comoro village, Dili Municipality. The dependent variable in this study is dengue prevention behaviors and independent variables are age, education, knowledge regarding dengue, perceived susceptibility, perceived severity, perceived benefits, perceived barriers and self-efficacy.

Operational definitions

Age is defined as mother's age ranged by year, counting from date of birth to date of the study. It was measured by using a Demographic record form.

Education is defined as years of education of mother, categorized into illiterate, primary school, junior high school, secondary high school, vocational school, university. It was measured by using a Demographic record form.

Knowledge regarding dengue is defined as mother understanding about the dengue that can help to take action to prevent or avoid dengue. The level of knowledge regarding dengue consists of two components: knowledge of symptoms and knowledge of transmission. It was measured by using Knowledge on dengue questionnaire develop by Dhimal et al. (2014).

Perceived susceptibility refers to mother perception of the risk of developing dengue disease. It was measured by using HBM dengue questionnaire was develop by Ghafar & Shah (2017) and modified by Mashudi et al. (2022).

Perceived severity refers to perception of mother on the seriousness of the dengue disease. It was measured by using HBM dengue questionnaire developed by Ghafar & Shah (2017) and modified by Mashudi et al. (2022).

Perceived benefit refers to perception of mother about the advantages of dengue prevention practice to reduce threat of dengue. It was measured by using

HBM dengue questionnaire developed by Ghafar & Shah (2017) and modified by Mashudi et al. (2022).

Perceived barrier is mother perception about any impediment to taking action of dengue prevention behaviors. It was measured by using HBM dengue questionnaire was developed by Othman et al. (2019) and modified by Mashudi et al. (2022).

Self-efficacy is defined as mother perception on confidence in ability to successfully perform dengue prevention behavior. The self-efficacy consists of strength of self-efficacy. It was measured by using behavioral self-efficacy regarding dengue questionnaire developed by Maibach et al. (1991) and modified by Isa et al. (2013).

Dengue prevention behaviors refer to activity of mother's prevention and control measures against dengue disease. The prevention practices measure consists of prevention of mosquito breeding, prevention of mosquito bites and prevention of dengue transmission. It was measured by using dengue preventive practices questionnaire was develop by Abdullah et al. (2013) and modified by Mashudi et al. (2022).

CHAPTER 2
LITERATURE REVIEW

The contents of this chapter, the researcher reviews concepts related to dengue and factors influencing dengue prevention behaviors. The information is presented as follows:

1. Dengue situation Globally, in South-East Asia and in Timor Leste
2. Overview of dengue
3. Theory of Health Belief Model
4. Factors influencing dengue prevention behaviors
5. Summary

Dengue situation Globally, in South East Asia and in Timor Leste

Dengue has become a significant public health concern and affects over half of the World's population, with an estimated 100-400 million infections occurring each year. There are now more than 100 Countries with endemic cases of this disease in the WHO Regions of Africa, the Americas, the Eastern Mediterranean, South-East Asia and the Western Pacific. The Americas, South-East Asia, and Western Pacific regions are the worst affected, with Asia representing 70% of Global disease burden. Worldwide, dengue incidence has increased dramatically in recent decades, from 505. 430 cases in 2000 to 5.2 million cases in 2019 according to WHO statistics. DENV infections are most commonly asymptomatic or cause mild illness, but can occasionally cause more severe cases and sometimes even death. It is more widespread in tropical and subtropical climates (World Health Organization, 2023). The World Health Organization (WHO) still classifies dengue as a "Neglected Tropical Disease," but the significant rate of its spread has brought it to Public attention (Yang et al., 2021).

The incidence rate and burden of dengue in the main endemic spots were analyzed by age distribution and the results showed that the risk and disease burden are primarily concentrated in those under the age of 14 or those over the age of 70. The majority of the Countries with the highest dengue fever burden have low and medium levels of socio-demographic Index (Tian et al., 2022).

The current situation of the high burden of dengue cases in the South East Asia region is coupled with the absence of effective treatment and lack of comprehensive sustainable vector control. High rates of population growth, inadequate water supply and poor storage practices, sewer, and waste management systems, rise in Global commerce and tourism, Global warming, changes in public health policy and the development of hyper-endemicity in urban areas. 1.3 billion of the 3.5 billion people living in dengue-endemic regions in the World's ten Countries in the South East Asia Region are at risk of developing dengue. Moreover, there is also an impact of dengue fever on disability-adjusted life years (DALYs). Most disability-adjusted life years (DALYs) are found in South Asia and South-East Asia. In South East Asia, 372 DALYs per million per year were reported (Shrestha et al., 2022).

Timor Leste is a small island Country in Southeast Asia with a population of 1.3 million living in 14 municipalities. After becoming an independent Country in 2002, the Democratic Republic of Timor-Leste is one of Asia's newest Nation. Situated between Indonesia and Australia, Timor Leste occupies an area of 14. 874 km ^{2} lying between 8.1 and 9.5^{o}S and 125.0 and 127.3^{o}E on the island of Timor and includes the small enclave of Oecussi between 9.2 and 9.5^{o}S and 124.1 and 124.5^{o}E located in the western half of the island within West Timor (Molyneux et al., 2012). Topographically, the country is mostly comprised of mountainous terrain (80%) surrounded by coastal swamp plains with no permanent rivers (Wangdi et al., 2018). Timor-Leste’s tropical climate is heavily influenced by West Pacific Monsoon and its mountainous climate, a hot tropical climate with a dry season, May-November, and a wet season, December-April. The temperature on the coast is usually between 25-35^{o}C and in the mountains at higher elevation the weather is much cooler, sometimes wet and misty and at other times clear and invigorating.

Timor Leste's tropical climate allows for the emergence of a variety of mosquito-borne illnesses, including dengue, as endemic diseases. Dengue is becoming a major public health concern in Timor-Leste with frequent outbreaks. Timor-Leste recorded its first outbreak in 2004 with 434 patients. Most cases of dengue are diagnosed based on clinical findings and All four DENV serotypes have been identified in Timor-Leste (Kalayanarooj et al., 2007).

Dili Municipality, as capital of Timor Leste and the only significant population center with 324. 738 population with no other municipality have higher population than Dili. Dili contributes significantly to the burden of dengue morbidity and mortality rates in each year and faced with a variety of difficulties common to developing-country cities, such as increased population through migration from rural regions and unplanned growth of cities (Tilman et al., 2022; Wangdi et al., 2018). Dengue reported during the wettest and hottest months of the year (December–February) and dengue is mostly being diagnosed based on the clinical findings (Ministry of Health Timor Leste, 2022).

Comoro is a village in Dom Aleixo administrative post located in a little west of Dili, and according to the most recent administrative divisions Comoro consists of 14 hamlets. Total area of Comoro village is 15.36 km^2 with total population 58.891 (The Timor Leste National Institute of Statistics, 2023). Comoro Village reported highest number of dengue cases than other village in Dili Municipality (Wangdi et al., 2018). The number of cases of dengue in Comoro Village continues to grow that reported highest number of dengue cases than other Village in Dili Municipality (Wangdi et al., 2018).

Overview of dengue

In this part the researcher reviews the definition of dengue, etiology, signs and symptoms, classification, pathophysiology, transmission, diagnostic, complication, dengue prevention behaviors and impacts on dengue is presented.

Definition

Dengue is a viral infection transmitted to humans by mosquito bites infected with dengue virus (DENV). Infection with the dengue virus causes muscle spasms and joint pain, leading to the name breakbone fever. This is also known as dandy fever and seven-day fever due to the typical duration of symptoms (Schaefer et al., 2020; WHO, 2023). Kothai & Arul (2020) stated this disease is carried by mosquitoes, which spread a virus family that causes dengue fever. DENV is a virus belonging to the Flaviviridae family and constitutes the most common vector-borne disease in humans today.

Other study define dengue fever (DF) is an acute infectious disease caused by the dengue virus and spread by the Aedes aegypti mosquito, also known as "tropical flu" (Zamri et al., 2020; Suman & Geetanjali, 2020).

Etiology

Dengue is caused by one of four different serotypes dengue virus (DENV). There are 4 main serotypes of DENV: DENV-1, DENV-2, DENV-3, and DENV-4 of single-stranded RNA viruses from the Flavivirus genus. Primary infection confers lifetime immunity to that specific serotype, but not to secondary infection by another serotype. When these mosquitos bite an infected human, they become infected with the virus and then transmit it to other humans during subsequent blood meals. Infection with one serotype results in lifetime immunity against that serotype, as well as temporary protection against subsequent infection with other serotypes. In reality, secondary infection with another serotype increases the likelihood of developing more severe types of dengue, such as dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) (Schaefer; et al. 2020; Key & Schiebel, 2021).

Furthermore, dengue is caused primarily by an infected mosquito bite, but it can also be acquired accidentally through vertical transmission, particularly in near-term pregnant women through the placenta, infected blood products, organ transplantation , and even needle stick injury (Kothai & Arul, 2020).

Signs and symptoms

One-half of DENV infections are asymptomatic and recover in 1-2 weeks (Kothai & Arul, 2020). According to Guzman et al. (2016) dengue disease can progress through three stages: the acute febrile phase, which is seen in the majority of patients, the critical phase, and the recovery (convalescent) phase. Fever is a clinical sign of illness that often appears during the acute febrile stage and might vary in intensity. Along with body pain, it is accompanied by nausea and headache. In children, fever frequently has no other clinical symptoms or is accompanied by a rash and or nonspecific digestive complaints. It is possible to experience mild abdominal pain and diarrhea. Patients under the age of two and adults are more likely to get diarrhea.

During the febrile phase, leukocyte counts are often decreased. These symptoms can be followed by rapid clinical deterioration after 2-5 days. Most dengue

patients recover after defervescence; however, the clinical condition of some people gets worse after the fever drops. As a result, the time when the temperature goes down marks the start of the critical phase. The critical phase, which is characterized by coolness integuments, a weak pulse, delayed capillary filling, tachycardia, oliguria, and hypotension, occurs at the same time as plasma leakage that can cause shock. Low blood volume (hypovolemia) is the primary cause of shock. Patients typically exhibit diaphoresis (sweating), delayed venous filling, restlessness, irritability, pain in the upper and middle abdomen, and decreased urine output at this stage. They may also have a flushed face, a warm trunk, cold and clammy limbs, and a warm face including circumoral and peripheral cyanosis (blue skin discoloration), scattered petechiae on the forehead and extremities, spontaneous ecchymoses, easy bruising and bleeding at venipuncture sites. In addition, 10% of patients experience gastrointestinal bleeding, which typically occurs after a period of untreated hypotensive shock. Furthermore, rapid and potentially breathing difficulty, a weak pulse and have a rapid heartbeat that sounds ‘thready’. Finally, their hematocrit level is elevated and the platelets which had been continually decreasing, reach their lowest count. Their livers are often firmly, tender, and can enlarged to 4-6 cm below the costal border. This critical period lasts for 24-36 hours in those who recover, and is followed by a rapid convalescence. Complications during convalescence may include encephalopathy, bradycardia, ventricular extarsystoles, and in rare cases, myocarditis and encephalitis (Guzman et al., 2019).

Classification

According to the previous dengue classification, which has been in use since the 1970s, dengue can manifest as dengue fever (DF), dengue hemorrhagic fever (DHF) or dengue shock syndrome (DSS). There are several obstacles to applying the previous classification and having difficulty implementing the DHF/DSS criteria (Horstick et al., 2012).

Based on the results of numerous investigations, the World Health Organization proposed a new categorization for dengue in 2009. It distinguishes between serious dengue cases and those that have warning signs or without warning signs. According to this analysis, revised dengue case classifications can standardize clinical management, increase awareness of unnecessary interventions, match patient

categories with particular treatment guidelines, and make it simpler for medical staff to comprehend the main patient management (Horstick et al., 2012).

Table 1 The revised dengue classification based on WHO dengue guideline 2009 (WHO, 2009)

Dengue Case Classification by Severity		
Criteria for dengue Without and with warning signs		**Severe dengue**
Probable Dengue	**Warning signs**	**Criteria for severe dengue**
Live in /travel to dengue endemic area Fever and 2 of the following criteria: Nausea, vomiting Rash Aches and pains Tourniquet test positive Leukopenia Any warning signs Laboratory-confirmed dengue (Important when no sign of plasma leakage)	Abdominal pain or tenderness Persistent vomiting Clinical fluid accumulation Mucosal bleed Lethargy, restlessness Liver enlargement > 2 cm Laboratory: increase in HCT concurrent with rapid decrease in platelet count (Requiring strict observation and medical intervention)	Severe plasma leakage Leading to: Shock (DSS) Fluid accumulation with respiratory distress Severe bleeding As evaluated by clinician Severe organ Involvement Liver: AST or ALT >= 1000 CNS: impaired consciousness Heart and other organs

ALT = alanine aminotransferase; AST = aspartate aminotransferase; CNS = central nervous system; DSS = dengue shock syndrome; HCT = hematocrit.

Pathophysiology

Halstead (2008) stated pathogenesis of all infectious diseases is influenced both by the host and by the pathogen microbial factors. In the case of the host, extrinsic factors such as immunity are important, as well as intrinsic factors such as age, sex, innate immune system and individual or species level genetics, may act singularly or in combination on the host. In other words, organisms have a wide range of virulent factors.

The bite of an infected mosquito transmits dengue from person to person. The primary vector is Aedes aegypti, a day biter that breeds in water containers in peri-domestic areas. Its eggs may survive in dry places for months without suffocation and the life cycle begins with the first contact with water. Aedes albopictus is a secondary dengue vector that is only found in a few parts of the World. It is also known as the 'tiger mosquito' because to its uncommon structure. The virus replicates in subdermal Langerhans dendritic cells after being bitten by an infected mosquito before spreading to regional lymph nodes. By circulating monocytes and macrophages, viraemia affects solid organs, including bone marrow. The possibility of DENV infection leading to a range of disease states, such as DHF/DSS, adds another level of complexity to our understanding of pathophysiology. Dengue hemorrhagic fever (DHF) is a severe form of dengue that is defined by increased vascular permeability, which produces plasma leak and bleeding.

As a result of a temporary rise in vascular permeability, plasma leaks into the pleural cavity, third gaps in the tissue, and peritoneal spaces. This is most likely the result of a cytokine storm, which is an abnormal immune response accompanied by cytokine production. The abnormal immune response increases microvascular permeability without generating inflammation or vasculitis, in addition to altering thermoregulatory processes. Antibody-dependent immune enhancement is a well-known phenomenon in which the presence of pre-existing non-neutralizing DENV antibodies for a different serotype increases the risk of DHF. The immunological complexes formed consist of non-neutralizing DENV antibodies from a different serotype connected to current DENV that can fix complement and bind to cell surface Fc receptors, facilitating viral entry into phagocytic cells (macrophages). Opsonizing is the term for this. The opsonizing effect causes exponential viral reproduction inside

the phagocytic cell, resulting in significant viraemia. Extreme DHF, and even shock, are more likely in cases of high viraemia, which is known as (DSS) dengue shock syndrome (Kularatne & Dalugama, 2022; Reis & Ganim, 2010).

Transmission

According to (World Health Organization, 2023), transmission of dengue can be categorized into several types of transmission such as transmission through mosquito bite, human to mosquito transmission, maternal transmission and other types of transmission.

1. Transmission through mosquito bite

Humans are infected with the virus by the bites of infected female mosquitos, primarily the Aedes aegypti mosquito. Other Aedes species can also operate as vectors, although their contribution is secondary to that of Aedes aegypti. The virus reproduces in the mosquito's midgut after it feeds on a host with DENV infection before spreading to secondary tissues, such as the salivary glands. The extrinsic incubation period (EIP) refers to the duration of time between consuming the virus and actually transmitting it to a new host. When the environment's temperature is between 25 and 28 °C, the EIP takes approximately 8 to 12 days. The magnitude of daily temperature changes, the virus genotype, and the initial viral concentration are a few more variables that affect the extrinsic incubation period and can affect how long it takes a mosquito to transmit a virus. The mosquito can continue to spread the virus for the remainder of its life if it becomes infected.

2. Human to mosquito transmission

Mosquitoes can be infected by DENV-infected humans. This includes persons who have a symptomatic dengue infection, those who have yet to develop a symptomatic infection (pre-symptomatic), and those who exhibit no signs of disease (asymptomatic). Human-to-mosquito transmission can occur up to two days before symptoms appear and up to two days after the fever has subsided. High levels of DENV-specific antibodies are inversely correlated with a reduced chance of mosquito infection, but high viremia and fever in the patient are positively connected with the likelihood of mosquito infection. The average person has viremia for four to five days, but it can persist up to twelve days.

3. Maternal Transmission

Mosquito vectors are the main means of DENV transmission between people. However, there is evidence suggesting that a pregnant woman could transmit the disease to her unborn child. The danger of vertical transmission appears to be related to the timing of the dengue infection during pregnancy, however vertical transmission rates appear to be minimal. Babies may have preterm birth, low birthweight, and fetal distress when a mother has a DENV infection while she is pregnant.

4. Other types of transmission

Only a few cases of transmission by blood products, organ donation, and transfusions have been documented. Similarly, transovarial transmission of the virus within mosquitos has been seen.

Diagnostic

Diagnosis can be confirmed in the laboratory either directly by finding viral components in the blood or indirectly by serological techniques. The choice of test is determined by the clinical presentation's timing. Detection of viral components in the circulation is extremely sensitive during the early sickness of the febrile phase. Viral nucleic acid in serum can be detected using the reverse transcriptase polymerase chain reaction (RT-PCR) assay, or the virus-expressed soluble non-structural protein 1 (NS1) can be detected using the enzyme-linked immunosorbent assay (ELISA). Serology to identify IgM and IgG antibodies begins on the fifth day of illness and aids in determining whether the infection is primary or secondary. Secondary dengue infection is suggested by a high level of haemagglutinin antibodies (Kularatne & Dalugama 2022). In addition, Complete blood counts (CBCs) are utilized to check for low platelet counts, which are frequent in the later stages of the illness, as well as changes in hemoglobin, hematocrit, and red blood cell (RBC) count (evidence of anemia) caused by blood loss from severe dengue fever. A basic metabolic panel (BMP) is used to assess kidney function and look for indicators of dehydration, which can occur when someone is sick (Sampat, 2021).

Complication

Dengue can cause some complication such as liver injury, cardiomyopathy, pneumonia, orchitis, oophoritis, seizures, encephalopathy and encephalitis (Schaefer et al., 2022). According to Guzman et al. (2016) stated complications from the dengue virus can affect the heart, liver, lungs, nervous system, and respiratory system. DENV infection has been linked to cardiac disease, with clinical manifestations ranging from a mild increase in disease biomarkers to myocarditis and or pericarditis, and patients with severe dengue may show evidence of systolic and diastolic cardiac impairment, primarily affecting the septum and right ventricular walls. The capillary leakage from severe dengue might have an impact on the respiratory system.

Pleural effusion and respiratory distress linked to pulmonary oedema are examples of complications that can be worsening by over-hydration during fluid therapy. Hence, fluid balance must be managed during fluid treatment to avoid respiratory distress. Patients with dengue hepatitis may also require treatment for other problems, such as bleeding (using blood transfusion rather than platelets or fresh frozen plasma). Although not always related with severe liver failure, metabolic problems such as acidosis, hypoglycemia, and hypocalcemia may be major components of dengue severity.

Dengue Prevention behaviors

According to World Health Organization (World Health Organization, 2009) for dengue guideline, preventing or decreasing dengue virus transmission is entirely dependent on mosquito vector control or termination of human-vector contact. The strategies have been evaluated as safe, cost-effective, feasible, and environmentally acceptable: environmental management, personal protection, biological control, and chemical control (World Health Organization, 2009).

1. Environmental management

The primary goal of environmental management is to avoid or reduce vector reproduction and human contact with vector-pathogens by destroying, altering, removing, or recycling non-essential containers that serve as larval habitats for vectors. Environmental management is classified into three types: environmental modification, environmental manipulation and change to human habitation or behavior.

Environmental modification - the installation of reliable piped water supplies in communities, including connections to households, would be a long-term method of limiting vector larval habitats.

Environmental manipulation - domestic household containers are the primary breeding habitats for Aedes aegypti. Water storage should be covered with tight-fitting lids or screens on regularly. Regular emptying and cleaning of water-storage vessels, flower vases, and desert room coolers; cleaning gutters; sheltering tyres from rainfall; recycling or proper disposal of discarded containers and tyres.

Changes in human place of living or behavior - activities taken to decrease human-vector contact, such as placing mosquito screening on windows, doors, and other entry points, and sleeping under mosquito nets during the day.

2. Personal control

Clothing may reduce skin exposure during daylight hours, when mosquitoes are most active, provides some protection against dengue vector bites and is especially recommended during epidemics. Several methods of personal protection are available, including the use of repellents, the wearing of sleeves and trousers, the use nets for sleep, and the use of chemical insecticides products. Chemical repellents like DEET (N, N-Diethyl-m-Toluamide) can offer short-term protection from aedes species. The latest method involves impregnating with chemicals particularly permethrin for clothing, nets, and curtains. For those who sleep during the day (such as infants, people who are bedridden, and night shift workers), insecticide-treated mosquito nets provide good protection.

3. Chemical control

Chemical control may be required in exceptional situations such as epidemic control or cleanup water container limitations. For the prevention and control of dengue-vectors, chemical insecticides may be utilized. Wherever possible, it should be incorporated into environmental techniques. For difficult cleanup of domestically used containers utilizing chemical larvicide for treating water and temephos for larvicidal elimination may be necessary.

4. Biological control

Biological control strategies are only effective against immature stages of vector mosquitos in the larval habitat where they are introduced. Larvivorus fish eat

larva stage and endotoxin generating bacteria destroy larva stage as part of this control. Gambusia Affinis and Poecilia reticulate have been commonly used as larval fishes to control dengue vectors in South East Asia, particularly in the larval stage.

Additionally, Sperança (2023) mentioned prevention measures for dengue include the use of mosquito nets, avoiding the accumulation of scrap, and avoiding stagnant water collections. Furthermore, some studies revealed that people who have been sick with dengue fever will practice better preventive activities in order to prevent contracting the disease in the future (Rahman et al., 2021; Suwanbamrung et al., 2021).

Dengue Prevention in Timor Leste

Dengue has been emerging as a major public health concern in Timor-Leste. The Guidelines of the Asia-Pacific Dengue Strategic Plan 2008–2015 have been used for prevention and control of dengue in the country (Ministry of Health Timor Leste, 2022).

Multiple agencies are involved in programme implementation, and lack of integrated programme further makes it challenging to assess the burden of disease and prepare the programme implementation plan (PIP). Multi-pronged approach is adopted for prevention and control of dengue. The objective of this plan is to decrease the incidence of dengue to a level, where it ceases to be a public health challenge and to reduce the CFR due to dengue. While planning PIP some components has been adopted/strengthened such as: disease sentinel surveillance, diagnosis and case management, case reporting and notification, monitoring and supervision, vector control (mosquito fogging) and abate distribution.

As part of the preventive and control measures mass media messages to raise community awareness such as:

a) Inform the community to reduce larval habitats in and around houses by covering all water storage containers in the house to prevent egg-laying by mosquito, and emptying, drying water tanks, containers, coolers, birdbaths, pets' water bowls, plant pots and drip trays at least once every week.

b) Discard all waste articles, tyres, that are lying in open and may hold water during rains. Tyres should be properly disposed. If there is no proper disposal system,

it may be buried under the ground, though it is not an ideal disposal system, as it may releases chemicals, pollute water and soil, thereby creating an environmental hazard

c) Check for gutters and flat roofs regularly for any clogging and water stagnation

d) Carry out spray with commercially available safe aerosols

e) Rooms including closets and kitchens should be sprayed (by removing/covering all food items properly).

f) Take personal protection measures such as protective clothing (full sleeved shirts and full pants during day time), and using commercially available repellents

g) Use insecticide-treated mosquito nets while sleeping during day time

h) Ensure doors and windows have screens/wire mesh

i) Pass the message on preventive measures to different peer groups (Ministry of Health Timor Leste, 2022).

However, so far there is still lack of regular dengue campaign in the community to raise community awareness regarding dengue and lack of policy, strategy for the control of dengue and other vector-borne infectious disease.

Impacts of dengue

Impact on under five children

Children are the Nation's future pillars. Today's children will be tomorrow's citizens and leaders. Child health care is the most important component in determining a child's growth, especially in the first five years of life. Certain essential biological and psychological needs must be fulfilled to guarantee the survival and healthy development of the child and future adult (Rongmei, 2008).

Children, particularly those under the age of five, are at greater risk of severe dengue illness. In addition, under five children have the greatest rate of mortality worldwide (Sinha et al., 2022). Dengue fever was common in children under the age of five because of immunological deficiencies, malnutrition, poverty, a lack of health-care infrastructure, illiteracy and a lack of knowledge, particularly among mothers about dengue fever. Major complication of dengue infection among under five children are dengue hemorrhagic fever with shock accompanied by respiratory and renal failure. Other complications of dengue infection among children

are thrombocytopenia, encephalopathy, fulminant liver damage, organ failure, panophthalmitis and hemophagocytosis (Mercy, 2014). Children are more vulnerable to contracting the dengue virus particularly if they have already experienced with a different dengue serotype (Id et al., 2023). There have been numerous dengue epidemics, affecting the health and well-being of people, particularly children. Dengue may have a consequence on individual lives both directly and indirectly. Direct consequences include illness, treatment, and monetary expenditures by patients and their parents. Life disruptions and psychological problems are the indirect factors (Zahir et al., 2018). There are some several impact of dengue in children can be explained as follows:

Impact on household and family members

According to Qureshi & Qureshi (2019) mentioned that dengue virus epidemics had a minimal financial impact on households, but had greatest an impact on low-income families. When a child is hospitalized, the parents must concentrate on caring for their child and their income is heavily impacted because the caregiver had to stay in the hospital. This financial burden can add additional stress and uncertainty for the family. In addition, having multiple people in a family contract dengue worsens this burden. Based on the transmission types of dengue virus, dengue can be transmitted to a person through mosquito bite, human to mosquito, maternal transmission and other transmission such as organ transplantation, blood transfusion (World Health Organization, 2023). Hence, there is a risk for other family member in the household particularly vulnerable people such as another children, pregnant woman and elderly people with comorbidities. In some cases, someone already infected with dengue may be bitten by a mosquito who then bites another family member and spreads the virus.

Impacts on the community

The mosquito that spreads dengue, Aedes aegypti, does not usually fly far from where it is born. This indicates that if dengue is present, whether in a mosquito or a human, it can spread to multiple household members.

A study performed by Stoddard et al. (2013) indicated human house-to-house movements are crucial in defining individual infection risk, local patterns of incidence, rapid urban-wide virus distribution, and variation in DENV transmission

rates. The distribution of cases reflected the distribution of distances to visited houses. Thus, human mobility patterns on both the individual and collective levels had a significant impact on how DENV spread through the human population. These would be spreading throughout four houses, the index's home, another neighboring house, and two further distant (>100 m) well outside the range of targeted insecticide applications. Therefore, households who live very close to each other, can easy to spreads the dengue virus to other households in the community.

The Health Belief Model

Health belief model (HBM) is a social psychological health behavior change model designed to explain, predict, and promote health-related behaviors, specifically regarding health service utilization (Siddiqui et al., 2016; Mashudi et al., 2022).
The health belief model was developed in the 1950s by social psychologists, Irwin M. Rosenstock, Godfrey M. Hochbaum, S. Stephen Kegeles, and Howard Leventhal at the United States Public Health Service and remains one of the most well-known and popular theories in the field of health behavior (Carpenter, 2010; Glanz & Bishop, 2010).

The earliest characteristics of the Model, translated from the previous abstraction, were that in order for an individual to take action to avoid a disease, he or she would need to believe (perceived susceptibility), the occurrence of the disease would have at least moderate severity on some component of her or his life (perceived severity), taking a particular action would in fact be beneficial by reducing her or his susceptibility to the condition (perceived benefit) and if the disease occurred, by reducing its severity, and that it would not entail overcoming important psychological barriers such as cost, convenience, pain, embarrassment (perceived barrier).
Thus, as Rosenstock et al (1988) notes the combined levels of susceptibility and severity provided the energy or force to act and the perception of benefits (less barriers) provided a preferred path of action. However, it was also felt that some stimulus was necessary to trigger the decision-making process. This so-called “cue to action” might be internal (i.e., symptoms) or external (e.g., mass media communications, interpersonal interactions, or reminder postcards from health care providers). Unfortunately, few HBM studies have attempted to assess the contribution

of cues to predicting health actions. Finally, it was assumed that diverse demographic, sociopsychological, and structural variables might, in any given instance, affect the individual's perception and thus indirectly influence health-related behavior.
The self-efficacy was added to the four components of the HBM in 1988. Self-efficacy refers to an individual's perception of his or her competence to successfully perform a behavior. Self-efficacy was added to the HBM in an attempt to better explain individual differences in health behaviors (Rosenstock et al., 1988).

In recent years, Health Belief Model (HBM) has been widely used in the analysis of behavior regarding dengue (Othman et al., 2019; Mashudi et al., 2022; Liu et al., 2021; Tai & Yang, 2022; Wong et al., 2023).

The HBM contains several primary concepts that predict why people will take action to prevent and control illness conditions; this includes: perceived susceptibility, perceived severity, perceived benefits, perceived barriers to taking action for one's health, cues to action and self-efficacy. Some research suggested that certain health beliefs could assist in the prevention of dengue fever (Liu et al., 2021).

Perceived susceptibility refers to beliefs about the likelihood of getting a diseases or illness. People will be motivated to practice dengue preventative behaviors if they realize the severity and terrible effects of dengue. Perceived severity is a person's assessment of the seriousness of a negative health consequence that determines how motivated he or she is to take action to avoid it. Perceived susceptibility and perceived severity are the individual factors that related to preventive behavior. People are more inclined to adopt preventive measures to keep themselves safe if they understand how serious the disease is (Rosenstock et al., 1988).

Other components that affect personal behavior are perceived benefit and perceived barriers. Perceived benefit refers to individual's perception of the necessity or usefulness of preventative measures in reducing the risk of illness. The individual must feel that the chosen activity will lead to significant positive results.
Perceived barrier defined as individual's perception about potential negative aspects or obstacles to take a recommended health action such as perceived as having insufficient time to plan for environmental cleanup (Rosenstock et al., 1988).

According to HBM if individual belief that a course of action available for him or her would be beneficial in reducing either their susceptibility or severity of the condition, and believe the anticipated benefits of taking action outweigh the barriers to action, they are likely to take action that they belief will reduce their risks (Glanz et al., 2008).

Cues to action in the HBM are events or experiences that drive a person to take action, whether they are personal (physical symptoms related to a health issue), interpersonal or environmental (media coverage). For instance, influence from a nearby individual who may have been susceptible to the same sickness, mass media, campaign, magazine, reminder postcard from health care provider signaling the need for action (Tarkang & Zotor, 2015).

Self-efficacy is the belief in one's own ability to carry out the suggested activity. Bandura put up this social learning/social cognitive theory concept, which was subsequently incorporated into the HBM. This is typically accomplished by completing incremental or step-by-step goals. It could relate to a method for building confidence to implement dengue prevention measures. In addition, self-efficacy is an important concept in the HBM that encourages individuals to implement preventive practices.

Modifying factors such as demographic (age, gender, race), socio-psychological (socio-economic factors, peers), and structural variables (knowledge regarding the disease, prior contact with the disease) can impact a person's perceptions as a result, indirectly affect by influencing the perception of susceptibility, severity, benefits, and barriers health-related behaviors (Tarkang & Zotor, 2015; Glanz et al., 2008).

This study addressed HBM principles such as age, education, knowledge regarding dengue, perceived susceptibility, perceived severity, perceived benefits perceived barriers and self-efficacy.

Factors influencing dengue prevention behaviors

Age

Age is a demographic characteristic that can affect an individual's beliefs and consequently have an indirect impact on health-related actions (Tarkang & Zotor, 2015). Age in this study defined as mother's age ranged by year, counting from date of birth to date of study. A cross-sectional study in Malang, Indonesia performed by Rakhmani et al. (2018) indicated older participants (> 60 years and 41–60 years) were more likely perform better dengue prevention behavior than younger participants (21–40 years and < 21 years). Additionally, a community based cross – sectional study in Karachi, Pakistan revealed that age was found to be significantly associated with dengue prevention practices ($p < .01$) (Siddiqui et al., 2016). Similarly, Chanyasanha et al. (2015) performed a study to determine the knowledge, attitude and preventive behaviors associated with dengue and analyzed the factors influencing preventive behaviors among housewives in Colombo, Sri Lanka revealed that age of housewives was significantly associated with preventive behaviors ($p < .01$). Therefore**,** several studies above have shown that age has positive effect on dengue prevention behaviors.

Education

Education can contribute to the formation of ideas, thoughts and attitudes in individuals. An individual with a high level of education had more opportunities to learn about disease and health care in many different ways than an individual with a low level of education, who developed skills in areas such as attitude and moral principle (Huff et al., 2014). Education of this study referred to mother's years of education, categorized into illiterate, primary school, junior high school, secondary high school, vocational school and university.

Paudel et al. (2023) conducted a cross-sectional study in Nepal to 181 households among head of households through face-to-face interview found that educational status of respondents was associated with dengue prevention practices ($p < .05$). Similar finding from Sri Lanka (Chanyasanha et al., 2015) among housewives has shown that education of housewives was significantly associated with preventive behaviors ($p < .01$). Moreover, a cross-sectional KAP survey about climate change and dengue were conducted in 360 households in Laos (180 urban and 180 rural), 359

households in Thailand (179 urban and 180 rural) and 20 government officials (10 in each country) using structured questionnaires revealed that the highest level of education was significant factors for good dengue prevention practices in Laos and the highest level of education was the only significant factor regarding good dengue prevention practices in Thailand (Rahman et al., 2021). Thus, from several studies showed education level has positive effect on dengue prevention behaviors.

Knowledge regarding dengue

Bloom et al. (1971) gave definition of knowledge as concerned thing with realization on special or common thing and process of various situations by emphasized on memory. Knowledge as ability to recall information that has been done before. Knowledge about dengue fever plays an important role to prevent dengue infection. It can increase the individual's understanding and can motivate decisions for change behaviors.

Knowledge is a part of modifying factor (structural variables) on Health belief Model. Knowledge can indirectly affect by influencing the perception of susceptibility, severity, benefits, and barriers health-related behaviors (Glanz et al., 2008). In this study, knowledge regarding dengue defined as mothers' understanding about the dengue that can help to take action to prevent or avoid the dengue. Mother's knowledge regarding dengue can indirectly affect by influencing mother's perception about susceptibility, severity of getting dengue as well as perceived benefit and barrier. Hence, based on the HBM, mother's knowledge can affect mother to take dengue prevention behaviors. If mothers have good knowledge, they will be able to practice dengue prevention behaviors. In addition, Liu et al., (2021) suggested knowledge of dengue and beliefs may affect people's willingness to participate in the control of dengue fever and influence the further spread of the disease.

A number of studies indicated that knowledge of dengue was associated with practice towards dengue (Selvarajoo et al., 2020; Othman et al., 2019; Annan et al., 2022). Rahman et al. (2022) conducted a study to assess the dengue fever status and responses among students through their knowledge, attitude and practices (KAP) survey with an online self-reported survey was completed by 625 students by convenience sampling technique. The study result showed that significant positive correlations ($r = .211$, $p < .01$) between knowledge and practices. Linear regression

analysis identified knowledge as significant predictors ($R^2 = 0.145$, $p < .01$) of practices towards dengue fever.

A community based cross-sectional study of 608 Karachi residents in Pakistan (Siddiqui et al., 2016), reported dengue preventive practices were significantly associated dengue knowledge. Participants with higher knowledge (OR = 1.581; 95% CI = 1.05–2.37; $p = 0.028$) scores had higher (2-fold) odds of implementing dengue preventive practices**.** Hence, as revealed in this study, adequate knowledge of dengue leads to adequate prevention practices. Similar finding from Hossain et al. (2021) has shown there was significant positive association of knowledge with preventing ways and preventing practice of Aedes reproduction ($p < .05$). Therefore, the literature indicates that knowledge regarding dengue has positive effect on dengue prevention behaviors.

Perceived susceptibility

Perceived Susceptibility is defined as an individual's subjective assessment of his or her own likelihood of encountering a hazard. People will be more motivated to take action in healthy ways if they believe they are at risk of a specific negative health outcome. Regarding dengue, a person's perceived susceptibility explains how vulnerable they are to contracting dengue. This is one aspect that can impact individual's decisions to take action, such as the assumption that everyone will most likely contract dengue (Rosenstock et al., 1988; Lennon, 2005). Perceived susceptibility refers to mother's perception of the risk acquiring the dengue fever. This perception may influence the mother to perform dengue prevention behavior. Mashudi et al. (2022) conducted a study to determine the level of dengue preventive practices and its associated factors among residents in a residential area in Johor, Malaysia during the COVID-19 pandemic. Multiple logistic regression analyses revealed that perceived susceptibility was significantly linked to a good level of dengue prevention ($p <.05$).

Another study in Karachi, Pakistan (Siddiqui et al., 2016) in different socioeconomic groups, assessed perceived susceptibility and perceived severity as a perceived threat showed that perceived threat significantly contributed as true predictors of dengue preventive practices ($p < .05$). Similar finding from a study conducted via a National telephone survey was carried out with 2,512 individuals of

the Malaysian Public aged 18–60 years (Wong et al., 2015), reported higher perceived susceptibility to dengue was associated with higher dengue prevention practices (p =.05). Likewise, Rakhmani et al. (2018) in their study showed participants who had higher perceived susceptibility had better dengue prevention behaviors compared with those who had moderate perceptions (p < .01). Thus, several studies above revealed perceived susceptibility has positive effect on dengue prevention behaviors.

Perceived severity

Perceived severity is a person's perception of the severity of the negative health outcome that will determine how motivated he or she is to take action to avoid it. People are more likely to take dengue preventive measures to keep themselves safe when they understand how serious the dengue is (Rosenstock et al., 1988; Lennon, 2005). Perceived severity towards dengue defines as mother's perception regarding the seriousness of dengue. Dengue has many severe consequences and if not treated promptly can cause death. If people internalize the severity of the dengue, they will take action to prevent the infection of dengue.

A previous study in Pakistan assessed perceived susceptibility and perceived severity as perceived threat showed that perceived threat significantly contributed as true predictors of dengue preventive practices (p <.05) (Siddiqui et al., 2016). Additionally, an experimental study to understand the effectiveness of a health education intervention (HEI) for Filipino migrant workers in Taiwan and explores the factors affecting preventive practices of mosquito borne diseases. The results suggested perceived severity (β = .24, p < .01) was the factor that drove migrant workers to adopt preventive practices (Tai & Yang, 2022). From literatures review showed perceived severity has positive effect on dengue prevention behaviors.

Perceived benefit

The perceived on the importance of prevention practice to reduce threat of illness referred as perceived benefit. It is a perception that the target behaviors will provide strong benefits to the individual and has the potential to prevent negative health outcomes. Regarding to dengue, individual perceived benefit on whether frequent environmental cleaning will help to reduce the number of dengue-carrying mosquitoes in their area can reduce the risk of dengue (Rosenstock et al., 1988;

Lennon, 2005). The perceived benefit of dengue in this study refers to mother's perception on the effectiveness of dengue prevention practice to reduce threat of dengue fever.

A previous research of Mashudi et al. (2022) among residents in a residential area in Johor, Malaysia during the COVID-19 pandemic showed simple logistics regression analysis of people with high perceived benefit was significantly associated with a good level of dengue preventive ($p < .05$). Furthermore, AlSahafi et al. (2021) assessed the knowledge, health beliefs and preventive practices against dengue fever in different dengue endemic districts of Jeddah, Saudi Arabia has shown that respondents' perception of mosquito control benefit had 1.8 times or around two times showed a higher level of anti-dengue fever activities as compared to those who think the benefits of these are lower (OR=1.864, $p = 0.019$).

Additionally, an experimental study by Tai & Yang (2022) using health education intervention to understand the effectiveness of a health education intervention (HEI) for Filipino migrant workers in Taiwan and explores the factors affecting preventive practices of mosquito borne diseases revealed that perceived benefits did not directly affect the preventive practices, but still had an indirect impact on the preventive practice through the perceived severity (β^s perceived benefit was 0.39). Hence, perceived benefit of taking action regarding dengue has positive effect on dengue prevention behaviors.

Perceived barrier

Perceived barrier defined as individual's perception about potential negative aspects or obstacles to take a recommended health action such as perceived as having insufficient time to plan for environmental cleanup. In other words, perceived barriers mean any obstacles to adopting preventative behavior that may discourage adoption of that behavior. Beliefs about the costs (psychological or material) that limit a person's ability to carry out important dengue preventive measures such as perceived not enough time to reduce mosquitoes breeding sites can limit a person to perform necessary preventive behaviors (Rosenstock et al., 1988; Lennon, 2005). According to Glanz et al. (2008). perceived barriers may act as an impediment to undertaking the recommended behaviors. A kind of nonconscious cost benefit analysis occurs where individuals weigh the action's expected benefits with perceived barriers. When an

individual weighs the preventive behaviors as more effective against barriers (perceived benefit minus perceived barrier) that will produce a force to initiate preventive behaviors.

The perceived barrier of dengue in this study refers to mother's perception about any impediment to undertaking the behavior changes being considered to decrease risk of dengue. In a study performed by Mashudi et al. (2022) through simple logistics regression analysis revealed people with perceived barrier was significantly associated with a good level of dengue preventive ($p < .05$). Chandren et al. (2015) conducted a study among Orang Asli communities in Peninsular Malaysia of 560 samples, multivariate analysis showed perceived barrier to perform dengue prevention, as significant factor associated to dengue prevention practices. Furthermore, respondents with low perceived barriers to prevent dengue (score 1-5) were more likely to practice dengue prevention (OR = 2.06, 95% CI = 1.21–3.53, vs. score of 6–10, $p < .01$). In addition, Tai & Yang (2022) proved by an experimental study using health education intervention revealed that practices perceived barrier as the factor that drove migrant workers to adopt preventive behaviors of mosquito borne disease ($\beta = -.14$, $p < .01$). Therefore, perceived barriers have positive effect on dengue prevention behaviors.

Self-efficacy

Perceived self-efficacy as individual belief in his or her ability to successfully perform a given task in certain situations. In other words, self-efficacy is a key factor to establish good health care behaviors. The self-efficacy theory holds that different modes of influence alter coping behavior by creating and enhancing expectations of personal efficacy. Based on this formulation, perceived self-efficacy can influence a person's behavior (Bandura, 1977).

Self-efficacy in this study defined as mother's opinion or confidence in ability to successfully perform dengue prevention behavior. It could relate to a method for building confidence to implement dengue prevention measures. Mother self-efficacy in caring for children is an important issue which affects mother's performance of care. Self-efficacy towards dengue as measures the confidence level engaging in ability to do protective practices regarding dengue (Wong et al., 2023).

In community-based cross-sectional study was conducted on 303 respondents from Johor residential in Malaysia through simple logistic regression analysis showed self-efficacy was significantly associated with a good level of dengue preventive (p <.05). High self-efficacy had higher odds of practicing good dengue preventive measures (aOR = 1.7, 95% CI: 1.0–2.8, p = 0.045). In addition, respondents with yes self-efficacy were nearly twice as likely as those with no self-efficacy to have good dengue prevention practices (aOR = 1.8, 95% CI: 1.1–2.9, p = 0.023). Hence, Self-efficacy is an important concept in the HBM that encourages people to practice preventive measures. One of the obstacles to effectively implementing these initiatives is a lack of self-efficacy (Mashudi et al., 2022).

Another study also has shown that self-efficacy significantly contributed as true predictor of dengue preventive practices (p < .01). Additionally, participants with higher self-efficacy (OR = 1.982; 95% CI = 1.34–2.91; p <.01) scores had higher (2-fold) odds of implementing dengue preventive practices (Siddiqui et al., 2016).

Self-efficacy has been widely discussed in the literature and has positive effect on dengue prevention behaviors.

Summary

Dengue is a major public health issues that can cause high morbidity, as well as severe and life-threatening symptoms, if not handled properly, complications of dengue fever can occur such as dengue shock syndrome (DSS) and dengue hemorrhagic fever or even death. Dengue not only affects the child physical health but can affect psychological, family member and Community. Hence, it requires people to control and manage dengue through the dengue prevention behaviors. From the review literature and the theory, identify the variety of factors that related to dengue prevention behaviors. Knowledge, age, educational level, perceived susceptibility, perceived severity, perceived benefit, perceived barriers and self-efficacy are the factors that are associated to dengue prevention behaviors. These factors are supported by both theoretical concept and research evidence.

Mother is the primary caregiver who plays important role in taking care for the family especially children. Mother’s age and education level can contribute to dengue prevention practices for their child. Mothers' understanding of dengue can

help to take measures to prevent dengue. If mothers have good knowledge about dengue, they will be able to practice dengue prevention behaviors. Perceived susceptibility and severity together can drive mothers to perform dengue prevention behaviors. However, to initiate the behaviors mothers must believe that perceived benefits outweigh the perceived barriers. Furthermore, mother self-efficacy is an important part that can encourages mother to perform dengue prevention measures.

Most of the reviewed studies were conducted in other Countries regarding dengue prevention and there are limited studies conducted in the community regarding dengue prevention behaviors among mothers of children under five years old in Comoro Village, Dili Municipality, Timor Leste. Thus, from limitation of information about dengue prevention behaviors suggests this present study aims to examine the factors predicting dengue prevention behaviors among mother of under five children.

CHAPTER 3
RESEARCH METHODOLOGY

This chapter presents the research methodology that includes research design, population and sample, study setting, research instruments, psychometric property of the instruments, translation of the instruments, protection of human rights, data collection procedures and data analysis procedures.

Research design

A predictive correlational study design was conducted to describe the dengue prevention behaviors among mothers of under five children and to examine factors predicting dengue prevention behaviors among mothers of under five children in Comoro village, Dili Municipality, Timor Leste.

Population and sample

Population

The target population of this study was mothers of under five children who lived in Comoro village, Dili Municipality, during February to March 2024.

Sample

The sample of the study was the mothers of under five children who lived in Comoro village, Dili Municipality who fulfilled the inclusive sampling criteria. The inclusion criteria to select the participant as follows:

1. Age least 18 years or older.
2. Biological mother of under five children.
3. No history of mental health disorders.
4. Be able to read, communicate and understand in Tetum language.

Sample size

Sample size estimation in this study was calculated by using rule of thumb calculation. According to Riley et al. (2020) stated events per candidate predictor parameter below 10 or increasing it to 15, 20, or even 50. For this study the researcher used EPP = 30. There were 8 numbers of predictors in this study. Therefore, sample

size from calculation was 240 samples (from 8 x 30 = 240). The researcher added 10 % for a non-response rate according to previous study (Phuyal et al., 2022). Thus, final sample size estimated 264 samples of mothers were recruited in this study. In data collection process, the researcher collected 288 samples. 24 samples were used to replace the missing data and outliers and final sample size remain 264 samples.

Sampling technique

According to recent administrative division, Comoro village divided into 14 hamlets. The list of households who have under five children's data in Comoro village was obtained from Comoro Community Health Center include household contact number and address. The study population comprised of mothers of under five children from 14 hamlets. The researcher utilized simple cluster random sampling to draw the sample. The Random selection of 14 hamlets was selected then the eligible mothers within the hamlets represented 14 hamlets. Each hamlet gave a number on a piece of paper, all numbers of each hamlet placed in a bowl, mixed well and the researcher drew one paper each time for one hamlet. The total of eligible mothers from each hamlet were in the list from Comoro Community Health Center. The researcher repeated same random selection for each hamlet until reach the required sample size (264 samples). Three hamlets from 14 hamlets were selected from random selection and the list of eligible mothers of each hamlet based on data from Comoro Community Health Center. Fomento 2 hamlet (74 samples), São José hamlet (62 samples) and Aimutin hamlet (152 samples) were selected in this study.

Study setting

The study was conducted in Comoro village, Dili Municipality. Comoro Village located in Dom Aleixo administrative post and situated in a little west of Dili, the Country's capital and according to the most recent administrative divisions Comoro Village divided into of 14 hamlets. Total area of Comoro village is 15.36 km^2 with total population 58.891 and have 10.899 households (Timor-Leste Population and Housing Census 2022). Comoro village was selected because of high incidence of dengue cases than other village in Dili Municipality (Wangdi et al., 2018). In addition, Comoro village has a higher population than another village. Thus, this research was studied in hotspot area of dengue. The population who lived in Comoro

Village had different characteristics such as religion, race and comes from 14 Municipalities.

Research instruments

Research instrument in this study consisted of a demographic record form and 7 questionnaires including knowledge regarding dengue questionnaire, perceived susceptibility questionnaire, perceived severity questionnaire, perceived benefits questionnaire, perceived barriers questionnaire, self-efficacy questionnaire, and dengue prevention behaviors questionnaires. The detail contents of each instrument present following:

1. The Demographic record form and information regarding dengue was developed by the researcher, consisted of 6 items about age, education level, marital status, family income, occupation, number of under five children, number of family member. Information regarding dengue including source of information regarding dengue, history of dengue, house flooded when rainy season, standing water in the water containers and use of mosquito net.

2. Knowledge on dengue questionnaire was developed by Dhimal et al. (2014). The level of knowledge regarding dengue consisted of two parts; knowledge of symptoms and knowledge of transmission. The questionnaire contains 24 items**.** Each right answer accounts for 1 point, while a wrong or unsure answer is given 0 point. The possible scores range from 0-24. For analysis using the 80 % cut off score with 0-18 being categorized as poor knowledge and ≥ 19 as good knowledge. The Cronbach alpha value from previous study was .82.

3. Perceived susceptibility towards dengue fever was developed by Ghafar & Shah (2017) and modified by Mashudi et al. (2022). The questionnaire contained 6 items that examine the respondents' perception of the risk of getting dengue fever using a similar four-point Likert scale. Four-point Likert scale coding ranging from "strongly disagree" (4) to "strongly agree" (1). The possible sum of scores ranges from 6-24. Four items (1,2,3,4) had a reverse coding in this construct with 18–24 was classified as high perceived susceptibility and 6–17 as low. The Cronbach alpha value from previous study was .94.

4. Perceived severity of dengue questionnaire was developed by Ghafar & Shah (2017) and modified by Mashudi et al. (2022). The questionnaire contained 6 items that examine the respondents' feelings towards the seriousness of dengue. The possible sum of scores ranges from 6-24 with 18–24 was classified as high perceived severity and 6–17 as low. The Cronbach alpha value from previous study was .59.

5. Perceived benefit questionnaire was develop by Ghafar & Shah (2017) and modified by Mashudi et al. (2022). The questionnaire consisted of five items rated using a four-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (4) with a total score range of 5–20 with 18-20 was classified as high perceived benefit and 5-17 as low perceived benefit. The Cronbach alpha value from previous study was .91.

6. The perceived barrier questionnaire was develop by Othman et al. (2019) and modified by Mashudi et al. (2022) this questionnaire also used a four-point Likert scale to answer six questions on barriers in performing dengue prevention practice. The possible range of scores between 6–24. Those scoring 6 to 11 have a lower perceived barrier, whereas those scoring 12 to 24 have a higher perceived barrier. The Cronbach alpha value from previous study was .76.

7. Self-efficacy questionnaire was developed by Maibach et al. (1991) and modified by Isa et al. (2013). Self-efficacy consisted of level and strength of self-efficacy. However, in this study only strength of self-efficacy was used. Strength of self-efficacy contained 10 items. Strength of self-efficacy was measured using Likert-type scales from 1 (Not at all confident) to 10 (Extremely confident). Each scale has possible scores ranging from 10 – 100. The higher score indicates the higher level of confident. The Cronbach alpha value from previous study was .99.

8. Dengue prevention behaviors questionnaire was developed by Abdullah et al. (2013) and modified by Mashudi et al. (2022). The dengue preventive practices measure consisted of prevention of mosquito breeding, prevention of mosquito bites and prevention of dengue transmission. Contained of 15 items on a five-point Likert-type scale, i.e., "never", "rarely", "sometimes", "usually", and "always", with scores "1" to "5", respectively. The total score ranged from 15 to 75. The scores were dichotomized for analysis using the median split, with 15–59 being categorized as

poor practice and 60–75 as good practice The Cronbach alpha value from previous study was .79.

Psychometric property of the Instruments

All of instruments used in this study were tested for reliability with a pilot study. The pilot test was conducted in Comoro Village which includes 30 community-dwelling mothers from Comoro village who had same characteristic with the participants of the study. The Kuder-Richardson formula 20 (KR-20) coefficient was used to identify reliability of the knowledge regarding dengue questionnaire and Cronbach's alpha coefficient was used to determine reliability for perceived susceptibility, perceived severity, perceived benefit, perceived barrier, self-efficacy and dengue prevention behaviors. The Kuder-Richardson formula 20 (KR-20) coefficient value was .84 and Cronbach's alpha coefficient for perceived susceptibility, perceived severity, perceived benefit, perceived barrier, self-efficacy and dengue prevention behaviors were .75, .65, .96, .74, .96 and .80.

Translation of the instruments

In order to be appropriate instruments for Timorese People, the instruments were translated from English into Tetum version based on process translation and adaptation on instrument technique (World Health Organization, 2016).
The specific translation procedure follows the steps below:

1. For forward translation, the original English version translated into Tetum language by two independent bilingual translators who were good at both English and Tetum Languages.

2. Another a bilingual expert compared the results translation to identify and resolve any inadequacies in the translation, as well as discrepancies between the forward translation and the previous versions of the questions, if any. Then, produced a complete one Tetum version of each instrument.

3. An independent translator that expert in English and had no knowledge in the questionnaires done the back translation from Tetum language to English.

4. Two professors from the Faculty of Nursing compared with the original English version to validate the accuracy of the translation process.

Protection of human rights

This research was carried out only after the research proposal was approved by the Institutional Review Board (IRB), Burapha University (Protocol code G-HS 104/2566) and the IRB committee from Institute National of Public Health Timor Leste (INSPTL) and the referral number was 57/INSP-TL/UEPD/XII/2023. The data collection process began only after the concern authority of the setting (Local Authority of Comoro Village) gave the researcher permission to collect data in the Comoro Village setting.

Before the data collection process, all the participants were informed carefully about the aims of the study and the involvement procedure. The researcher described the nature of the study and also emphasized the individual's rights to participate or to refuse to participate in the study. The data in this study only was collected from those individuals who were willing to participate and signed the consent form. The consent form was completed before data collection. The researcher informed participant that they have right not to answer any questions and have the right to change their mind or withdraw from the study at any time if they want. All the forms for collecting data were anonymous and participating in this study was no harm for the participants.

Confidentiality and anonymity were maintained throughout the study. All data on the paper documents were stored in secure place and only utilized for the purposes of the study and all electronic data were locked by a password that only the researcher can be accessed. All data will be destroyed one year after the publication of the research. In addition, if any participant would like to know the results of this study, they could contact the researcher.

Data collection

The data collection procedure in this study were conducted by the researcher and research assistant as follows:

1. After the proposal and instruments were approved by the Research Ethical institutional Board, Burapha University, the letter from the Dean of Graduate School, Burapha University presented to IRB committee from Institute National of Public Health Timor Leste (INSPTL).

2. After the researcher got the approval from Institute National of Public Health Timor Leste. The researcher sent the approval letter to Comoro Community health Center then got the list of households of under five children.

3. The researcher also sent the approval letter from IRB committee (INSPTL) to Local Authority of Comoro Village and got the permission for data collection.

4. The researcher recruited one research assistant. He is an undergraduate student of nursing who had completed his study. The researcher trained him on how to collect data accurately and clearly explained the research purpose, procedure and every part of the research instrument. The researcher also informed about the protection of human subjects and inclusion criteria to select the participant.

5. Based on participant's address and contact number, the researcher and research assistant started to visit eligible house for data collection.

6. Data was collected on Monday to Saturday in the morning from 09:00 to 11: 00 am and in the afternoon from 1:00 – 5:00 pm. The researcher and research assistant collected about 16-18 participants per day.

7. The researcher and research assistant met and informed the participants about the aims of the study, ethical issues and human protection of the study. Written consent signed after the participants understand and expressed their willingness to participate in this study. Then the researcher started to distribute the questionnaire. The data was collected through a self-administer questionnaire.

7. The participants completed the questionnaire freely and it took 25-30 minutes to complete the whole set of questionnaires. All the participants were informed if they chose not to answer some of questions purposely, they can leave them unanswered.

8. The researcher checked if the questionnaires had been filled completely after the participants submitted them.

9. This process was repeated until the required sample size was reached.

Data analysis

All data were analyzed by using software statistical package for social science (SPSS 26.0). The level of significance was set as .05 and data analysis included:

1. The descriptive statistics were used to describe frequencies, percentages, means and standard deviations of the participants demographic data and variables

2. The data were tested for normality of the variables, linearity, homoscedasticity, outliers, autocorrelation and multicollinearity to verify the assumptions of the standard multiple regression model.

3. Standard multiple regression was performed to examine the predicting factors of dengue preventive behaviors among mothers of under five children

CHAPTER 4
RESULTS

This chapter presents the finding of the study. The purposes of the study were to describe the dengue prevention behaviors among mothers of under five children and examine factors predicting dengue prevention behaviors among mothers of under-five children in Comoro village, Dili Municipality, Timor Leste. The finding of the study is presented as follows:

1. Description of demographic characteristics and information regarding dengue
2. Description of independent and dependent variables
3. Factors predicting dengue prevention behaviors among mothers of under-five children.

Description of demographic characteristics and information regarding dengue

1. Description of demographic characteristics

Table 2 presents descriptive statistical analysis results of demographics characteristics showed that mothers of under-five children age ranged from 18-43 years old with an average age of 31.84 years old (SD = 6.17). Almost half of the participants had completed secondary high school (49.2%), followed by Bachelor's degree and higher level (26.9%), primary school (12.9%) junior high school (10.2%) and illiterate (0.4%). The majority of participants were married (97.0%) and housewives (75.0%). More than half of family (89.0%) earned monthly income between USD 100.00 - 500.00, 1 number of under-five children in their family (61.4%) and less than five number of family member (71.6%).

Table 2 Demographic characteristics of participants (n = 264)

Characteristics	Number (N)	Percentage (%)
Age (years) (*M* = 31.84, *SD* = 6.17, Min = 18, Max =43)		
18-24	33	12.5
25-34	143	54.2
≥ 35	88	33.3
Education (years) *M* = 11.94, *SD* = 3.23, Min = 0, Max = 16)		
Illiterate	1	0.4
Primary school	34	12.9
Junior high school	28	10.6
Secondary high school	130	49.2
Bachelor's degree and higher	71	26.9
Marital status		
Single/divorced	4	1.5
Married	256	97.0
Widowed	4	1.5
Occupation		
Public Servant/Government	25	9.5
Non-Government worker	15	5.7
Housewife	198	75.0
Merchant	14	5.3
Other (specify)	12	4.5

Table 2 (Continued)

Characteristics	Number (n)	Percentage (%)
Monthly income (n = 91), *Mdn* = 200.00, *SD* = 129.50, Min = 15, Max = 675)		
< USD 100.00	7	7.7
USD 100.00 - 500.00	81	89.0
> USD 500.00	3	3.3
Number of under-five children in the family		
1	162	61.4
2	67	25.4
3	28	10.6
4	7	2.7
Number of family member (*M* = 4.86, *SD* = 2.15, Min = 1, Max =14)		
<5	189	71.6
5-10	68	25.8
>10	7	2.6

2. Information regarding dengue

As shown in Table 3, the majority of participants received information regarding dengue from health professionals (77.7%), no history of dengue (85.6%). Only 29.2% of participants' houses flooded in the rainy season and the majority of participants had no standing water in the containers at home (81.4%). More than half of the participants use mosquito nets (58.0%) while 42.0% do not use mosquito nets to prevent mosquito bites while sleeping.

Table 3 Information regarding dengue (n = 264)

Information	Number (n)	Percentage (%)
Source of information regarding dengue		
Health Professionals	205	77.7
T.V, Radio, Posters	51	19.3
Friends/neighbors/family	8	3.0
History of dengue		
No history	226	85.6
1 time	27	10.2
2 times	11	4.2
Yearly house flooded		
Yes	77	29.2
No	187	70.8
Having standing water at home		
Yes	49	18.6
No	215	81.4
Using mosquito nets		
Yes	153	58.0
No	111	42.0

Description of independent and dependent variables

The variables studied in this study were dengue prevention behaviors, age, education level, knowledge regarding dengue, perceived susceptibility, perceived severity, perceived benefits, perceived barriers and self-efficacy. The table 4 shows the description of dependent and independent variables that were studied.

In table 4, results revealed that the mean score of dengue prevention behaviors was 58.28 which indicated poor practice of dengue prevention behaviors, ranged from 32 to 75 (*SD* = 11.06). The mean score of participants age was 31.84 (*SD* = 6.17) with a minimum age was 18 years and a maximum age was 43 years. For participants' education level (years), the actual education level ranged from 0 to 16

years with the mean score 11.94 (*SD* = 3.23). The overall score of knowledge regarding dengue ranged from 3 to 24 and the mean score was 14.96 out of 24 (*SD* = 4.86) categorized as low-level knowledge regarding dengue. For the perceived susceptibility, the mean score was 15.62 (actual score: 10-21, *SD* = 1.94) which indicated low level of perceived susceptibility. The overall score of perceived severity ranged from 6 to 24, with a mean score of 16.82 (*SD* = 2.89) which indicated low perceived severity. The perceived benefit of the participants ranged from 5 to 20 with a mean score of 15.16 (*SD* = 2.39) which is categorized as low level of perceived benefit. The overall score of perceived barriers of participants ranged from 6 to 21 and the mean score was 12.94 (*SD* = 2.69) which indicated as high level of perceived barrier. The self-efficacy actual score ranged from 16 to 100 with the mean score was 81.41 (*SD* = 18.89) that relatively high self-efficacy.

Table 4 Mean and standard deviation of dependent and independent variables (n=264)

Variables	**Possible score**	**Actual score**	***M***	***SD***	**Level**
Dengue prevention behaviors	15-75	32-75	58.28	11.06	Poor practice
Age	≥18	18-43	31.84	6.17	-
Education	0-16	0-16	11.94	3.23	-
Knowledge regarding dengue	0-24	3-24	14.96	4.86	Low
Perceived Susceptibility	6-24	10-21	15.62	1.94	Low
Perceived Severity	6-24	6-24	16.82	2.89	Low
Perceived benefit	5-20	5-20	15.16	2.39	Low
Perceived barrier	6-24	6-21	12.94	2.69	High
Self-efficacy	10-100	16-100	81.41	18.89	-

Factors predicting dengue prevention behaviors among mothers of under-five children

Preliminary analysis was conducted to test the assumptions of the regression analysis which included checking the normality of the variables being studied, checking for outliers, autocorrelation, multicollinearity, homoscedasticity, and linearity.

Assumptions of standard multiple linear regression analysis

1. Normal distribution of variables was examined by the standard error of skewness, histogram, and box plot and all the variables were distributed normally.

2. Correlation analysis of variables was examined by Pearson's correlation to check the relationship among the variables that were studied. As for correlation analysis showed in Table 5, four selected variables met the assumption as having a significant correlation with dengue prevention behaviors as follows: knowledge regarding dengue (r = .225, p < .01), perceived severity (r = .161, p < .01), perceived benefit (r = .191, p < .01) and self-efficacy (r = .211, p < .01) except the age (r = .043, p > .05), education level (r = .065, p > .05), perceived susceptibility (r = -.072, p > .05) and perceived barriers (r = .007, p > .05) that showed no statistically significant correlation with dengue prevention behaviors.

Table 5 Correlation matrix among the independent and dependent variables (n = 264)

	1	2	3	4	5	6	7	8	9
Dengue prevention behaviors	1.000								
Age	.043	1.000							
Education	.065	-.055	1.000						
Knowledge	.225**	.84	.254**	1.000					
Perceived Susceptibility	-.072	-.012	.072	-.088	1.000				
Perceived Severity	.161**	.117	.088	.266**	.116	1.000			
Perceived Benefit	.191**	.117	.098	.234**	.008	.514**	1.000		
Perceived Barrier	.007	-.125*	-.120	-.282**	-.031	-.022	.001	1.000	
Self-efficacy	.211**	.073	.024	.253**	.064	.170**	.247**	.095	1.000

** $p < .01$; * $p < .05$

3. Multicollinearity assumption

The presence of severe multicollinearity was assessed by inspecting the variance inflation factor (VIF > 10) associated with each independent variable. There is no multicollinearity was detected (VIF value which were all less than 10), no outliers, and the scatter plot of the residuals showed that the assumption of linearity and homoscedasticity were met. The Durbin–Watson statistic can vary between 0 and 4, which has an acceptable range of values from 1.50 to 2.50, with a value of 1.97 meaning that the residuals are uncorrelated.

Results of standard multiple linear regression analysis

Data were calculated by regression analysis with the method of “enter”. The R^2 was an indicator of how much variance was explained by the model compared to

how much variance was not explained after the model had been fitted. All statistical tests were two-sided and performed at a significance level of .05.

Results from the standard multiple linear regression analysis indicated that all the variables combined could explained 7.2% in the variance of mothers of under five children (Adj R^2 = .072, $F_{(8, 254)}$ = 3.528, p < .001). The summary of regression analysis is presented in Table 6.

Table 6 Summary of regression analysis for variables predicting dengue prevention behaviors among mothers of under-five children (n = 264)

Predicting variables	**B**	**SE**	**β**	**t**	***p*-value**
(Constant)	39.855	8.891	-	4.482	.000
Age	.018	.109	.010	.164	.870
Education	.092	.214	.027	.432	.666
Knowledge regarding dengue	.340	.158	.149	2.147	.033
Perceived susceptibility	-.457	.349	-.080	-1.311	.191
Perceived severity	.227	.273	.059	.832	.406
Perceived benefit	.396	.328	.086	1.205	.229
Perceived barrier	.158	.263	.038	.600	.549
Self-efficacy	.086	.038	.147	2.282	.023

R^2 = .100, Adj R^2 = .072, F (8, 254) = 3.528, p < .001

CHAPTER 5
CONCLUSION AND DISCUSSION

This chapter provides the summary of the results and discussion of the study. This chapter also presents the implication of the study findings in nursing practices and research. Recommendations for future research are shown at the end.

Summary of findings

This study was carried out to describe the dengue prevention behaviors among mothers of under five children and examine factors predicting dengue prevention behaviors among mothers of under five children in Comoro village, Dili Municipality, Timor Leste. Predicting factors were age, education level, knowledge regarding dengue, perceived susceptibility, perceived severity, perceived benefits, perceived barriers and self-efficacy**.** The study was guided by Health belief Model (HBM) was developed in the 1950s by social psychologists Hochbaum, Rosenstock and Kegels from the United States. A total of 264 mothers of under five children were recruited by a simple cluster random sampling method from mothers of under five children who live in Comoro village, Dili Municipality, Timor Leste. Data were collected by self-reported questionnaires using the demographic data questionnaire, knowledge regarding dengue questionnaire (Dhimal et al., 2014), perceived susceptibility questionnaire (Ghafar & Shah, 2017 and modified by Mashudi et al., 2022), perceived severity questionnaire (Ghafar & Shah, 2017 and modified by Mashudi et al., 2022), perceived benefits questionnaire (Ghafar & Shah, 2017 and modified by Mashudi et al., 2022), perceived barriers questionnaire (Othman et al., 2019 and modified by Mashudi et al., 2022), self-efficacy questionnaire (Maibach et al.,1991 and modified by Isa et al., 2013) and dengue prevention behaviors questionnaires (Abdullah et al., 2013 and modified by Mashudi et al., 2022). The Kuder-Richardson formula 20 (KR-20) coefficient value was .84 and Cronbach's alpha coefficient for perceived susceptibility, perceived severity, perceived benefit, perceived barrier, self-efficacy and dengue prevention behaviors were .75, .65, .96, .74, .96 and .80.

The results revealed that the age of recruited participants ranged from 18-43 years with the mean score 31.84 years (SD = 6.17). Most of the participants had completed secondary high school (49.2%), followed by bachelor degree and higher level (26.9%), primary school (12.9%) junior high school (10.2%) and illiterate (0.4%). The majority of participants were married (97.0%) and housewives (75.0%). 89.0% of participants earned monthly income between $100.00 - 500.00 and have 1 number of under-five children in their family (61.4%). 71.6% of the participants have less than five family members in their family.

Regarding the information of dengue, most of participants received information regarding dengue from health professionals (77.7%) and 85.6% of participants have no history of dengue. Only 29.2% of participants' houses flooded in the rainy season and more than half of participants had no standing water in the containers at home (81.4%). Majority of the participants use mosquito nets (58.0%) while 42.0% do not use mosquito nets to prevent mosquito bites while sleeping.

The mean score of dengue prevention behaviors among the participants was 58.28, ranged from 32 to 75 (*SD* = 11.06) which indicated as poor practice of dengue prevention behaviors. The mean score of participants age was 31.84 (*SD* = 6.17) with a minimum age was 18 years and a maximum age was 43 years. The actual education level ranged from 0 to 16 years with the mean score 11.94 (*SD* = 3.23). The actual score of knowledge regarding dengue ranged from 3 to 24 (possible score 0 to 24) and the mean score was 14.96 out of 24 which categorized as low-level knowledge regarding dengue (*SD* = 4.86). For the perceived susceptibility, the mean score was 15.62 (actual score: 10-21, *SD* = 1.94), which indicated as low perceived susceptibility. The overall score of perceived severity ranged from 6 to 24, with a mean score of 16.82 (*SD* = 2.89) which indicated low level of perceived severity. The perceived benefit of the participants ranged from 5 to 20 with a mean score of 15.16 (*SD* = 2.39) indicated as low perceived benefit. The overall score of perceived barriers of participants ranged from 6 to 21 and the mean was 12.94 (*SD* = 2.69) which indicated as high perceived barrier. The self-efficacy actual score ranged from 16 to 100 with the mean score was 81.41 (*SD* = 18.89), indicated relatively high self-efficacy.

The result of standard multiple regression analysis indicated that dengue prevention behaviors among mother of under five children was only predicted by

knowledge regarding dengue and self-efficacy. The regression model showed that all the variables could explain 7.2% in the variance of mothers of under five children (Adj R^2 = .072, $F_{(8, 254)}$ = 3.528, p < .001).

Discussion

1. Dengue prevention behaviors among mothers of children under five in Comoro Village, Dili Municipality, Timor Leste

From the result, the mean score of dengue prevention behaviors among mothers of under five children in Comoro village was 58.28, possible score 15 to 75, ranged from 32 to 75 (*SD* = 11.06) which indicated that mothers of under five children in Comoro Village had poor practice of dengue prevention behaviors. From the finding in this study, majority of participants rated low score in participate in any dengue infection campaign in their residential area, inadequate behavior of use of mosquito repellent in their house, inadequate behavior to check the presence of mosquito larvae in the water storage container in their house with the mean score were 2.72 (*SD* = 1.47), 3.61 (*SD* = 1.32) and 3.78 (*SD* = 1.20) respectively. However, majority of the participants rated high score to see the doctor if they experience signs and symptoms of dengue fever was 4.51 (*SD* = .97). This finding consistent with cross-sectional mixed method study from Nepal revealed that insufficient preventive practice in both highland and lowland communities of Nepal (Phuyal et al., 2022). Another similar findings from Malang, Indonesia has shown that only 3.2% of respondents had good level of prevention behavior, and 35.8% needed to improve their prevention behavior (Rakhmani et al., 2018). A prior community-based cross-sectional study was conducted in Malaysia mentioned that 50.2% participants reported poor practice for dengue control. This may be due to low knowledge of dengue as presented in this study (mean score was 14.96 out of 24, *SD* = 4.86). This findings aligns with Health Belief Model concept that knowledge of the disease can indirectly affect a person's perception of susceptibility, severity, benefits, and barriers health-related behaviors to perform prevention behaviors (Tarkang & Zotor, 2015; Glanz et al., 2008).

In this present study result, despite Dili Municipality being marked as a hotspot area of dengue, 85.6% respondents self-reported that they never had any history of dengue. Only 14.4.% of participants had been infected with dengue previously. This is a possible reason of poor dengue prevention behaviors of participants in this study. As mentioned in previous cross-sectional community-based study indicated those who had a history of dengue were more (OR = 1.4, $p < 0.001$) aware of the disease (Khan et al., 2022).

Moreover, most of the participants in this study were unemployed or housewives (75%). It shows that even though mothers stay at home, but practice of dengue prevention is still poor. This finding might be due to mothers of under five children were more likely to spend their time to taking care their under five children and many household chores to do during the day. Additionally, possible reason of different cultural background and tradition that very strong among Timorese people, such as cultural ceremony that occur very often in the community.

This findings aligns with a recent study from Sri Lanka, indicated participants who engaged in employment (aOR=1.68) were more likely to have adequate dengue prevention behaviors than non-employed individual (Rajapaksha et al., 2023). Regarding dengue prevention behaviors was poor in this study, might be due to working mothers more likely to participate in education and health campaigns at work and have more knowledge of dengue fever than unemployed mothers. If the mothers have adequate knowledge, they can perform good practice of dengue prevention (Selvarajoo et al., 2020).

Another plausible explanation that large number of the participants in this study (77.7%) indicated health personnel were the major source of information regarding dengue. This finding was inconsistent with previous studies that indicated television/radio was the most common source of dengue information. Hence, can be concluded that mass media can effectively communicate health information to general population because television is the most popular form of media for every socioeconomic class, whether literate or illiterate and every age group rather than only received health information from health personnel as source of information regarding dengue (Hossain et al., 2021; Harapan et al., 2018; Siddiqui et al., 2016).

Additionally, poor practices along with high density of population in Dili Capital and a suitable environment might be contribute to the greater risk of dengue transmission in Dili. From this study findings highlights requirement to prioritize dengue prevention and management on National health agendas, fostering stakeholder cooperation, incorporating population perspectives and designing sustainable dengue prevention and management programs in order to eradicate dengue outbreaks in endemic area.

2. Factors predicting dengue prevention behaviors among mothers of under five children in Comoro Village, Dili Municipality, Timor Leste

Results from standard multiple linear regression revealed that all the variables could explained 7.2% in the variance of mothers of under five children (Adj R^2 = .072, $F_{(8, 254)}$ = 3.528, p < .001). Additionally, correlation between variables showed that knowledge regarding dengue (r = .225, p < .01), perceived severity (r = .161, p < .01), perceived benefit (r = .191, p < .01) and self-efficacy (r = .211, p < .01) that showed statistically significant correlation with dengue prevention behaviors, except the age (r = .043, p > .05), education level (r = .065, p > .05), perceived susceptibility (r = -.072, p > .05) and perceived barriers (r = .007, p > .05) that showed no statistically significant correlation with dengue prevention behaviors. The results can be discussed as follows:

Age

The current result presented that age could not predict dengue prevention behaviors, which rejected the hypotheses of this study. additionally, age was not significantly correlated with dengue prevention behaviors (r = .043, p > .05).

As mentioned from literature review, in terms of health belief using HBM, age is a demographic characteristic that can affect an individual's beliefs and consequently have an indirect impact on health-related actions (Tarkang & Zotor, 2015). This study finding presented that the mean score of age was 31.84 (SD = 6.17) that was aligned with finding from a previous study in Sri Lanka that age group of 46 to 70 years' individuals (aOR=1.74) likely to have adequate dengue prevention behavior than the group of 18 to 45 years (Rajapaksha et al., 2023). This outcome also aligns with another study from Malang, Indonesia (Rakhmani et al., 2018) indicated

older respondents (> 60 years and 41–60 years) showed better dengue prevention behavior than younger respondents (21–40 years and < 21 years). The result of this study was not in accordance with previous study in Indonesia which promote dengue prevention through environmental control with 3 Do's (covering water storage, cleaning water storage, and recycling unused items) practices revealed that age was associated with covering water storage variable (Makrufardi et al., 2021).

It can be concluded that older people tend to perform better preventive practices than younger age (Siddiqui et al., 2016).

Education

The current result presented education could not predict dengue prevention behavior, which rejected the hypotheses of this study and was not significantly correlated with dengue prevention behavior (r = .065, p > .05) and it could not predict dengue prevention behavior.

This study revealed that the majority of participants education level from secondary high school and up. It showed that even mothers education level was high but dengue prevention still low. One possible explanation could be related to mother's health beliefs on dengue prevention practices (Siddiqui et al., 2016). As indicated in this study that mothers perceived susceptibility, perceived severity and perceived benefit were low and high perceived barrier were possible reason that they had poor dengue prevention behaviors.

According to Huff et al. 2014 stated individuals with a high educational level had more opportunities to learn about diseases and health care in many different ways than those with a low educational level. This study finding was inconsistent to another study which stated that educational status of respondents was associated with dengue prevention practices (Paudel et al., 2023; Chanyasanha et al., 2015;). Another similar study from Thailand also stated that highest level of education was the only significant factor regarding good dengue prevention practices in Thailand (Rahman et al., 2021).

This study suggested that the disease related subject can be included in the school (secondary school and university) curriculum. Therefore, students can start to learn about dengue disease and can influence their perceived threat to perform dengue

prevention behaviors, considering that Timor Leste as a tropical Country that reported high number of dengue cases.

Knowledge regarding dengue

In this current finding, knowledge regarding dengue could predict dengue prevention behaviors significantly (β = .149, p < .001), which means that mothers of under five children with good knowledge regarding dengue had higher scores of dengue prevention behaviors. Consistently, some prior studies also affirmed that knowledge regarding dengue as significant predictors (R^2 = 0.145, p < .01) of practices towards dengue fever (Rahman et al. 2022) and knowledge regarding dengue has significant positive correlations (r = .211, p < .01) with dengue prevention behaviors. Other studies also stated that knowledge of dengue was associated with practice towards dengue (Selvarajoo et al., 2020; Annan et al., 2022; Othman et al., 2019).

In terms of health belief Model, knowledge is one of the modifying factors (structural variables) in the Health Belief Model that can indirectly affect by influencing the perception of susceptibility, severity, benefit, and barrier health-related behaviors (Glanz et al., 2008).

This study finding presented the mean score of participants knowledge regarding dengue 14.96 out of possible score 24 (SD = 4.86) categorized as low-level knowledge regarding dengue., which means the participants had no adequate knowledge and it could be one possible reason for the low dengue prevention behaviors. In addition, some participants in this study had lack of knowledge about dengue typical symptoms, such as joint pain, headache, vomiting, stomach discomfort and diarrhea. One possible cause might be due to dengue typical symptoms might be easily confused with other common causes of fever, such as chikungunya (notified in Timor Leste, 2023) and influenza (Hossain et al., 2021).

Perceived susceptibility

The results of this study indicated that perceived susceptibility could not predict dengue prevention behaviors among mothers of under five children (β = -.080, p = .192) which rejected the hypotheses of this study and perceived susceptibility also was not correlated with dengue prevention behavior (r = -.072, p > .05). However, inconsistent finding revealed from a study in Karachi, Pakistan (Siddiqui et al., 2016)

conducted to different socioeconomic group assessed perceived susceptibility and perceived severity as a perceived threat showed that perceived threat significantly contributed as true predictors of dengue preventive practices ($p < .05$).

As mentioned in Health Belief Model, perceived susceptibility as one aspect that can impact individual's decisions to take action, such as the assumption that everyone will most likely contract dengue (Rosenstock et al., 1988; Lennon, 2005). In this current study, the mean score of perceived susceptibility was 15.62 out of possible score of 24 (SD = 1.94) which indicated low perceived susceptibility. This finding was similar to a previous study from China (Liu et al., 2021) that stated only one third of the participants (30.1%, 78/259) indicated the perceived susceptibility of dengue fever. This finding also aligns with a study from Malaysia (Chandren et al., 2015) indicated participants with lower perceived susceptibility (level of susceptibility 1–5) was less likely (OR = 0.54) to perform dengue prevention practices compared with those with the reference level of susceptibility (level 6–10). It inconsistent to another previous study finding from Malang, Indonesia (Rakhmani et al. 2018) indicated participants who had higher perceived susceptibility had better dengue prevention behaviors compared with those who had moderate perceptions ($p < .01$).

This could be majority of mothers are not aware of the dangers of dengue and have not experienced it for themselves or their family member (Chandren et al., 2015). We can conclude that mothers of under five children in this study will be more motivated to perform dengue prevention if they perceived that they are susceptible to dengue.

Perceived severity

The results of this study indicated that perceived severity could not predict dengue prevention behaviors among mothers of under five children ($\beta = .059$, $p = .832$) which rejected the hypotheses of this study, although perceived severity was correlated with dengue prevention behaviors ($r = .161$, $p = .009$). However, it was inconsistent to an experimental study from Taiwan, the study aims to understand the effectiveness of health education intervention (HEI) for Filipino migrant workers in Taiwan and explores the factors affecting preventive practices of mosquito borne diseases stated that perceived severity ($\beta = .24$, $p < .01$) was the factor that drove

migrant workers to adopt preventive practices (Tai & Yang, 2022). Similar study from Pakistan (Siddiqui et al., 2016) stated perceived severity (perceived threat) significantly contributed as true predictors of dengue preventive practices.

According to Health belief Model concept, people are more inclined to adopt preventive measures to keep themselves safe if they understand how serious the disease is (Rosenstock et al., 1988). Related to this study findings, the mean score of the participant's perceived severity was 16.82 out of possible score of 24 (*SD* = 2.89) which indicated low perceived severity.

A possible reason, in this study due to lack of dengue campaign in the community, may affect participants perceived severity of dengue and another possible reason about traditional beliefs among community has reduced people perceived susceptibility and severity to dengue fever (Liu et al., 2021).

Perceived benefit

The results of this study indicated that perceived benefit could not predict dengue prevention behaviors among mothers of under five children (β = .086, p = .229) which rejected the hypotheses of this study, however there was a correlation between perceived benefit and dengue prevention behaviors (r = .191, p < .01). The result of this study was not in accordance with a previous study from Saudi Arabia which stated that perceived benefit as a significant predictor preventive practices (AlSahafi et al., 2021).

Based on Health Belief Model, perceived benefit refers to individual's perception of the necessity or usefulness of preventative measures in reducing the risk of illness. The individual must feel that the chosen activity will lead to significant positive results. In this study finding has shown that the mean score of participants perceived benefit was 15.16 out of 20 (*SD* = 2.39) which indicated as low level of perceived benefit and can contribute to poor dengue prevention behaviors. Additionally, participants had poor practice of using mosquito repellent and inadequate behavior to check the presence of mosquito larvae in the water storage container in their house. The possible reason might be due to changed beliefs and low perceptions about dengue fever might have contributed to their lack of willingness to perform dengue prevention (Liu et al., 2021).

Perceived barrier

The current result presented that perceived barrier could not predict dengue prevention behaviors (β = .038, p = .549) which rejected the hypotheses of this study and was not significantly correlated with dengue prevention behaviors (r = .007, p > .05).

According to Rosenstock et al., (1988). & Lennon (2005) stated perceived barriers refer to any obstacles to adopting preventative behavior that may discourage adoption of that behavior. Beliefs about the costs (psychological or material) such as perceived not enough time to reduce mosquitoes breeding sites can limit a person to perform necessary preventive behaviors. The result of this study was not consistent with previous studies which stated that low perceived barriers to prevent dengue (score of 1–5) were more likely (OR = 2.06, 95%CI = 1.21–3.53, vs. score of 6–10, P = 0.008) to practice dengue prevention.

A possible explanation was that the participants' understanding of the dengue was poor, resulting in a high mean score of perceived barriers (M = 12.94) out of 24. The high mean score of perceived barriers lead to poor prevention control. As mentioned on Health belief Model, in situations where an individual views preventive behavior as more effective than barriers will lead to begin implementing preventive measures. Another possible reason might be due to environmental factors in this study that preventing an individual from practicing the desired behaviors such as densely populated area, bad waste management, lack of sufficient water supply can limit individuals' willingness to adopt dengue prevention practices (Siddiqui., 2016).

Self-efficacy

Self-efficacy was also the variable that could significantly predict dengue prevention behaviors (β = .147, p = .023). It implies that participants who had higher self-efficacy would perform frequently the dengue prevention behaviors. Additionally, there was correlation between self-efficacy and dengue prevention behaviors (r = .211, p < .01). Similar with previous studies, self-efficacy was found to be a significant predictor of dengue control measures (Annan et al., 2022; Siddiqui et al., 2016; Mashudi et al., 2022).

Bandura (1977) noted perceived self-efficacy influence a person's behavior. Additionally, Mashudi et al. (2022) also stated self-efficacy is the key important in the HBM that can encourage individual to perform prevention measures.

The concept of perceived self-efficacy refers to people's perception of their ability to plan and execute specific behaviors in various situations. "Self-efficacy" about people's ability that influence their behavior: expectations of personal efficacy determine whether coping behaviors will be initiated, how much effort will be expended, and how long they will be sustained despite obstacles (Tarkang & Zotor 2015). Mashudi et al. (2022) also stated self-efficacy is the key important in the HBM that can encourage individual to perform prevention measures.

According to Health Belief Model, an individual who feels susceptible to dengue and believes that contracting dengue may have severe health consequences will be actively seeking out information on dengue in order to prevent the disease. However, its effectiveness may determine by some factors such as time restrictions, risk perceptions and trust (Annan et al., 2022).

Implication of the finding

This study focusses on the dengue prevention behaviors and its predictors. The results showed that participants had poor dengue prevention behaviors, insufficient knowledge regarding dengue, low perceived susceptibility, perceived severity, perceived benefit, high perceived barrier and sufficient self-efficacy. Significantly, results from the study revealed that most of the mothers of under five children in Comoro, Dili Municipality do not perform better dengue prevention behaviors and it still can contribute to high morbidity and mortality of dengue cases especially for their children. Therefore, relevant interventions are urgently needed for mother of under five children to enhance their dengue prevention behaviors. The recommendations are as follows:

Nursing practice

The results of this study demonstrated that dengue prevention behaviors were poor among mothers of under five children in Comoro Village, Dili Municipality, Timor Leste. Additionally, mothers of under five children had low basic knowledge regarding dengue and low knowledge about typical symptoms of dengue,

low perceived susceptibility, perceived severity, perceived benefit and high barrier, low self-efficacy leads to poorer protective practices against dengue. Health care providers need to focus on increasing individuals' knowledge regarding dengue that can indirectly affect individual perception, to perform better dengue prevention behaviors and self-efficacy. Moreover, health care provider should be trained to provide proper counselling in order to promote dengue prevention practices among the population with high density where dengue dominates. Furthermore, continual teaching and monitoring should be done to achieve long-term behavioral changes for successful dengue prevention. Hence, they can seek immediate treatment to prevent unwarranted death caused by dengue.

Nursing research

From this study finding, the variables studied could explain only 7.2% in the variance of mothers of under five children in this study, which indicated that there are other factors that may predict dengue prevention behaviors. For further study, recommendations include a similar study should be conducted elsewhere in Timor Leste to corroborate these findings. Secondly, another research that focus on other variables to see other factors that may predict dengue prevention behaviors in Timor Leste. Thirdly, other tools need to be developed in Tetum version which may fit to Timor Leste context and lastly suggested intervention research should be conducted such as effective Health Education Programs, public health campaigns by local NGOs and the Ministry of Health should be carried out, particularly in densely populated areas (Hossain et al., 2021).

Strength and Limitations

This study documented dengue preventive practices at the household level among mothers as primary caregiver where dengue is growing concern. Hence, this study finding can be used as baseline data to health care planners for better planning specific health intervention strategies in the future. There are some limitations in this study such as despite HBM is a conceptual guiding framework for health behavior intervention, it has some limitations. For Instance, the HBM does not account for environmental factors that may prevent an individual from practicing the desired behaviors. For example, inadequate infrastructure, poor sanitation, and a poor water

supply may make it more difficult for a person to implement dengue preventative activities. Furthermore, the use of a self-reported questionnaire in this study may cause social desirability bias.

Conclusion

The study result revealed that knowledge regarding dengue and self-efficacy could predict dengue prevention behaviors significantly, while age education level, perceived susceptibility, perceived severity, perceived benefit and perceived barriers could not predict dengue prevention behaviors significantly. Based on the HBM, by influencing the perception of susceptibility, severity, benefits, and barriers health-related behaviors and self-efficacy could have improve dengue prevention behaviors. This study suggested improving knowledge regarding dengue, perceived susceptibility, perceived severity, perceived benefit and reducing perceived barriers and improve self-efficacy could improve the dengue prevention behaviors. The disparity in outcomes could be due to community type, dissimilarity in participants' background, differing Governments' education and awareness initiatives in dengue-endemic countries, as indicated by the level of knowledge and dengue prevention behaviors in community.

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APPENDICES

APPENDIX A

Questionnaires in English and Tetum

I. Demographic Data (English Version)

Please complete this survey form by tick (√) in the answer checkbox or fill in the answer in the space provided.

1. Age of the mother: …….
2. Number of children < 5 years of age…….
3. Educational status of the mother
   - □ Illiterate
   - □ Primary school
   - □ Junior high school
   - □ Secondary high school
   - □ Vocational school
   - □ University
4. Marital status
   - □ Single □ Married
   - □ Divorced □ Widowed
5. Occupation
   - □ Public servant/Government
   - □ Non-Government worker
   - □ House wife
   - □ Merchant
   - □ Other(specify)
6. Source of information regarding dengue
   - □ Health Professionals
   - □ T.V, Radio, Posters
   - □ Friends/neighbors/family
7. Family income……. $ /month
8. Number of family member…….
9. History of dengue (You and your family member)
   - □ Yes (If yes, Number of having dengue……. times)
   - □ No

10. Was your house flooded in the rainy season?

    □ Yes

    □ No

11. Do you have standing water in the containers at home?

    □ Yes

    □ No

12. Do you use mosquito nets to prevent mosquito bites while sleeping?

    □ Yes

    □ No

II. Knowledge Regarding Dengue

Please respond to the following questions by placing a circle in the answer box that corresponds to your response

No	Knowledge of symptoms	Yes	No	Do not Know
1	Is fever a symptom of dengue?	1	2	3
2	Is headache a symptom of dengue fever?	1	2	3
3	Is joint pain a symptom of dengue fever?	1	2	3
4	Is muscle pain a symptom of dengue fever?	1	2	3
5	Is pain behind the eyes a symptom of dengue fever?	1	2	3
6	Are nausea/vomiting symptoms of dengue fever?	1	2	3
7	Is rash a symptom of dengue fever?	1	2	3
8	Is diarrhoea common in dengue fever?	1	2	3
9	Is back pain common in dengue fever?	1	2	3
10	Is stomach pain common in dengue fever?	1	2	3
	Knowledge of transmission			
11.	Can all mosquitoes transmit dengue fever?	1	2	3
12.	Do the *Aedes* mosquitoes transmit dengue fever?	1	2	3
13.	Do flies transmit Dengue fever?	1	2	3
14.	Do ticks transmit Dengue fever?	1	2	3

No	Knowledge of symptoms	Yes	No	Do not Know
15.	Does ordinary person to person contact transmit Dengue fever?	1	2	3
16.	Is Dengue fever transmitted through food and water?	1	2	3
17.	Can dengue fever be transmitted by blood transfusion?	1	2	3
18.	When are the Dengue mosquitoes likely to feed/bite? 1 Night time 2 Day time 3 Both day and night 4 Morning 5 Evening 6 Anytime 7 Don't know			
19.	Mosquitoes breed in standing water	1	2	3
20.	Window screens and bed net reduce mosquitoes	1	2	3
21.	Insecticide sprays reduce mosquitoes and prevent Dengue	1	2	3
22.	Tightly covering water containers reduces mosquitoes	1	2	3
23	Removal of standing water can prevent mosquito breeding	1	2	3
24	Mosquito repellents prevent mosquitoes	1	2	3

Health Belief Model (HBM) Concept Regarding Dengue Questionnaire

III. Perceived Susceptibility

Please thick (√) on the appropriate scale according to the susceptibility to dengue infection that you feel.

No	Perceived Susceptibility	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4
1.	The chances of me and my children getting dengue fever are lower than other family				
2.	My children immune and my immune system is strong so we will not get dengue fever				
3.	The chances of me and my children getting dengue fever next year are low				
4.	I believe strong and healthy people will not get dengue infection				
5.	Everyone has a chance to get dengue infection				
6.	I was scared if my children and I got dengue fever				

NB: Four items in Perceived Susceptibility (1,2,3, and 4) have a reverse score four-point Likert scale coding ranging from strongly disagree (4) to strongly agree (1)

IV. Perceived Severity

Please thick (√) on the appropriate scale according to the Severity to dengue infection that you feel.

No	Perceived Severity	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4
1.	If left untreated, dengue fever will get worse				
2.	Dengue fever can worsen to become dengue hemorrhagic fever				
3.	Dengue fever is not easily treated				
4.	Dengue outbreaks can occur in a place if no prevention and control measures are taken				
5.	Secondary infection of dengue has more severity than the first infection				
6	Inappropriate treatment of dengue fever may cause complications				

V. Perceived Benefit

Please thick (√) on the appropriate scale according to the benefits you feel.

No	Perceived Benefit	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4
1.	I believe cleaning residential areas from containers that hold water, such as old tires and drains around the house, can prevent mosquitoes from breeding				
2.	I believe using mosquito repellent can prevent adult mosquito bites				
3.	I believe using mosquito nets can prevent mosquito bites while sleeping.				
4.	I believe fogging can kill adult mosquitoes				
5.	I believe the use of abate in the water can kill mosquito larvae.				

VI. Perceived Barrier

Please thick (√) on the appropriate scale according to the barrier you feel.

No	Perceived Barrier	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4
1.	Fogging is dangerous to health				
2.	Abate in the water is not good for health				
3.	I need a lot of money to implement dengue prevention at home				
4.	My family or I feel that fogging can stain the house. So, during fog, I don't like to open doors and windows				
5.	The fogging in the evening was disturbing as my family and I was asked to leave the house while we were worshipping or eating.				
6.	I have other reasons for not cooperating with dengue prevention activities				

VII. Behavioral Self-Efficacy

Strength of self-efficacy

Using a scale of 0-10 where 0-not at all confident and 10-extremely confident, please rate your confidence level to the following statements by circling the appropriate response.

1. I can change the water in plant pot trays every week.

0 1 2 3 4 5 6 7 8 9 10

Not at all Moderately Extremely

Confident Confident Confident

2. I can clean the drain to prevent blockage every 7 days

0 1 2 3 4 5 6 7 8 9 10

Not at all Moderately Extremely

Confident Confident Confident

3. I can always cover tightly all water containers inside and outside house

0 1 2 3 4 5 6 7 8 9 10

Not at all Moderately Extremely

Confident Confident Confident

4. I can convince my children to always put all garbage into closed bin

0 1 2 3 4 5 6 7 8 9 10

Not at all Moderately Extremely

Confident Confident Confident

5. I can go or bring my family member to see a doctor immediately when they fall sick

0 1 2 3 4 5 6 7 8 9 10

Not at all Moderately Extremely

Confident Confident Confident

6. I can change the water in the container under the fridge every week

0 1 2 3 4 5 6 7 8 9 10

Not at all Moderately Extremely

Confident Confident Confident

7. I can allow the health authority to fog and inspect my house at anytime

0 1 2 3 4 5 6 7 8 9 10

Not at all Moderately Extremely

Confident Confident Confident

8. I can work convince my neighbors to do a weekly search and destroy any potential aedes breeding sites outside the house

0 1 2 3 4 5 6 7 8 9 10

Not at all Moderately Extremely

Confident Confident Confident

9. I can always put larvicides in water containers inside my house

0 1 2 3 4 5 6 7 8 9 10

Not at all Moderately Extremely

Confident Confident Confident

10. I can always ensure my family sleeps under a mosquito net every day/night

0 1 2 3 4 5 6 7 8 9 10

Not at all Moderately Extremely

Confident Confident Confident

VIII. Dengue Preventive Practices

Dengue preventive practices (indoor and outdoor). Please thick (√) on the appropriate scale according to your practice.

No	Item	Never 1	Rarely 2	Sometimes 3	Often 4	Always 5
1	The water storage container or water tank in my house has a lid					
2	I immediately close the water storage container after using it.					
3	I checked the presence of mosquito larvae in the water storage container in my house.					
4	If there are mosquito larvae in the water storage container, I will throw the water in the water storage container					
5	I change the water in the base of the flower pot that is in my house.					
6	I checked the presence of mosquito larvae in the bottom of the flower pot.					
7	I check for waste/garbage that can block water flow around my house					

No	Item	Never 1	Rarely 2	Sometimes 3	Often 4	Always 5
8	If there is trash blocking the water flow, I will dispose of it					
9	I use mosquito repellent in my house					
10	I use a mosquito net when I sleep					
11	I participate in any dengue infection campaign in my residential area					
12	I checked the presence of mosquito larvae in the toilet tank in my house					
13	I clean the drain/gutters of my house in the rainy season					
14	I close the water reservoirs when I leave the house for a long Vacation					
15	If I experience signs and symptoms of dengue fever, I will immediately see a doctor.					

I. Dadus Demográfiku (Tetum Version)

Halo Favor kompleta formulário peskija ne'e ho marka vistu (√) iha kuadru resposta ka fo resposta iha espasu ne'ebe prepara ona.

1. Inan nia idade : ……
2. Númeru labarik menus husi tinan 5 mai kraik : ……
3. Inan nia nível Edukasaun
   - □ Analfabeto
   - □ Eskola Primária
   - □ Eskola Pre sekundária
   - □ Eskola Sekundária
   - □ Eskola Vokasional
   - □ Universidade
4. Estadu sivíl
   - □ Solteiru □ Casada
   - □ Divorsiadu □ Faluk
5. Servisu
   - □ Funsionáriu Públiku
   - □ Laos funsionariu Públiku/ Funsionáriu Estadu
   - □ Dona da Casa
   - □ Negosiante
   - □ Seluk (espesífiku)
6. Fontes informasaun kona ba Dengue
   - □ Pessoal Saúde
   - □ Televisaun, Rádio, Poster
   - □ Kolega/Vizinhos/família
7. Rendimentu familiar…….$/fulan
8. Númeru membru família iha uma kain : ……
9. Iha história antes ba Dengue (ita bo'ot no ita bot nia membru família)
   - □ Sim (Karik sim, dalahira hetan moras dengue…….)
   - □ Lae

10. Ita bo’ot nia hela fatin hetan inundasaun iha tempu udan?
    □ Sim
    □ Lae
11. Iha Ita bo’ot nia uma iha be’e nalihun husi tanki be’e nian ?
    □ Sim
    □ Lae
12. Ita bo’ot uza mosketeiru atu prevene susuk tata wainhira tempu toba?
    □ Sim
    □ Lae

II. Koñesimentu kona ba Dengue

Halo Favor responde perguntas tuir mai ne ho marka círculu iha kuadru resposta ne’ebe korresponde ho ita bot nia resposta.

No	**Koñesimentu ba sintomas dengue**	**Sim**	**Lae**	**La hatene**
1	Isin manas hanesan sintoma ida husi dengue?	1	2	3
2	Ulun moras hanesan sintoma ida husi dengue?	1	2	3
3	Isin sikun moras hanesan sintoma ida husi dengue?	1	2	3
4	Múskulu moras hanesan sintoma ida husi dengue?	1	2	3
5	Moras iha matan fuan kotuk hanesan sintomas ida husi dengue?	1	2	3
6	Laran sae/muta hanesan sintoma ida husi dengue?	1	2	3
7	Isin lolon mosu kafuak mean kikoan ka *rash* hanesan sintoma ida husi dengue?	1	2	3
8	Diarrhea comum iha moras dengue?	1	2	3
9	Kotuk laran moras hanesan sintoma ida husi dengue?	1	2	3
10	Stomak moras comum iha moras dengue?	1	2	3

No	Koñesimentu ba sintomas dengue	Sim	Lae	La hatene
11.	Susuk ho tipu hotu-hotu wainhira tata ema bele transmite moras dengue?	1	2	3
12.	Susuk *Aedes* bele transmite moras dengue?	1	2	3
13.	Lalar bele transmite moras dengue?	1	2	3
	Koñesimentu ba transmisaun dengue	**Sim**	**Lae**	**La hatene**
14.	Kutun oin-oin bele transmite moras dengue?	1	2	3
15.	Kontaktu ema ho ema bele transmite moras dengue?	1	2	3
16.	Dengue bele transmite liu husi hahan no be?	1	2	3
17.	Dengue bele transmite husi transfusaun ran?	1	2	3
18.	Iha Tempu ne'ebe susuk dengue tata ? 1. Tempu kalan 2. Tempu loron 3. Tempu loron no kalan 4. Kualker tempu 5. La hatene	1, 2, 3, 4, 5		
19.	Susuk bele tolun iha be nalihun	1	2	3
20.	Tau Rede ba janela no moskiteiru bele redus susuk	1	2	3
21	Aimoruk insecticida hodi rega susuk sei bele reduz susuk no prevene dengue	1	2	3
22.	Taka be'e nia fatin metin sei redus susuk	1	2	3
23	Hasai/hamo'os be'e nalihun bele prevene susuk tolun iha laran	1	2	3
24	Repelente ka *autan* ba susuk bele prevene susuk tata	1	2	3

Kuesionáriu Health Belief Model (HBM) kona ba Dengue

III. Persebidu/persepsaun Suscetibilidade

Halo Favor marka vistu (√) iha scalaun apropriadu tuir infeksaun dengue nia susceptibilidade ne'ebe ita bot sente

No	Persebidu suscetibilidade	La aseita Liu 1	La Aseita 2	Aseita 3	Aseita Liu 4
1.	Oportunidade ba ha'u no ha'u nia oan sira atu hetan moras dengue mínimu liu kompara ho familia seluk				
2.	Ha'u no ha'u nia oan sira nia Sistema imunidade forte no ami sei la hetan moras dengue				
3.	Oportunidade ba ha'u no ha'u nia oan sira hetan moras dengue iha tinan oin menus liu				
4.	Ha'u fiar ema forte no saudável sei la hetan moras infeksaun dengue				
5.	Ema hotu iha oportunidade bele hetan infeksaun virus dengue				
6.	Ha'u sente tauk se wainhira ha'u no ha'u nia oan hetan moras dengue				

NB: Iha item 4 husi Persebidu suscetibilidade (1,2,3, and 4) iha skor reversa.

IV. Persebidu/persepsaun Severidade

Halo Favor marka vistu (√) iha scalaun apropriadu tuir infeksaun dengue nia severidade (grave) ne'ebe ita bot sente.

No	Persebidu Severidade	La Aseita Liu 1	La aseita 2	Aseita 3	Aseita Liu 4
1.	Se wainhira ha'u la halo tratamentu ba moras dengue, sei grave liu tan.				
2.	Dengue sei grave liu tan no bele hamosu dengue hemorrhagic (*demam berdarah dengue)*				
3.	Dengue la fasil atu trata				
4.	Surtu dengue bele akontese iha fatin nebe laiha prevensaun no kontrolu ba dengue				
5.	Infeksaun sekundária ba dengue (infeksaun dengue ba dala rua) sei grave liu tan kompara ho infeksaun dengue primeiru				
6.	Tratamentu ne'ebe la apropriadu ba dengue sei hamosu komplikasaun husi dengue ne'e rasik				

V. Persebidu/persepsaun benefísiu

Halo Favor marka vistu (√) iha scalaun apropriadu tuir aksaun benefisiu ne'ebe ita bot sente.

No	**Persebidu Benefísiu**	**La Aseita Liu** 1	**La aseita** 2	**Aseita** 3	**Aseita Liu** 4
1.	Ha'u fiar bainhira ha'u hamos ha'u nia hela fatin, hamós continer ka fatin ne'ebe bele akumula be'e iha laran hanesan píneu ka roda aat, valeta iha uma sor-sorin, bele prevene susuk hodi tolun iha neba.				
2.	Ha'u fiar uza repelente susuk/autan bele prevene husi susuk tata				
3.	Ha'u fiar uza moskiteiru bele prevene susuk tata wainhira toba				
4.	Ha'u fiar rega susuk (fogging husi parte Governo) bele oho susuk adultu				
5.	Ha'u fiar uza abate iha be'e laran bele oho larva susuk.				

VI. Persebidu/persepsaun Bareira

Halo Favor marka vistu (√) iha scalaun apropriadu tuir bareira aksaun ne'ebe ita bot sente.

No	**Persebidu Barreira**	**La Aseita Liu** 1	**La aseita** 2	**Aseita** 3	**Aseita Liu** 4
1.	Fogging ka rega aimoruk susuk bele fo perigu ba saúde				
2.	Abate ne'ebe tau iha be laran fo impaktu ladiak ba saúde				
3.	Ha'u presija osan ne'ebe ho montante bo'ot hodi implementa prevensaun ba dengue iha ha'u nia uma.				
4.	Ha'u no ha'u nia familia sente katak fogging ka rega susuk bele halo foer ka *noda* iha ha'u nia uma. Ne'e duni, wainhira husi parte Governo mai ha'u nia uma hodi rega susuk, ha'u la gosta atu loke odamatan ka janela.				
5.	Fogging ka rega susuk iha tempu kalan fo disturbu ba ha'u no ha'u nia familia.				
6.	Ha'u iha razaun seluk atu lakohi koopera ho atividade prevensaun ba moras dengue.				

VII. Hahalok efikásiu an rasik

Forsa husi efikásiu an rasik

Uza scalaun husi 0-10 nebe signifika 0- laiha fiar-an no 10- fiar-an tebes. Favór avalia ita nia nível fiar-an tuir statement hodi marka sírkulu iha resposta ne'ebe apropriadu.

1. **Ha'u bele troka be iha vazu aifunan/kualker plantasaun kada semana.**

0 1 2 3 4 5 6 7 8 9 10

La Fiar-an Fiar-an Fiar-an tebes Tebes Moderadu

2. **Ha'u bele hamoos valeta atu prevene intupidu kada loron hitu.**

0 1 2 3 4 5 6 7 8 9 10

La Fiar-an Fiar-an Fiar-an tebes Tebes Moderadu

3. **Ha'u sempre bele taka metin be'e nia fatin hotu-hotu iha uma laran no uma liur.**

0 1 2 3 4 5 6 7 8 9 10

La Fiar-an Fiar-an Fiar-an tebes Tebes Moderadu

4. **Ha'u bele konvense ha'u nia oan sira atu sempre soe lixu iha lixu fatin ne'ebe taka ho nia matan.**

0 1 2 3 4 5 6 7 8 9 10

La Fiar-an Fiar-an Fiar-an tebes Tebes Moderadu

5. **Ha'u bele ba ka lori ha'u nia membru família atu konsulta doutor immediata wainhira sira moras.**

0 1 2 3 4 5 6 7 8 9 10

La Fiar-an Fiar-an Fiar-an tebes Tebes Moderadu

6. Ha’u bele troka be’e continer iha geleira (freezer) okos kada semana.

0 1 2 3 4 5 6 7 8 9 10

La Fiar-an Fiar-an Fiar-an tebes

Tebes Moderadu

7. Ha’u bele autoriza pessoal saúde nebe atu mai rega susuk no halo inspeksaun iha ha’u nia uma iha tempu saida deit.

0 1 2 3 4 5 6 7 8 9 10

La Fiar-an Fiar-an Fiar-an tebes

Tebes Moderadu

8. Ha’u bele Konvense ha’u nia vizinhos atu buka tuir no destroi fatin ne’ebe iha potensial hodi fo fatin ba susuk tolun iha sira nia uma liur.

0 1 2 3 4 5 6 7 8 9 10

La Fiar-an Fiar-an Fiar-an tebes

Tebes Moderadu

9. Ha’u sempre bele tau larvacida/abate iha tanke be’e iha ha’u nia uma laran.

0 1 2 3 4 5 6 7 8 9 10

La Fiar-an Fiar-an Fiar-an tebes

Tebes Moderadu

10. Ha’u sempre bele garante katak ha’u nia familia toba iha moskiteiru okos iha tempu loron no kalan.

0 1 2 3 4 5 6 7 8 9 10

La Fiar-an Fiar-an Fiar-an tebes

Tebes Moderadu

VIII. Prátika Prevensaun Dengue

Prátika prevensaun ba dengue (Iha uma laran no liur). Halo Favór marka vistu (√) iha scalaun apropriadu tuir Itabot nia Prátika.

No	Item	Nunka 1	Ladun 2	Dalaruma 3	Frequentemente 4	Sempre 5
1	Be'e fatin no be'e continer hotu iha ha'u nia uma iha nia matan hodi taka					
2	Ha'u taka imediatamente be'e fatin ka continer be'e nian wainhira depois de uza.					
3	Ha'u cek ka observa prejensa susuk nia larva iha be fatin no continer be'e nian iha ha'u nia uma.					
4	Se karik iha larva susuk iha ha'u nia be'e fatin ka container be'e nian, ha'u sei fakar sai be'e ne'ebe iha laran.					
5	Ha'u troka be'e iha vazu aifunan nian iha ha'u nia uma					
6	Ha'u cek/observa presensa larva susuk iha vazu aifunan.					
7	Ha'u cek/observa lixu no be'e foer ne'ebe bele intupidu iha ha'u nia uma sor-sorin.					

No	Item	Nunka 1	Ladun 2	Dalaruma 3	Frequentemente 4	Sempre 5
8	Se karik iha lixu ne'ebe intupidu iha valeta, ha'u sei hamo'os					
9	Ha'u uza repelente susuk iha ha'u nia uma					
10	Ha'u uza moskiteiru wainhira toba					
11	Ha'u partisipa kampanha kona ba dengue iha ha'u nia area/suku					
12	Ha'u cek/observa prejensa larva susuk nian iha tanke toilet iha ha'u nia uma					
13	Ha'u hamo'os valeta ka be'e nalihun iha uma sor-sorin durante tempu udan					
14	Ha'u taka tanki be'e nian wainhira ha'u sei husik ha'u nia uma iha tempu naruk					
15	Sekarik ha'u hetan sinál no sintomas ba moras dengue, ha'u sei ba hasoru doutor immediata.					

APPENDIX B

Additional information about dengue prevention behaviors

Table showing frequency of each score in each items of Dengue prevention behaviors

Statistics						
		DPB 1	**DPB 2**	**DPB 3**	**DPB 4**	**DPB 5**
N	Valid	264	264	264	264	264
	Missing	0	0	0	0	0
Mean		4.06	4.11	3.78	4.08	3.95
Std. Deviation		1.127	1.091	1.202	1.114	1.093
Minimum		1	1	1	1	1
Maximum		5	5	5	5	5

Statistics						
		DPB 6	**DPB 7**	**DPB 8**	**DPB 9**	**DPB 10**
N	Valid	264	264	264	264	264
	Missing	0	0	0	0	0
Mean		3.79	4.09	4.13	3.61	3.38
Std. Deviation		1.180	1.052	1.090	1.323	1.521
Minimum		1	1	1	1	1
Maximum		5	5	5	5	5

Statistics						
		DPB 11	**DPB 12**	**DPB 13**	**DPB 14**	**DPB 15**
N	Valid	264	264	264	264	264
	Missing	0	0	0	0	0
Mean		2.72	3.84	4.12	4.12	4.51
Std. Deviation		1.471	1.231	1.096	1.218	.979
Minimum		1	1	1	1	1
Maximum		5	5	5	5	5

DPB 1 (The water storage container or water tank in my house has a lid)			
		Frequency	Percent
Valid	Never	5	1.9
	Rarely	16	6.1
	Sometimes	82	31.1
	Often	17	6.4
	Always	144	54.5
	Total	264	100.0

DPB 2 (I immediately close the water storage container after using it)			
		Frequency	Percent
Valid	Never	3	1.1
	Rarely	18	6.8
	Sometimes	72	27.3
	Often	26	9.8
	Always	145	54.9
	Total	264	100.0

DPB 3 (I checked the presence of mosquito larvae in the water storage container in my house)			
		Frequency	Percent
Valid	Never	12	4.5
	Rarely	24	9.1
	Sometimes	82	31.1
	Often	39	14.8
	Always	107	40.5
	Total	264	100.0

DPB 4 (If there are mosquito larvae in the water storage container, I will throw the water in the water storage container			
		Frequency	Percent
Valid	Never	7	2.7
	Rarely	10	3.8
	Sometimes	82	31.1
	Often	22	8.3
	Always	143	54.2
	Total	264	100.0

DPB 5 (I change the water in the base of the flower pot that is in my house)			
		Frequency	Percent
Valid	Never	6	2.3
	Rarely	14	5.3
	Sometimes	86	32.6
	Often	39	14.8
	Always	119	45.1
	Total	264	100.0

DPB 6 (I checked the presence of mosquito larvae in the bottom of the flower pot)			
		Frequency	Percent
Valid	Never	15	5.7
	Rarely	14	5.3
	Sometimes	85	32.2
	Often	48	18.2
	Always	102	38.6
	Total	264	100.0

DPB 7 (I check for waste/garbage that can block water flow around my house)			
		Frequency	Percent
Valid	Never	2	.8
	Rarely	15	5.7
	Sometimes	78	29.5
	Often	32	12.1
	Always	137	51.9
	Total	264	100.0

DPB 8 (If there is trash blocking the water flow, I will dispose of it)			
		Frequency	Percent
Valid	Never	5	1.9
	Rarely	15	5.7
	Sometimes	66	25.0
	Often	32	12.1
	Always	146	55.3
	Total	264	100.0

DPB 9 (I use mosquito repellent in my house)			
		Frequency	Percent
Valid	Never	19	7.2
	Rarely	38	14.4
	Sometimes	73	27.7
	Often	30	11.4
	Always	104	39.4
	Total	264	100.0

DPB 10 (I use a mosquito net when I sleep)			
		Frequency	Percent
Valid	Never	39	14.7
	Rarely	83	31.6
	Sometimes	49	18.6
	Often	43	16.2
	Always	50	18.9
	Total	264	100.0

DPB 11 (I participate in any dengue infection campaign in my residential area)			
		Frequency	Percent
Valid	Never	77	29.2
	Rarely	47	17.8
	Sometimes	67	25.4
	Often	19	7.2
	Always	54	20.5
	Total	264	100.0

DPB 12 (I checked the presence of mosquito larvae in the toilet tank in my house)			
		Frequency	Percent
Valid	Never	12	4.5
	Rarely	28	10.6
	Sometimes	67	25.4
	Often	39	14.8
	Always	118	44.7
	Total	264	100.0

DPB 13 (I clean the drain/gutters of my house in the rainy season)			
		Frequency	Percent
Valid	Never	3	1.1
	Rarely	22	8.3
	Sometimes	60	22.7
	Often	34	12.9
	Always	145	54.9
	Total	264	100.0

DPB 14 (I close the water reservoirs when I leave the house for a long Vacation)			
		Frequency	Percent
Valid	Never	11	4.2
	Rarely	24	9.1
	Sometimes	43	16.3
	Often	30	11.4
	Always	156	59.1
	Total	264	100.0

DPB 15 (If I experience signs and symptoms of dengue fever, I will immediately see a doctor)			
		Frequency	Percent
Valid	Never	7	2.7
	Rarely	7	2.7
	Sometimes	30	11.4
	Often	20	7.6
	Always	200	75.8
	Total	264	100.0

APPENDIX C

Permission Letters

Permission letter to use Knowledge regarding dengue questionnaire

From : Dr. Meghnath Dhimal (meghdhimal@gmail.com)

Monday 10/07/2023 07:57 Am

To: Eleonora fernandes Almeida

Dear Eleonora,

Thank you so much for your email and you are granted to use tools used in my study.

With best regards,

Meghnath

Meghnath Dhimal, PhD

Chief/Senior Research Officer

Nepal Health Research Council (NHRC)

Government of Nepal

Ministry of Health Complex

Ramshah Path, Kathmandu, Nepal

Phone No. 00977-14254220

Fax No. 00977-14262469

Website: www.nhrc.gov.np

Alumnus, Global Young Academy (https://globalyoungacademy.net/meghnath-dhimal/)

Associate Academician, Nepal Academy of Science and Technology (NAST)

Associate Editor, BMC Public Health, Frontiers in Tropical Diseases

Editor, PLOS Global Public Health

Publication links

https://scholar.google.com/citations?user=iD4CQUgAAAAJ&hl=en

https://www.researchgate.net/profile/Meghnath_Dhimal2

http://www.ncbi.nlm.nih.gov/pubmed/?term=Dhimal+M

Permission letter to use Health Belief Model questionnaire (Perceived Susceptibility, perceived severity, perceived benefit, perceived barrier) and Dengue prevention behaviors

From : Dr. Noraini Abdul Ghafar (norainiag@usm.my)

Monday 10/07/2023 10:13 Am

To: Eleonora fernandes Almeida

Hi Eleonora,

First of all, thank you very much for recognizing my work. Yes, you may use the items/questions in the questionnaire. Please cite the article later in your writing.

Regards,
Dr Noraini

From : Dr. Norliza Ahmad (lizaahmad@upm.edu.my)
Thursday, 20/07/2023 08:30 Am

To : Eleonora Fernandes Almeida

Dear Ms Eleonara,

Thank you for your email and interest in our study. It is our pleasure; you can use the questionnaire. However, please cite our article in your thesis and publication.

Dr. Dina can assist you with the questionnaire. Her email is dinanurfarahin@gmail.com.

Dear Dr Dina,

Please assist Ms Eleonara.

Thank you and have a nice day,

Sincerely,

"MALAYSIA MADANI"
"BERKHIDMAT UNTUK NEGARA"
"BERILMU BERBAKTI"

Yang menjalankan amanah,
Dr Norliza Ahmad

MMC Reg No: 30480
MD (USM), MPH (UKM), PhD (UPM)
Head of Department,
Medical Lecturer and Public Health Physician,
Department of Community Health,
Faculty of Medicine and Health Science,
Universiti Putra Malaysia,
43400 Serdang, Selangor
Tel: 03-89472582
Fax: 03-89450151

Permission letter to use Self-efficacy questionnaire

From : Professor Affendi Isa (affendi.isa@moh.gov.my)

Monday, 18/09/2023 06:42 Am

To : Eleonora Fernandes Almeida

Hi Eleonora,

It's glad that you chose to apply my tools in your study. I agree to give permission to you to use it. Please give me some credits in your writing.

Thanks,

Affendi

APPENDIX D

Participant’s information sheet and consent form

PARTICIPANT INFORMATION SHEET

Research protocol Code: **……**

Research Title: Factors predicting Dengue prevention behaviors among mothers of under five children in Comoro Village, Dili – Timor Leste.

Dear Participants

I am Eleonora Fernandes Almeida, a Master student at the Faculty of Nursing, Burapha University, would like to invite you to participate in a research project, entitled "Factors predicting Dengue prevention behaviors among mothers of under five children in Comoro Village, Dili – Timor Leste".

Before agreeing to participate in this project, the details of the projects are as follows:

The objectives of the study are to describe the dengue prevention behaviors among mothers of under five children in and to examine factors predicting dengue prevention behaviors among mothers of under five children in Comoro village.

The participation in this study is voluntary. If you agree to participate in this study, you will answer the questionnaires, which will take approximately 15-20 minutes. During the data collection period the researcher will clarify any question posed by the participants for clarity regarding the language or content. You will not get any direct benefit by participating in this study. However, the information collected from this study can further identify factors predicting Dengue prevention behaviors among mothers of under five children in Comoro Village to inform the nurses and other health care providers to develop Intervention program and management plans which will be crucial in reducing morbidity and mortality of dengue especially in Children. There will be no identified physical and psychological risk to the person participating in this study and no risk to the society.

You have the right to end your participation in this study at any time and no necessary to inform the researcher and it will not affect the quality of health services for you. Any information collected in this study including your identity will be kept confidential. A coding number will be assigned to you and your name will not be used. Findings from the study will presented as a group of participants and no specific information from any individual will be disclosed. All the data will be accessible only to the researcher which will be destroyed completely one year after publishing the findings. You will receive a further explanation of the nature of the study upon its completion, if you wish.

The research will be conducted by Mrs. Eleonora Fernandes Almeida under supervision of my major-advisor Assoc. Prof. Dr. Chintana Wacharasin. If you have any question, please contact me at mobile number +670 74189986 or by email fernandeseleonora43@gmail.com or you my advisor's email address chintana@buu.ac.th.

If the researchers do not follow the research protocol as stated in the participant information sheet, please contact Burapha University Institutional Review Board Office, Burapha University (Division of research and Innovation), Tel. 038-102 620.

Your cooperation in this research is highly appreciated. You will be given a copy of this consent form to keep.

Eleonora Fernandes Almeida

Researcher

CONSENT FORM

Research Code: ……

Research Title: Factors Predicting Dengue Prevention Behaviors Among Mothers of Under Five Children in Comoro Village, Dili Timor Leste

Date ……..…... Month ……..…… Year …….

Before signing the consent form for this research participation, I was provided the information about the purposes and the processes of the research in the participant information sheet, which the researcher has given to me. I have fully understood the preceding explanation and the researcher has undertaken to answer my questions willingly and without concealment to my satisfaction.

I voluntarily agree to participate in this research project. I understand I can withdraw from the research project at any time without giving a reason, without it affecting any benefits that I am entitled to.

I have been given the explicit guarantees that my information and identity will be kept confidential and will be shared only in the summary of research results. Disclosure of my information to the relevant authorities requires my permission.

I have read and fully understood the above statements in all respects and have signed this consent document willingly.

In the case that I cannot read or write, the researcher has read the statement in the consent form to me until I fully understand it well. Therefore, I willingly signed or stamped my thumb on this consent form.

Participant's signature

(…….)

Researcher's signature

(…….)

Note: If the participant gave thumbprint as their consent, witness signature will be needed.

FOLHA INFORMASAUN PARTISIPANTE

Kódigu peskiza: …….

Títulu peskiza: Fatór Sira nebe'e fo predisaun ba Prátika Prevensaun dengue ba inan sira ho oan nebe'e idade tinan lima mai kraik iha Comoro, Dili Timor Leste

Querido/a Maluk Partisipante

Hau nia naran Eleonora Fernandes Almeida, nu'udar estudante Nível Mestradu ida husi Faculdade Enfermagem, Universidade Burapha, hakarak konvida ita bo'ot atu partisipa iha projetu peskiza ho nia títulu "Fatór Sira nebe'e fo predisaun ba Prátika Prevensaun dengue ba inan sira ho oan nebe'e idade tinan lima mai kraik iha Comoro, Dili Timor Leste ".

Molok konkorda hodi hola parte iha estudo ida ne'e, informasaun detailhu peskiza nian mak hanesan tuir mai ne'e :

Objectivu estudu nian mak deskreve prátika prevensaun dengue ba inan sira ne'ebe ho oan husi tinan lima mai kraik no ezamina fatór sira ne'ebe fo predisaun prátika prevensaun dengue ba inan sira ne'ebe ho oan husi tinan lima ba kraik iha Suku Comoro, Dili Timor Leste. Partisipasaun iha estudu ida ne'e ho voluntariamente. Wainhira ita bo'ot konkorda hodi partisipa iha estudu ida ne'e, ita bo'ot sei hatan/responde pergunta hirak tuir mai ne'e sei lori tempu mais ou menus minutu 15-20. Durante períodu ba ba koleksaun dadus, peskizador sei klarifika pergunta saida deit mak koloka husi pertisipante relasiona ho língua ka kontextu. Ita bo'ot sei la hetan benefísiu direita ka imediata husi estudo ne'e. Maibe, informasaun ne'ebe kolekta husi estudu ne'e sei identifika fatór sira ne'ebe fo predisaun prátika prevensaun dengue nian ba inan sira ho oan tinan lima mai kraik iha suku Comoro atu tulun enfermeiru sira no professionais saúde sira seluk hodi dezemvolve programa intervensaun no planu jestaun nian ne'ebe importante tebes hodi redus kazu morbilidade no mortalidade husi dengue liu-liu ba labarik sira.

Husi peskiza da ne'e sei la fo risku físiku no psikolójiku iha partisipasaun ba estudu ida ne'e no laiha mos risku ba sosiedade. Ita bo'ot iha direitu atu la kontinua

ita bo'ot nia partisipasaun iha estudo ida ne'e iha tempu saida deit no la nesesáriu atu informa ba peskizador no ida ne'e sei la afeta ba kualidade asistensia saude nian ba ita bo'ot.

Informasaun balun rekolha iha estudu ne'e inklui ita bo'ot nia identidade sei rai konfidensial ka segredu. Númeru Kódigu ne'ebe fo ba ita bo'ot no ita bo'ot nia naran sei la uza iha futuru mai. Rezultadu husi estudu ne'e sei apresenta nudar grupo ba partisipante sira no laiha informasaun espesífika husi kualker individu ne'ebe sei fo sai. Dadus sira ne'e hotu sei hetan asesu husi peskizador nebe'e sei destroi hotu iha tinan ida depois halo publikasaun ba rezultadu peskiza ne. Ita bo'ot sei simu informasaun kona ba natureza estudu nian hafoin remata estudu ne'e, se ita bo'ot hakarak.

Peskiza ida ne'e sei halao husi Sra. Eleonora Fernandes Almeida iha supervisaun husi hau nia principal orientadora Assoc. Prof. Dr. Chintana Wacharasin. Se karik ita bo'ot iha dúvida, halo favor bele kontaktu hau husi hau nia númeru telemovel +670 74189986 ka liu husi hau nia email fernandeseleonora43@gmail.com ou hau nia principal orientador nia email chintana@buu.ac.th. Se karik peskizador la halo tuir protokolu peskiza nian hanesan mentiona ona iha folha informasaun partisipante, halo favor bele kontaktu Eskritóriu Institusional konselhu de Revisaun, Universidade Burapha (Divisaun peskiza no inovasaun), Tel. 038-102 620. Ami Agradese no apresia tebes Ita bo'ot sira kooperasaun no kolaborasaun iha peskiza ida ne'e. Ami sei fo kopia ida ba formualiu konsentimentu ne ba Ita bo'ot atu rai.

Eleonora Fernandes Almeida

Peskizadora

FORMULÁRIU KONSENTIMENTU

Kódigu peskiza: …….

Títulu peskiza: Fatór Sira nebe'e fo predisaun ba Prátika Prevensaun dengue ba inan sira ho oan nebe'e idade tinan lima mai kraik iha Comoro, Dili Timor Leste

Data…….Fulan……Tinan……

Molok asina formuláriu konsentimentu/autorizasaun ba partisipasaun peskiza ida ne'e, hau hetan ona informasaun kona ba objectivo no prosesu sira husi peskiza nian iha ficha/folha husi informasaun partisipante nian nebe'e peskizador fo ona mai hau. Hau komprende tebes esplikasaun no informasaun nebe hau hetan ona husi peskizador no peskizador kumpri ho vontade hodi hatan hau nia perguntas sira no lataka hau nia satisfasaun.

Hau konkorda ho voluntariamente hodi partisipa iha projetu peskiza ida ne'e. Hau komprende katak hau bele deziste husi projetu peskiza ida ne'e iha momentu saida deit seim fo razaun ruma no ida ne'e sei la afeita ba benefisiu saida deit mak pertense mai hau, nudar hau nia direitu.

Hau hetan garantia eksplisita katak hau nia informasaun no identidade sei rai konfidensial/segredu no sei partilha deit iha rezumu husi rezultadu peskiza nian. Statementu/divulgasaun ba informasaun hirak ne'e ba deit autoridade relevante sira ne'ebe hetan hau nia permissaun. Hau le'e no komprende hotu deklarasaun hirak iha leten ba aspetu hot-hotu no hau asina formuláriu konsentimentu ida ne'e ho vontade . Wainhira hau labele konsege le ou hakerek, peskizador le deklarasaun iha formuláriu konsentimentu nian mai hau to'o hau bele komprende hotu. Tamba ne'e, hau ho vontade asina ka marka karimbu liman fuan bo'ot iha formuláriu konsentimentu ne'e.

Assinatura husi participante

(…….)

Asinatura husi peskizador

(…….)

Nota: se karik partisipante fo marka liman fuan ba formatu autorizasaun ne’e, sei presija testemunha nia asinatura.

APPENDIX E

Ethical approval letter and data collection letter

สำเนา

ที่ IRB3-122/2566

เอกสารรับรองผลการพิจารณาจริยธรรมการวิจัยในมนุษย์

มหาวิทยาลัยบูรพา

คณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ มหาวิทยาลัยบูรพา ได้พิจารณาโครงการวิจัย

รหัสโครงการวิจัย : G-HS104/2566

โครงการวิจัยเรื่อง : Factors predicting dengue prevention behaviors among mothers of under five children in Comoro Village, Dili Timor Leste

หัวหน้าโครงการวิจัย : MRS.ELEONORA FERNANDES ALMEIDA

หน่วยงานที่สังกัด : คณะพยาบาลศาสตร์

อาจารย์ที่ปรึกษาโครงการหลัก (สารนิพนธ์/ งานนิพนธ์/ วิทยานิพนธ์/ ดุษฎีนิพนธ์) : รองศาสตราจารย์ ดร.จินตนา วัชรสินธุ์

หน่วยงานที่สังกัด : คณะพยาบาลศาสตร์

วิธีพิจารณา : ☑ Exemption Determination ☐ Expedited Reviews ☐ Full Board

BUU Ethics Committee for Human Research has considered the following research protocol according to the ethical principles of human research in which the researchers respect human's right and honor, do not violate right and safety, and do no harms to the research participants.

Therefore, the research protocol is approved (See attached)

1. Form of Human Research Protocol Submission Version 1: 19 October 2023
2. Research Protocol Version 1: 19 October 2023
3. Participant Information Sheet Version 2: 18 October 2023
4. Informed Consent Form Version 2: 18 October 2023
5. Research Instruments Version 1: 19 October 2023
6. Others (if any) Version -: -

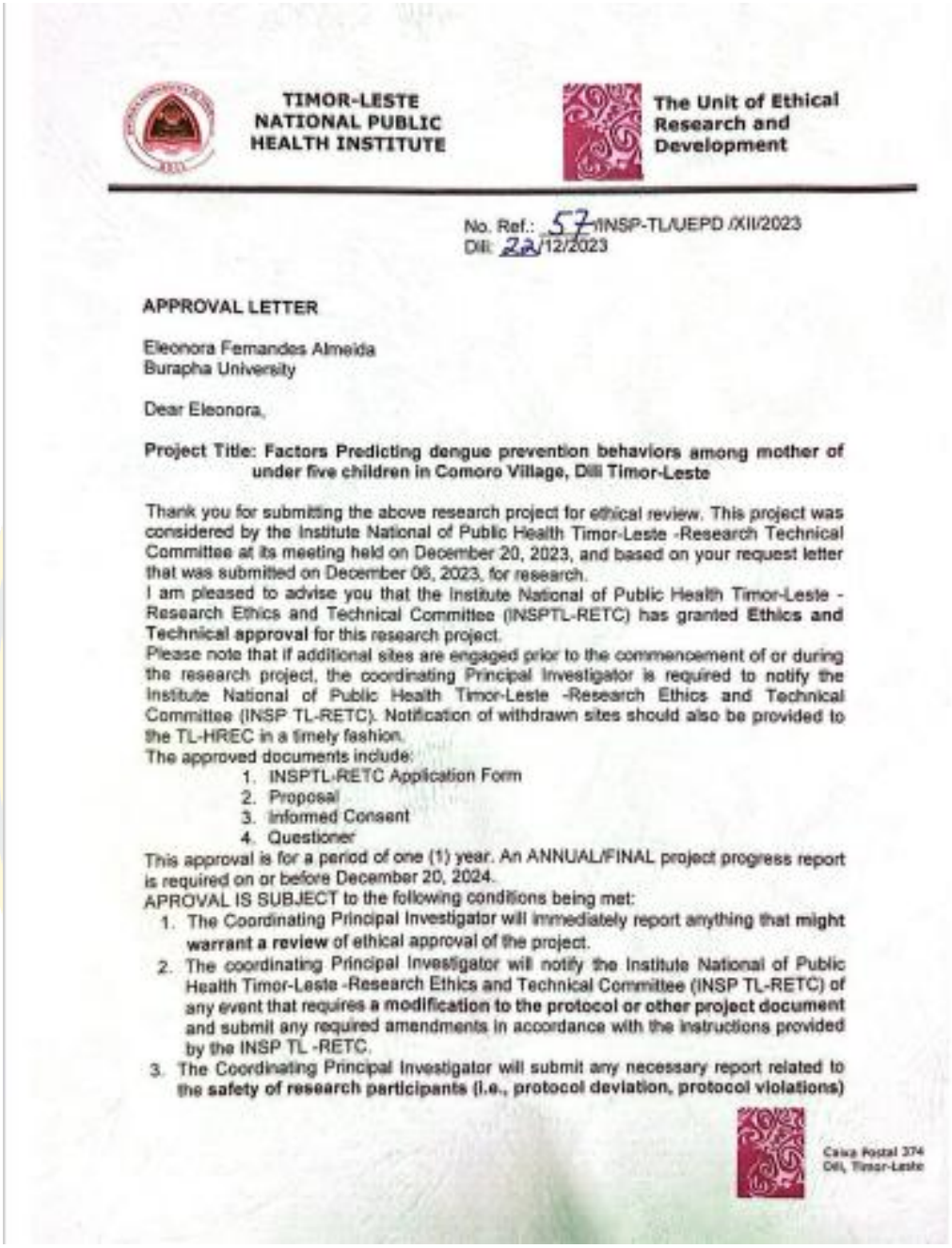
วันที่รับรอง : วันที่ 29 เดือน พฤศจิกายน พ.ศ. 2566

วันที่หมดอายุ : วันที่ 29 เดือน พฤศจิกายน พ.ศ. 2567

ลงนาม *ผู้ช่วยศาสตราจารย์ แพทย์หญิงรมร แย้มประทุม*

(ผู้ช่วยศาสตราจารย์ แพทย์หญิงรมร แย้มประทุม)

ประธานคณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ มหาวิทยาลัยบูรพา



TIMOR-LESTE
NATIONAL PUBLIC
HEALTH INSTITUTE

The Unit of Ethical
Research and
Development

No. Ref.: 57/INSP-TL/UEPD /XII/2023
Dili: 22/12/2023

APPROVAL LETTER

Eleonora Fernandes Almeida
Burapha University

Dear Eleonora,

Project Title: Factors Predicting dengue prevention behaviors among mother of under five children in Comoro Village, Dili Timor-Leste

Thank you for submitting the above research project for ethical review. This project was considered by the Institute National of Public Health Timor-Leste -Research Technical Committee at its meeting held on December 20, 2023, and based on your request letter that was submitted on December 06, 2023, for research.
I am pleased to advise you that the Institute National of Public Health Timor-Leste - Research Ethics and Technical Committee (INSPTL-RETC) has granted **Ethics and Technical approval** for this research project.
Please note that if additional sites are engaged prior to the commencement of or during the research project, the coordinating Principal Investigator is required to notify the Institute National of Public Health Timor-Leste -Research Ethics and Technical Committee (INSP TL-RETC). Notification of withdrawn sites should also be provided to the TL-HREC in a timely fashion.
The approved documents include:

1. INSPTL-RETC Application Form
2. Proposal
3. Informed Consent
4. Questioner

This approval is for a period of one (1) year. An ANNUAL/FINAL project progress report is required on or before December 20, 2024.
APROVAL IS SUBJECT to the following conditions being met:

1. The Coordinating Principal Investigator will immediately report anything that **might warrant a review** of ethical approval of the project.
2. The coordinating Principal Investigator will notify the Institute National of Public Health Timor-Leste -Research Ethics and Technical Committee (INSP TL-RETC) of any event that requires **a modification to the protocol or other project document** and submit any required amendments in accordance with the instructions provided by the INSP TL -RETC.
3. The Coordinating Principal Investigator will submit any necessary report related to **the safety of research participants (i.e., protocol deviation, protocol violations)**

Caixa Postal 374
Dili, Timor-Leste

TIMOR-LESTE NATIONAL PUBLIC HEALTH INSTITUTE

The Unit of Ethical Research and Development

in accordance with Institute National of Public Health Timor-Leste -Research Ethics and Technical Committee (INSP TL-RETC) policy and procedures.

4. The coordinating PI will report to the INSP TL-RETC, annually in the specified format and
   Notify the HREC when the project is completed at all sites.
5. The coordinating PI will notify the INSP TL-RETC if the project is discontinued at a participating site before the expected completion date, with a reason provided.
6. The coordinating PI will notify the INSP TL-RETC of any plan to extend the duration of the project past the approval period listed above and will submit any associated required documentation.
7. The coordinating PI will notify the INSP TL-RETC of his or her inability to continue as coordinating PI, including the name and contact information for a replacement.
8. The safe and ethical conduct of this project is entirely the responsibility of the investigators and their institution(s).
9. The researcher should report immediately anything that might affect the continued ethical acceptance of the project, including:
   a. The adverse effects of the project on the subject and steps taken to deal with them.
   b. Other unforeseen events include.
   c. New information that may invalidate the ethical integrity of the study; and
   d. Propose changes to the project.
10. Approval for the next six months will be granted if the INSP TL-RETC is satisfied that project has been conducted in accordance with the original protocol.
11. Confidentiality among research participants should be always maintained as required by law.
12. The patient information sheet and the consent form shall be printed on the relevant site letterhead with full contact details.

This Letter Constitutes Ethical and Technical Approval Only.
Should you have any queries about the Institute National of Public Health Timor-Leste - Research Ethics and Technical Committee's (INSP TL-RETC) Consideration of your project, please contact dr. Adriano Barbosa, MAPM, with the contact number +670 77711666 and email address: alniano2801@gmail.com. INSP TL-RETC wishes you every success in your research.

Yours Sincerely,

Dr. Marck Antonio A. Nunes, MPH
Director of the Unit of Ethics, Research and Development INSP-TL

Copy: Archive.

Caixa Postal 374
Dili, Timor-Leste

MHESI 8137/2290

Graduate School, Burapha University
169 Longhaad Bangsaen Rd.
Saensuk, Muang, Chonburi
Thailand, 20131

December 19th, 2023

To Director of the National Institute of Public Health of Timor-Leste (INSPTL)
(Dr. Merita Antónia Armindo Monteiro, MPH)

Enclosure: 1. Certificate ethics document of Burapha University
2. Research Instruments (Try out)

On behalf of the Graduate School, Burapha University, I would like to request permission for Mrs. Eleonora Fernandes Almeida to collect data for testing the reliability of the research instruments.

Mrs. Eleonora Fernandes Almeida, ID 65910025, a graduate student of the Master of Nursing Science program (International Program) in Pediatric Nursing Pathway, Faculty of Nursing, Burapha University, Thailand, was approved her thesis proposal entitled: "Factors Predicting Dengue Prevention Behaviors Among Mothers of Under Five Children in Comoro Village, Dili Timor Leste" under supervision of Assoc. Prof. Dr. Chintana Wacharasin as the principle advisor. She proposes to collect data from 264 mothers of under five children who live in Comoro village, Dili Municipality.

The data collection will be carried out from January 16-27, 2024. In this regard, you can contact Mrs. Eleonora Fernandes Almeida via mobile phone +66-6-2391-0629 or +670-74189986 or E-mail: fernandeseleonora43@gmail.com

Please do not hesitate to contact me if you need further relevant queries.

Sincerely yours,

มัณฑนา รังสิโยภาส

(Assist. Prof. Dr. Montana Rungsiyopas)
Vice-Dean for Academic Affairs
Acting of Dean of Graduate School, Burapha University

Graduate School Office
Tel: +66 3810 2700 ext. 705, 707
E-mail: grd.buu@go.buu.ac.th
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MHESI 8137/2291

Graduate School, Burapha University
169 Longhaad Bangsaen Rd.
Saensuk, Muang, Chonburi
Thailand, 20131

December 19th, 2023

To Director of the National Institute of Public Health of Timor-Leste (INSPTL)
(Dr. Merita Antónia Armindo Monteiro, MPH)

Enclosure: 1. Certificate ethics document of Burapha University
2. Research Instruments

On behalf of the Graduate School, Burapha University, I would like to request permission for Mrs. Eleonora Fernandes Almeida to collect data for conducting research.

Mrs. Eleonora Fernandes Almeida, ID 65910025, a graduate student of the Master of Nursing Science program (International Program) in Pediatric Nursing Pathway, Faculty of Nursing, Burapha University, Thailand, was approved her thesis proposal entitled: "Factors Predicting Dengue Prevention Behaviors Among Mothers of Under Five Children in Comoro Village, Dili Timor Leste" under supervision of Assoc. Prof. Dr. Chintana Wacharasin as the principle advisor. She proposes to collect data from 264 mothers of under five children who live in Comoro village, Dili Municipality.

The data collection will be carried out from February 1 - March 30, 2024. In this regard, you can contact Mrs. Eleonora Fernandes Almeida via mobile phone +66-6-2391-0629 or +670-74189986 or E-mail: fernandeseleonora43@gmail.com

Please do not hesitate to contact me if you need further relevant queries.

Sincerely yours,

มัณฑนา รังสิโยภาส

(Assist. Prof. Dr. Montana Rungsiyopas)
Vice-Dean for Academic Affairs
Acting of Dean of Graduate School, Burapha University

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