Fear-based health messages for Malay diabetes patients in Singapore

Kawaja, Ariffin

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**NANYANG
TECHNOLOGICAL
UNIVERSITY**

SINGAPORE

**FEAR-BASED HEALTH MESSAGES FOR MALAY
DIABETES PATIENTS IN SINGAPORE**

ARIFFIN KAWAJA

SUPERVISOR: PROFESSOR THENG YIN LENG

WEE KIM WEE SCHOOL OF COMMUNICATION AND INFORMATION

A thesis submitted to the Nanyang Technological University in partial fulfilment of the
requirement for the degree of Doctor of Philosophy

2020

Statement of Originality

I certify that all work submitted for this thesis is my original work. I declare that no other person's work has been used without due acknowledgement. Except where it is clearly stated that I have used some of this material elsewhere, this work has not been presented by me for assessment in any other institution or University. I certify that the data collected for this project are authentic and the investigations were conducted in accordance with the ethics policies and integrity standards of Nanyang Technological University and that the research data are presented honestly and without prejudice.

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This thesis does not contain material from any paper(s) published.

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Mohamed Ariffin Bin Mohamed Kawaja K.

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SUMMARY

Diabetes is a major cause of death worldwide and ranks amongst killer diseases such as cancer and cardiovascular diseases. The Malays with Type 2 diabetes were being investigated in this research as they are the most susceptible to the disease compared to the other ethnic groups in Singapore. Among the non-clinical intervention programmes, scholarly articles suggest that emotion-based health messages can be a powerful driver to promote health preservation attitudes and behaviours. The objective of this research was to investigate the influence of fear-based messages on patients' behaviours in managing their diabetes condition. To achieve this objective, the research was divided into three phases.

In Phase I, forty stimuli were curated. Eight patients with diabetes and eight healthcare providers took part in two separate focus group discussions (FGDs) and a one-to-one interview to determine the appropriateness of the stimuli curated. In Phase II, 100 patients were recruited and asked to rank the stimuli according to three emotion metrics: valence, arousal and dominance. The metrics were derived from the standard Self-Assessment-Manikin (SAM).

In Phase III, the rated stimuli were used in a 2 (high-threat, low-threat) x 2 (image, text) factorial design experiment, where 60 patients were recruited. The research findings indicated that varying the threat levels and manipulating the type of format (image or text) had no significant impact on Malay patients accepting the health messages. However, it was found that varying threat levels could influence message acceptance among Malay patients when moderated with perceived susceptibility and perceived response efficacy.

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CHAPTER ONE: INTRODUCTION

1.1 Background

Diabetes mellitus or diabetes and its complications pose a significant health threat on a global scale (Zheng, Ley, & Hu, 2017). Every year, there is a growing human and economic toll affecting more people culminating patients at ever younger ages (Fradkin & Rodgers, 2013). There are two primary classification or types of diabetes:

- Type 1: Autoimmune destruction of beta–cells causes Type 1 diabetes, and it is also known as insulin-dependent diabetes (Gouveia Muniz de Alencar, Muniz Medeiros, Gouveia Muniz, & Muniz Medeiros, 2018).
- Type 2: Progressive decline of pancreatic beta-cell functions, also known as non-insulin-dependent diabetes (Galadari, Rahman, Pallichankandy, Galadari, & Thayyullathil, 2013). Type 2 diabetes is usually attributed to lifestyle (Steinbrecher et al., 2011).

About 90% of patients with diabetes worldwide have Type 2 diabetes compared to 10% who have Type 1 diabetes (World Health Organisation, 2015).

Globally, it is estimated that 451 million people were affected by diabetes in 2017. The number is set to increase to 693 million adults by 2045 (N. H. Cho et al., 2018). According to Diabetes Singapore, a Singapore-based NGO, one out of nine people aged 18 to 69, has diabetes which is about 11.3% of Singapore's total population (Diabetes Singapore, 2018). A study indicated that from 2010 to 2035, Singapore's population with diabetes and prediabetes is projected to more than double, from 434, 685 to 903, 596 and 373, 104 to 823, 802, respectively (L. Y. Wong, Toh, & Tham, 2017).

Among people with diabetes in Singapore, the Malay ethnic group is most at risk (Khalik, 2014). The other major ethnic groups in Singapore include the Chinese and the Indians

(Department of Statistics Singapore, 2018). According to a research done by a team from Khoo Teck Puat Hospital's (KTPH) in Singapore, the risks of Malays having diabetes-related complication is two times higher, and Indians 1.7 higher times when compared to Chinese patients with Type 2 diabetes (KTPH, 2014). Yang et al. (2011) suggested that the Malay diabetic patients, especially those with renal disease, should be screened more frequently as they are more likely to experience complications.

Currently, the biomedical community indicates that there is no known cure for both types of diabetes making self-management of the disease pivotal for a better quality of life (Hill, Troshani, Goldberg, & Wickramasinghe, 2014). People with long-term conditions such as diabetes are encouraged to take ownership and manage their conditions (Hewitt-Taylor & Bond, 2012). More motivated patients have better control of their diabetes (Lau, Campbell, Tang, Thompson, & Elliott, 2014). Managing diabetes remains a challenge until today, despite the intense research on the condition (Yates & Menon, 2015). Part of the difficulty in managing diabetes is because it can be attributed to various factors. Table 1-1 shows a non-exhaustive list of factors contributing to diabetes and the supporting literature.

Table 1-1
Factors Causing Diabetes

Contributing Factors	Supporting Literatures
Psychology	Caon et al. (2014); Winkley, Landau, Eisler, and Ismail (2006)
Lifestyle	Gillies et al. (2007)
Dietary	Vartanian, Schwartz, and Brownell (2007); Carter, Gray, Troughton, Khunti, and Davies (2010); Hu, Pan, Malik, and Sun (2012)
Sleep Pattern	Cappuccio, D'Elia, Strazzullo, and Miller (2010)
Depression	Hudson, Bundy, Coventry, and Dickens (2014)
Obesity	García-Jiménez et al. (2016)
Family History	Freemark and Bursey (2001); Wu et al. (2017)

Environment (pollution)	Sun et al. (2013); Balti, Echouffo-Tcheugui, Yako, and Kengne (2014)
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Zulman, Rosland, Choi, Langa, & Heisler (2012) posited that increasing patients' knowledge through educating patients and increasing risk awareness regarding diabetes can result in changes to health behaviours. Despite personalised health education, patients' beliefs, myths and misconceptions, remain a barrier for behavioural change (Brod, Alolga, & Meneghini, 2014). The Chronic Care Model considers patient education one of the essential non-clinical health intervention Wagner, Austin, and Von Korff (1996). According to this model, patients must be well informed about their condition to achieve improved outcomes. However, such claims do not consider the patients' growth or decline regarding physicality or maturity (Pelicand, Fournier, Le Rhun, & Aujoulat, 2015). O'Brien, Cardwell, Nair, & Hardy (2015) found that educational programs related to diabetes lessen anxiety and depression among people with diabetes in the short term. Still, it is difficult to assess its effectiveness in the long term. As such, health providers need to get creative in implementing non-clinical interventions.

According to Bandura (2004), *emotion* can be a possible mechanism to elicit changes in health-related behaviours. Emotions are primarily classified as negative and positive emotions. Negative emotions such as fear and guilt have featured regularly in various healthcare settings (Benet, Pitts, & Tour, 1993; Goldenberg & Arndt, 2008; Kok, Schaalma, Ruiter, Van Empelen, & Brug, 2004). Similarly, the use of positive emotions has also been mooted (Goldfried & Sobocinski, 1975; A. Lang, Dhillon, & Dong, 1995; Löw, Bradley, & Lang, 2013; Miniero, Rurale, & Addis, 2014). One of the primary emotions, which have been commonly incorporated as a healthcare strategy, is fear (Fairchild et al., 2018). The use of fear is generally manifested in threatening health messages to scare a person to do or avoid something (Simpson, 2017).

Among the many theoretical models that have attempted to explain how the fear mechanism works, include the model of motivation to protect, the direct action model of fear, the model of parallel responses, and the extended parallel process model (EPPM) (Guarnaccia & Henry, 2019). The EPPM theoretical framework is adopted for this thesis. It is one of the most widely used theoretical frameworks in health communications, due to its explanatory scope explaining how fear appeals may succeed or fail (So, 2013). This thesis focused on investigating the use of Type 2 diabetes since it is substantially more pervasive among people with diabetes and targeted the Malay ethnic group in Singapore since they have the highest risk of developing complications related to Type 2 diabetes.

1.2 Research Motivation

1.2.1 Problem Statement

Exploring Non-clinical Interventions apart from Patient Education

In recent years, there has been more recognition regarding the need to incorporate non-clinical interventions to manage diabetes (Upadhyay, Ibrahim, Mishra, & Alurkar, 2015). This recognition has been translated into greater resource allocation and funding for non-clinical interventions towards the disease (Gregg, Cheng, Narayan, Thompson, & Williamson, 2007). Educational intervention and behavioural counselling have figured regularly as non-clinical interventions in diabetes literature (DeWalt et al., 2009). According to the American Institute of Medicine, 30% of the top list of managing chronic diseases is related to patient education (Pino, Boutron, & Ravaud, 2012). Recent strategies of patient education include the use of Social Marketing Campaigns (SMC) (George, Roberts, Beasley, Fox, & Rashied-Henry, 2016), personalised mobile texting (Capozza et al., 2015) and Internet content (Cotter, Durant, Agne, & Cherrington, 2014). Tele-coaching has also been

incorporated in rural areas to educate patients in diabetes management (de Vasconcelos et al., 2018).

Despite being seen a core component of non-clinical intervention in diabetes care, patient education remains ineffective in some cultures (Aziz, Riddell, Absetz, Brand, & Oldenburg, 2018). Some patients are illiterate, cannot read well, and for some patients, they do not have any background in science to help them comprehend their healthcare providers (Gattullo & McDevitt, 2013). Patient education is not always dependent on the patients' understanding (Cabana & Le, 2005). Healthcare providers' responsibility and attitude are similarly critical in patient education (Ghaffari, Esmali, Atashgir, & Hokmabadi, 2018) and are not within the patients' control.

Considering the Effectiveness of Fear-based Messages

Previous studies suggest that emotion can help address chronic illness care (Strachan, Bean, & Jung, 2018). One of the emotions prominently used in the previous couple of decades was fear, and its operationalisation was unquestioned until recently where its proponents received heavy criticisms on ethical grounds (Esrick et al., 2019). "Fear is defined as an emotional and physical response to a threat or danger." (Gordon, Dionne, & Snyder, 1998, p. 88). Recent findings, however, have indicated that the use of fear coupled with hope-building messages, could enhance self-preservation behaviours (NewsRx, 2018). According to the American Psychological Association, Psychological Bulletin, studies conducted between 1962 and 2014, concluded that the use of fear messages was effective in influencing behaviour (Bayer & Fairchild, 2016).

However, the health communication literature remains ambivalent about the influential role in which fear plays in determining the effectiveness of health messages (Xueying Zhang & Zhou, 2019). The Heuristic Systematic Model suggests that prior knowledge regarding a particular health condition could determine the outcome of using fear messages (Averbeck,

Jones, & Robertson, 2011). Another factor to consider is individuals' traits which would impact the perception and response of fear-based messages (Wansink & Pope, 2015).

1.2.2 Research Gaps

Emotion-based Messages: a Novelty in Diabetes Context

Scholarly articles suggest that emotion-based health messages can be a powerful driver towards health promotion behaviours (Hendricks, Hendricks, Webb, Davis, & Spencer-Morgan, 2013). For instance, fear through health messages which depict smoking-related complications is thought to be an effective method to discourage adoption of smoking or encourage quitting it all together (Rayner, Baxter, & Illicic, 2015). Despite its effectiveness, fear-based health messages as a health promotion mechanism are primarily limited to a few domains such as smoking cessation and AIDS.

According to Nash (2013), the role of emotion in health messages for people with diabetes are often neglected and seldom addressed. Only a small number of experiments were conducted on health messages in studies related to diabetes (Turner et al., 2013). Fear-based health messages influence on health-related behaviours has had varying results. Moreover, little work is done in the context of diabetes care. Calls for more threatening messages to curb diabetes among societies have been mooted to have its desired effect (Hopkins, Shanahan, Hood, & White, 2017).

Previous studies have conducted numerous experiments to investigate emotions' role in general behaviours and those related to health. These studies would typically require the use of stimuli which could elicit a certain type of emotion to evaluate behavioural responses. These stimuli are most often retrieved from well-known stimuli databases such as the IAPS, GAPED, and NAPS (Balsamo, Carlucci, Padulo, Perfetti, & Fairfield, 2020). In recent years, stimuli in multiple formats such as visual, audio, and visual-audio have also emerged (Sarma & Barma, 2020). Despite the importance of socially relevant emotion stimuli databases (Wei,

Roodenrys, Miller, & Barkus, 2020), most databases fail to delineate the actual emotion because there is a disconnect between the stimuli and the actual research participants.

As such, this dissertation is timely in examining the role that fear could play to curtail further spread of diabetes. The investigation is done by explicitly curating a set of fear-based stimuli relevant to diabetes and conducting experiments to determine the influence fear-based message on patients' intentions to manage diabetes. The investigation will focus on the Malay patients who are already diagnosed with diabetes who are most at risk with diabetes complications compared to the other ethnic groups in Singapore (W.-Y. Lim et al., 2018). Several factors such as high visceral fat or abdominal fat (Kaur, 2020), dietary culture (R. B. T. Lim et al., 2019), higher body mass index (BMI), family history with diabetes and earlier age of diagnosis with diabetes (C. Hong, Chia, Hughes, & Ling, 2004) indicate that the Malay ethnic group is most susceptible to diabetes compared to other ethnic groups in Singapore. Recent studies suggested that the Malays and Indians still have the highest risk of developing diabetes-related complications as both had poorer glucose control compared to the ethnic Chinese (Seng et al., 2020) thus justifying the focus on the Malay patients with diabetes.

1.3 Research Aim

Based on the research gaps described, this research's main aim was to examine the role of fear-based health messages on Malay patients' behaviour towards managing their diabetes. To investigate the role of fear-based messages on Malay patients with diabetes, an affective stimuli database would be curated that has relevance to the Malay patients with diabetes. A fear-based stimuli database relevant to diabetes would include images and texts that hinges on potential complications, irregular blood glucose and stress of diabetes management (Al Hayek, Robert, & Al Dawish, 2020). The stimuli' objective is to evoke fear from the diabetes patients that could help to discern the impact of the emotion on their behaviour.

Additionally, this research aimed to investigate if the level of fear or threat can influence diabetes patients' health-related behaviour. The type of fear evoked in this research involves exposure to diabetes complication, which requires amputation or limb loss. Some patients believed that being confronted with frightening representations of complications could make them feel diabetes is real (Findlay-White, Slevin, Carey, & Coates, 2020).

Arising from the discussions in the research gaps and research aims, two research questions were proposed:

RQ1: Would fear-based stimuli relevant to diabetes could evoke fear emotion among Malay patients with diabetes to manage their condition better?

RQ2: Does a higher threat fear-based health message have more influence over patients' intentions to manage diabetes compared to a lower threat fear-based health message?

To achieve the research aim, a multiple mixed-method research methodology was adopted in three phases. In Phase I, healthcare providers and patients were asked regarding the appropriateness of using a set of curated diabetes-related stimuli in an experiment. In Phase II, patients were asked to rate the curated stimuli based on existing affective standards using a survey. An experiment in Phase III was carried out on patient-participants to assess their responses to the stimuli to assess their intentions and behaviours towards managing diabetes.

1.4 Thesis Structure

Chapter 1 presents the study's background, its context, the research gaps, the research aim and the proposed research questions (RQs). The expected contribution was also included in this chapter, followed by the thesis structure.

Chapter 2 is comprised of the literature review, which discusses the background information regarding emotion and emotion-related messages and psychosocial theories used in the diabetes context.

Chapter 3 proposes a conceptual framework based on the Extended Parallel Process Model. Hypotheses for the research will be raised at the end of this chapter.

Chapter 4 discusses Phase I of the research, which involves creating a collection of fear-based stimuli related to diabetes. In Phase I, the curated stimuli were validated by two focus groups where the first group was comprised of healthcare providers. The second group was comprised of patients with diabetes. Another group of patients were also recruited for a one-to-one interview to review the stimuli.

Chapter 5 details the processes in Phase II. The curated stimuli were rated by diabetes patients based on the Self-Assessment Manikin (SAM) standard.

Chapter 6 describes the experiment in Phase III of the research, which used the stimuli curated in Phase I and then rated based on the SAM emotion-based metrics in Phase II. The independent variables and dependent variables were introduced to represent the constructs based on the EPPM theoretical framework.

Chapter 7 provides discussions regarding the results and key findings for the overall research based on Phase 1, Phase 2 and Phase 3. Ethical implications were also discussed in this chapter.

Chapter 8 brings the thesis to a close. This chapter summarised the essential findings and highlighted the contributions. It also discussed the limitations of the research and future directions.

CHAPTER TWO: LITERATURE REVIEW

Meta-theories derived from healthcare models posit that emotion could be motivators and contributors to human health (Bandura, 2004). One emotion commonly used in health messages is fear which is a persuasive form of communication to raise attention and promote self-protective actions (Xueying Zhang & Zhou, 2019). The theories about fear have gone through constant evolution with multiple theoretical perspectives in the past 60 years (Nabi & Myrick, 2019). The extended parallel process model (EPPM) is one of the primary theoretical frameworks which explains why fear-based health messages will work or fail (Witte, 1992, 1994). This research will explore the framework by applying the model in the context of diabetes.

The literature review divides this chapter into three main sections: introduction to fear emotion, emotion-related theories and psychosocial theories. The literature reviewed facilitated the development of the conceptual model in the subsequent chapter.

2.1 Fear Emotion

Defining “emotion” is a thorny issue for researchers because there have been sharp disagreements regarding its definition as well as its nature (Gallois, 1993). David Hume (1711 – 1776) was one of the first scholars in the Western world to defend emotion from an epistemological angle (Robert, 1977). He interpreted emotion as a sensation, which is physiological. 19th-century psychologist, William James, posed the question, “What is emotion?” as a title for an essay he wrote for *Mind* in 1884 was among the earliest scholars to link emotion to bodily response (James, 1884). He articulated the *Theory of Human Emotion* which was then known as the *James–Lange Theory*. The theory states that emotion is the physiological response induced or provoked by a specific stimulus in an environment (Potter & Bolls, 2012).

There is a school of thought, which argues the behavioural view of emotion (Robert, 1977). This view stems from the influence of emotion on behaviour, which generates action tendencies (Mark, 2012). Emotion is said to prepare an individual's action tendencies. It is highly influential on emotion-consequent behaviour, leading to a migration of existing behaviours towards new goals and plans (Scherer, 2005).

Fear is a negative-valenced emotion comprised of psychological and physiological dimensions which may be aroused when a grave and personally relevant threat is perceived (Witte, 1996a). According to Armfield and Mattiske (1996), a combination of unpredictability, uncontrollability, and expected negative outcome such as self-harm contributes to the generation of fear emotions. Fear can also be a product of one's past experience (Coble, Selin, & Erickson, 2003). In retrospect, fear is present in multiple aversive emotions such as anger, disgust, hatred and horror (Bourke, 2003). For instance, jealousy could be attributed to the fear of losing one's partner; guilt manifests as the fear of God's wrath, whereas shame might originate from the fear of humiliation.

Previous studies indicated that females are more likely to report fear experiences because of stereotypes that suggest it is socially undesirable for males to express fear (Brody, Lovas, & Hay, 1995). Although scholars have indicated that females are more likely to express and report their emotions, recent studies showed no gender differences in fear expression (Fridkin, Gershon, Courey, & LaPlant, 2019). Cultural differences in emotion perception are well established in the emotion-related literature (Fang, van Kleef, & Sauter, 2019).

Apart from gender and culture, assessment of fear has variations due to individual differences or personality traits (Terblanche-Smit & Terblanche, 2011). According to Witte (1992), perception of fear can be correlated to past experiences and personality traits. Novak et al. (2017) even went further by suggesting that patients' spouses' personality traits influence patients' dietary and exercise adherence, thus affecting patients' ability to manage

their diabetes. However, Popova (2012) posited that individual differences such as demographics and personality traits do not appear to influence the processing of fear-based messages except in cases of outliers. Witte and Morrison (2000) explained that individual differences may not affect outcomes directly but could influence threat and efficacy, thus indirectly affect outcomes.

2.1.1 Fear Emotion in Health Messages

Incorporation of the fear in health messages to improve health-related behaviours have been widely discussed has had its fair share of proponents and critics. In general, emotions incorporated into health messages can promote healthy behaviours to detect diseases and influence how individuals process health information (Hoffman & Novak, 2016). The use of emotion in health messages can similarly affect the broader population's view of a disease (Bail, 2016). The logic behind using emotion-based health messages is to elicit emotional responses to patients or high-risk individuals who are apathetic or resistant to existing public health messages that healthcare providers or authorities are attempting to convey (Lupton, 2015).

The use of fear-based emotions in health messages has been established over the past fifty years (Higbee, 1969). Health messages that adopt fear-based emotion are also linked to literature, which discusses loss-framed messages and threat appeals. The concept behind the loss-frame originated from the *Prospect Theory* in 1981 by Tversky and Kahneman, positing that people react differently to how information is being framed. The emphasis is either for a person to gain or to lose (M. J. Lee & Kang, 2018). Gain-framed is also known as “positive framing” whereas loss-framed is also known as “negative framing” (Rothman, Salovey, Antone, Keough, & Martin, 1993). The limitation in message framing is that certain nuances are lost because emotions are seen as a single block, for example, fear, guilt, discuss all considered positively framed instead of treating each emotion discretely.

Fear-based health messages are also known as threat appeals or fear appeals. These are persuasive messages that evoke fear by depicting a personally relevant threat, followed by a description of achievable recommendations to manage the threat (Witte, 1992, 1994). Fear-related studies, typically measure fear by getting the research participants to rate the degree to which they feel frightened, tense, nervous, anxious, uncomfortable, and nauseated (Witte, 1996a). Recent studies have emphasised the benefits of including physiological measures such as Heart-Rate (HR), Skin Conductance Level (SCL) and Facial Electromyography (EMG) among others (Carey & Sarma, 2016) to measure fear. Recent studies indicate that fear-related messages can elicit multiple emotions bringing about different outcomes (Dillard & Shen, 2018). These outcomes can (a) disrupt or conceal the message, (b) increase the impact and (c) decrease the effectiveness of these messages.

According to many scholars in the field, threat appeals comprise two components, namely threat and action (Dillard, Li, Mieczkowski, Yang, & Shen, 2017). Threat is composed of the *severity*—the degree to which the consequences are undesirable and message recipient's *susceptibility*—the chances that the consequences will happen to the message recipient. The second component, action, is composed of *response efficacy*—the effectiveness of the message's recommendation in decreasing or averting the threat, and *self-efficacy* which tabulates one's perceived ability to observe the recommended behaviour. According to Witte, the action component is commonly cited as efficacy particularly in studies which utilises the EPPM framework (McMahan, Witte, & Meyer, 1998; Witte, 1992, 1994, 1996a, 1996b). The existing component of efficacy or action gives rise to the type of emotion that the efficacy component elicits in threat or fear appeals (Nabi & Myrick, 2019).

2.1.2 The Use of Fear in Diabetes-Related Studies

The use of emotions has illustrated to be an effective intervention to provoke positive behavioural changes among diabetics (Soureti, Hurling, Cobain, Van Mechelen, & Chinapaw, 2013). MacPhail, Mullan, Sharpe, MacCann, and Todd (2014) indicated that interventions using emotions improved patients' BG and resulted in better dietary controls. Clochesy, Buchner, Hickman, Pinto, and Znamenak (2015) posited that "serious games" for health that elicit emotions could be more effective than educating patients to change their health-related behaviours. Bleakley et al. (2015) considered persuasive messages which could arouse an emotional response as a potent moderator for individuals to adopt behavioural changes.

While there is no doubt about the use of emotions in health messages for people with diabetes, the challenge is to convince healthcare authorities and providers regarding the benefits of embedding fear into health messages specifically in the context of diabetes. There is a need to demonstrate with empirical evidence that fear can be useful in promoting positive behaviours for people with diabetes (Speight, Skinner, Rose, Scibilia, & Boulton, 2020). Despite the critics, Orbell and Hagger (2006) posited that regret is an emotion that people want to avoid more than fear. Aversion towards "not acting" or not dealing with the threat is greater than fear itself. Previous studies have also shown that fear of the ramifications of diabetes, motivated patients to engage in self-care practices (Saidi, Milnes, & Griffiths, 2018).

The effectiveness of diabetes-related health messages is related to patients' experience dealing with diabetes (Valerie L. Lawson, Christine Bundy, & John N. Harvey, 2007). Perceptions on these diabetes-related fear messages can be based on several factors such as social and cultural disposition, individual experience, education, the information provided by healthcare providers and the media (Valerie L. Lawson et al., 2007). A study on diabetes

narratives highlighted that first-person versus third-person narrative might influence and mediate the message's impact on a person's actions (M. Chen, Bell, & Taylor, 2017). From the study, it can be inferred that any incorporation of fear into messages has to have first-person referencing to impact a person's behaviour. Han and Kim (2019) posited that tailoring health messages based on personal values (attitudes, intentions and behaviours) and threat-to-freedom from complicated disease has impacted the self-management of diabetes symptoms.

Apart from investigating fear and the different level threats, the formats of health messages are also being investigated. Haines-Saah, Bell, and Dennis (2015) posited that the health messages' formats could influence the intended target audience. According to most health information scholars, image-based health messages are more influential than their text-based counterpart (Y. Hong & Yoo, 2015). However, Fried et al. (2016) argued that the linguistic element in text-based health messages could articulate and stress certain important cues that the health message intends to impart.

While discussions on fear messages as an intervention for Type 2 diabetes have been made in several studies, none of these studies elaborates on comparing the formats in which these messages are delivered. Health messages can be presented in multiple types of formats such as images, texts, audio, videos and a combination of these formats. The subsequent section will look at other health-related studies which have deliberated on the different formats. Due to time and resource constraints, this research focuses on comparing the image and text formats.

2.1.3 Format of Health Messages – Image versus Text

Image-based health messages on anti-smoking have been documented extensively in scientific studies as a very useful way of changing smokers' attitudes (Chéron, 2015). Although image-based health messages have found to be able to alter health behaviours,

studies have not confirmed if positively-framed or negatively-framed images are more effective in doing so (Stuart & Blanton, 2003).

Previous studies indicated that images provide symbolic inference and implicit claims and are more persuasive than words (Young, Hinnant, & Leshner, 2016). Clarke et al. (2019) suggested that image-and-text health-warning labels (HWL) may have a larger effect than text-only HWL; however, these findings were not statistically significant. The World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) promotes prominent pictorial health warnings labels (HWLs) on cigarette packaging (WHO, 2008). As of 2014, more than 70 countries had adopted this policy (Thrasher et al., 2016).

A study on food labels indicated that negatively-framed graphics messages always outperforms its text-based counterparts in terms of arousing the fear emotion (Rosenblatt, Dixon, Wakefield, & Bode, 2019). In a diabetes-related study, patients attribute limitation of text-based messages to (i) poor eyesight and (ii) poor understanding of technical terms used in the health messages (X. Z. Chen, Yu, Li, Zhan, & Yan, 2018). However, the study was conducted in rural China where low literacy rate could be a confounding factor.

A study found that diabetics who received text messages to remind them regarding their medication over six months have had improved BG readings (Celik et al., 2015). Text-based message interventions in healthcare have yielded promising results and have been associated with increased abstinence and adherence (Jordan Filion, Darlington, Chaput, Ybarra, & Haines, 2015). Text-based messages used in healthcare settings via SMS are becoming increasingly popular due to its effectiveness, convenience and low-cost (Fitts Willoughby & Furberg, 2015).

A recent study on text-based messages for diabetics reported improvements in healthy behaviours and high satisfaction among the participants (Arora, Peters, Burner, Lam, & Menchine, 2014). Diabetes-related text-based messages are far simpler for healthcare

providers to implement. It is within their constraints because it is easier to text than design image-based messages (Watterson, Rodriguez, Shortell, & Aguilera, 2018).

While both the image and text health messages have had a positive impact on health-related behaviours, the literature is split as to which format is more effective than the other. Most studies focus on one aspect of the message format (Hammond, 2011). For instance, Morrow, Hier, Menard, and Leirer (1998) posited that incorporating images into health messages will increase comprehension of medical information beyond what can be conveyed through text. Instead, according to Meppelink and Bol (2015), text-based health messages benefit people with adequate health literacy. In contrast, image-based health messages benefit people with limited health literacy. Physiological methods, such as eye-tracking can be a means to compare the effectiveness of image-based versus text-based health messages (Crespo, Cabestrero, Grzib, & Quirós, 2007).

2.2 Fear-based Theories

Incorporating negative emotions such as fear have been suggested by various scholars in the healthcare literature (Benet et al., 1993; Goldenberg & Arndt, 2008; Kok et al., 2004). There are numerous fear-related theories formulated by past and present scholars to explain how fear works. According to Witte, some of these theories illustrates the effectiveness of fear messages, while some, on the contrary, exposes its inadequacies and there those who linger on ambiguity (Witte, 1992). In the 1960s, fear-based theories have been depicted across numerous health-related domains such as dental hygiene, tetanus vaccination, smoking cessation, traffic safety, tuberculosis, proper viewing of the sun during eclipse, roundworms and even for the use of handrails for safety on staircases (Higbee, 1969). Post-1980s have seen these theories been incorporated in studies related to sexually transmitted diseases such as AIDS/HIV (Avery & Park, 2018) and more recently on the COVID-19 pandemic (Stolow, Moses, Lederer, & Carter, 2020).

The fear-as-acquired-drive model was a model which was proposed by Hovland, Janis, and Kelley (1953). The theory provides one of the earliest indications of fear's effect on behavioural change (Rogers, 1975). The theory posits that people learn to fear a threat (usually through a persuasive message) and the fear drives certain actions (Witte & Allen, 2000). When the individual is in a drive state, the recommended response is given to reduce fear. The reduction of fear acts as a reward and becomes a custom response to a threat for the individual. If defensive avoidance reduces fear, it becomes the custom response instead. Janis further extended the drive-model concept by introducing the concept of an optimal level of fear by suggesting that the relationship between fear and acceptance of a message (reflected by the change in behaviours) could be depicted by an inverted-U, where moderate levels of fear were optimal for encouraging positive action. In contrast, low and high levels of fear resulted in insignificant changes (Solansky, 2014).

Nonmonotonic fear models suggest that fear can be depicted as cue and drive (Sternthal & Craig, 1974). McGuire (1968) advances the two-factor theory that argues fear can act as both a drive and a cue. Witte and Donohue (2000) explain that fear as a drive motivates acceptance of recommendations compared to fear as a cue, which elicits habitual responses that tamper with message acceptance. However, previous findings were inconclusive regarding McGuire's model despite adding other factors such as concern, relevance and vulnerability to explain the model (Dziokonski & Weber, 1977). The model is also being criticised for making the arbitrary assumption that only responses cued off by fear interfere with message acceptance and that the responses driven by fear yields actions (McArdle, 1972).

Leventhal's (1970) proposed a parallel process model castigates the previous curvilinear models. The model empirically demonstrated in a dental hygiene study, that message acceptance were superior when strong fear appeals were introduced (Leventhal &

Singer, 1966). Leventhal's parallel process model introduced two independent responses to fear-appeal messages, namely danger-control and fear-control (Quick, LaVoie, Reynolds-Tylus, Martinez-Gonzalez, & Skurka, 2018). According to Jayne and Rankin (2001), the two parallel processes comprise of two aspects. The first is the cognition which involves the objective interpretation of a threat, and the second requires emotion, the subjective reaction to a threat. The model argues that protective behaviours are motivated by the need to protect or control the cognitive threat and not to control or manage the fear emotion (Witte & Allen, 2000). However, the model does not explain why and when the two processes are evoked (Popova, 2012).

The Protection Motivation Theory (PMT) proposed three components of fear appeal messages, namely (a) the level or magnitude of noxiousness derived from an article or event (severity); (b) the probability of that an event will occur (vulnerability); and (c) the efficacy of a protective response (response-efficacy) (Rogers, 1975). The PMT attempts to elaborate on the crucial cognitive mediating processes and associating them to antecedent communication stimuli (Maddux & Rogers, 1983). In the revised PMT, (d) self-efficacy was added as the fourth component (Witte & Allen, 2000). More recent studies that adopted PMT included (e) response cost, which emphasises the perceived opportunity costs in terms of effort, monetary and time required to adopt a recommended behaviour (Ifinedo, 2012). According to Witte and Allen (2000), both the original PMT and the revised PMT, fear indirectly affects message acceptance via an appraisal of severity. The model also suggests that fear cognitions would only influence behaviour when response efficacy or self-efficacy is low (Taylor & May, 1996).

The extended parallel process model (EPPM) is currently one of the primary theoretical models exclusively related to explaining fear as an emotion. EPPM expatiated previous fear-related theoretical frameworks borne between the 1960s and the 1980s (Witte,

1992). The EPPM elaborates fear in three areas, namely: (1) clarifying why evoking fear fail to get the desired goal, (2) considering fear as the leading independent variable and (3) outlining that when self-efficacy is robust, perceived threat mediates between the fear emotion and a specific response (Witte, 1994). EPPM claims that it offers a more comprehensive view of how an individual deals with fear as it incorporates both the cognitive and affective aspect of fear processing and response.

In EPPM, fear-arousing messages will result in two sequential cognitive processes (So, 2013). First, the *perceived severity* and *susceptibility* of the threat is evaluated. If the appraisal of the two cognitive processes reaches a certain threshold, the coping appraisal process will take place. This coping process will evaluate the response efficacy and self-efficacy. Still, within the EPPM framework, the related literature mentioned that there are three possible output responses from the fear-processing mechanism, namely; the danger control, fear control and no response. To determine which response is taken, Witte (1996b) proposed calculating the discriminating value. This value is obtained by subtracting the overall efficacy score to the overall threat score. If the value is positive, danger control is taken, but fear control takes over if the score is negative. No response action is taken if the severity or susceptibility of the threat is deemed to be low (Popova, 2012).

One of the critics of the EPPM is that the model assumes that threat or fear is appraised before efficacy is being evaluated. Another problem with the model is that EPPM assumes that evaluation of fear and threat is done lightning fast, thus making an empirical study, a challenge (Popova, 2012). The model suggests an immediate fear response but does not suggest that a sustained change of behaviour can be achieved. Michelle Obama's "Let's Move" campaign to fight childhood obesity, which used fear messages based on *Extended Parallel Process Model (EPPM)*, seems to indicate that the campaign has some degree of success (Batchelder & Matusitz, 2014). More recently, studies about Covid-19 have applied

EPPM to understand the type of messages which could promote adherence (Jahangiry et al., 2020; Szczuka, Meinert, & Krämer, 2020).

2.3 Emotion-based Stimuli

Empirical studies on health-messages incorporating emotions typically involve the use of stimuli to elicit the necessary emotions. Several databases and standards for emotion-based stimuli have been developed in the past couple of decades for such studies (Koelstra et al., 2012). The development of these affective stimuli were typically rated based on several dimensions of emotions. According to Peter J Lang, Bradley, and Cuthbert (1997), such standards should:

1. enhance experimental control in emotional-related studies;
2. facilitate the comparison of results across different studies conducted at multiple sites, and
3. allow replication of the experiments in related studies.

One such initiative is the development of the International Affective Picture System (IAPS). The IAPS was developed to create a set of normative emotional stimuli for emotional-based experiments. The goal was to develop a large set of stimuli, which can be standardised and accessed internationally. The IAPS standard is widely used in affective studies apart from the Geneva Affective Picture Database (GAPED) (Dan-Glauser & Scherer, 2011). The limitation for both of these standards is that they consist of only image-based stimuli.

The text counterpart for text-based stimuli is the Affective Norm for English Word (ANEW) (Margaret M Bradley & Lang, 1999) and Affective Norm for English Text (ANET) (Margret M Bradley & Lang, 2007). Although not as widely used as the IAPS, these two standards represent important standards for text-based stimuli. Another notable work worth

mentioning is Warriner, Kuperman, and Brysbaert (2013) for their affective rating of nearly 14,000 English words.

The image-based stimuli and the text-based stimuli mentioned are widely used in affective studies. Still, it should be noted that most of these standards were developed based on ratings by participants in North America and to a smaller extent Europe. There have been other standards which attempt to resonate with the target audience. For instance, the Nencki Affective Picture System (NAPS) was initiated by Polish researchers (Marchewka, Żurawski, Jednoróg, & Grabowska, 2014a). The Chinese introduced Chinese Affective Picture System (CAPS) (Lu, Hui, & Yu-Xia, 2005b), while the Spanish had the Madrid Affective Database for Spanish (MADS) (Hinojosa et al., 2016). Similarly, the French Affective Noun (FAN) (Monnier & Syssau, 2014) are examples of databases which considered the social and cultural context.

While both IAPS and the GAPED databases include fear-based stimuli, the only database which is dedicated for fear-based stimuli, is known as the Set of Fear Inducing Pictures (SFIP) which is comprised of 400 coloured images (Michałowski et al., 2017). It should be highlighted that some of these images were taken from multiple existing databases such as IAPS, GAPED, NAPS etc.

Although according to Isbister, Höök, Laaksolahti, and Sharp (2007) there are universal similarities regarding how emotions evoke responses in people, however, differences exist due to social and cultural context. As such, creating standards or instruments in the form of stimuli for affective studies have to consider these dimensions. Table 2-1 is a non-exhaustive list of various stimuli databases formulated and used in emotion-related studies.

Table 2-1

Databases of Emotion-based Stimuli

Database	Acronym	Supporting Literature
International Affective Picture System	IAPS	Peter J Lang et al. (1997)
Geneva Affective Picture Database	GAPED	Dan-Glauser and Scherer (2011)
Nencki Affective Picture System	NAPS	Marchewka et al. (2014a)
Chinese Affective Picture System	CAPS	Lu et al. (2005b)
Madrid Affective Database for Spanish	MADS	Hinojosa et al. (2016)
Affective Norm for French words	FAN	Monnier and Syssau (2014)
Military Affective Picture System	MAPS	Goodman, Katz, and Dretsch (2016)
Affective Norms for English Words	ANEW	Margaret M Bradley and Lang (1999)
Bank of Standardised Stimuli	BOSS	Brodeur, Dionne-Dostie, Montreuil, and Lepage (2010)
Open Affective Standardised Image Set	OASIS	Kurdi, Lozano, and Banaji (2017)
Set of Fear-based Inducing Pictures	SFIP	Michałowski et al., 2017

2.4 Summary

The first component of this chapter covers the scholarly literature of fear emotion and its operationalisation as health messages. This was followed by the literature review on the use of fear in diabetes-related studies. The literature review also explored the formats of the health messages in which the fear-based messages could be depicted. Two formats were specifically analysed, namely the image and text formats. The review is followed by investigating the landscape of fear-related theories and its evolution into the EPPM, which will serve as the main theoretical framework used in my research. The final component of Chapter 2 delved into the various stimuli databases used in emotion-related studies.

CHAPTER THREE: DEVELOPMENT OF THE CONCEPTUAL MODEL

The conceptual model in this chapter takes into account the literature which has been reviewed in Chapter 2. The theoretical model adopted for this study uses the Extended Parallel Process Model (EPPM), which conceptualise the effects of fear-based health messages by examining the interactivity between cognitive and affective responses (Witte, 1992). Although EPPM has been used in the various health context, its use in diabetes setting has been minimal (Tavakoly Sany et al., 2020). The EPPM posits that messages which elicit fear will be effective if it provides serious and relevant threats combined with a high-efficacy (Abbasi, Araban, Heidari, Alidosti, & Zamani-Alavijeh, 2020). Conversely, a substantial threat with a low-efficacy recommendation will trigger rejection of the message and result in counterproductive reactions. Based on these tenets and components of EPPM, this research examines the concepts of aggregated threat and aggregated efficacy adapted to the management of diabetes.

3.1 EPPM Theoretical Model

The motivating factors in the EPPM framework's formulation were due to the overemphasis on previous fear-based theories' cognitive aspect and the neglect of the fear emotion itself (Witte, 1992). These fear-based theories ignored the fear control processes. They provided little or no explanation on how people cope with the fear emotion, which the typical response is to deny or avoid a specific threat (Witte, 1994). In general, the EPPM posits that the most telling impact of fear is when the messages combine high-threat and high-efficacy (Rimal & Real, 2003). Before furthering the discussion on the components of the EPPM, it is noteworthy to point out that there is a difference between "threat" and "perceived threat". The former is an attribute of the message, whereas the latter is a characteristic of an individual consuming the message. The ambiguity between the "threat" and "perceived threat" have resulted in erroneous findings in the literature (O'Keefe, 1990).

A fear-based message in the EPPM framework begins with the appraisals of the threat and efficacy derived from the message which yields either a danger control response or a fear control response (Witte, 1992). The threat component in EPPM is comprised of two dimensions, namely; severity and susceptibility (H. Hong, 2011) whereas efficacy is made up of self-efficacy and response-efficacy (Maloney, Lapinski, & Witte, 2011). Below are components of EPPM, which is primarily based on Witte's studies in 1992 and 1994. More recent studies by Witte and those who cited her works were also used as references to triangulate the meaning of the critical components used in EPPM.

Fear

Fear is characterised as a negative valenced emotion associated with a high level of arousal that is perceived to be severe and personally relevant (Bessarabova, Banas, & Bernard, 2020). It is an internal affective response manifested in both psychological and physiological dimensions (Witte, 1996b). One of the main fears that patients with diabetes have expressed is to experience complications (Seehusen et al., 2019) and one of the major complications that is most feared by patients is related to mobility as a result of lower-limb amputation (Gómez-Ibáñez et al., 2020).

Threat

A threat is a danger which exists in the environment whether a person is aware of it or otherwise. Witte (1994) along with other scholars in the same era, differentiate between an actual threat and perceived threat. The latter is defined as thoughts which are deemed as a cognitive aspect of threat. Research in the area indicated that thoughts about danger or harm is a critical variable in determining behavioural outcomes.

Perceived threat refers to peoples' beliefs that they are vulnerable to a serious threat (Witte, Berkowitz, Cameron, & McKeon, 1998). Perceived threat constitutes perceived severity and perceived susceptibility (Witte, 1992). Witte (1994) posits that perceived

severity refers to the magnitude of a threat, for example, “High blood glucose could lead to glaucoma.”, while perceived susceptibility relates to individual’s conviction that he or she will experience the threat, for example, “I am at risk of lower-extremities amputation because my blood glucose is consistently high.” The perceived threat motivates individuals to take proactive actions that will help them to reduce the fear they are experiencing (Witte et al., 1998).

Efficacy

Efficacy refers to the feasibility and ease that a threat can be reduced or averted via a recommended response (Witte, 1996b). In EPPM, perceived efficacy is comprised of perceived self-efficacy and perceived response efficacy. Perceived self-efficacy is “beliefs about one’s ability to perform the recommended response to avert the threat” (Witte, 1996b, p. 320). Perceived response efficacy is “beliefs about the effectiveness of the recommended response in deterring the threat” (Witte, 1996b, p. 320). An example of a response efficacy is the home-based exercise regimes, which is a recommended task for diabetes patients in light of the Covid-19 pandemic (Futatsugi et al., 2020) and most patients believe that such recommendation would improve their blood glucose (Zare, Ostovarfar, Kaveh, & Vali, 2020). In the self-efficacy theory, Bandura (1977) assigned self-efficacy a pivotal role in determining if an individual will cope with a threatening situation or avoid it. According to him, the stronger the perceived self-efficacy, the greater the individual’s efforts to deal with the threat. Many studies have indicated that self-efficacy correlates with better management of diabetes (Johnson et al., 2019).

Danger Control

Danger control refers to a cognitive response that manifests as protective behaviours deriving from attempts to control the danger or threat (Witte & Allen, 2000). The cognitive process in danger control involves consumption of threat (appeals or) messages, evaluating

the messages' severity and susceptibility and assessment of the messages' response efficacy and self-efficacy (Ruiter, Verplanken, De Cremer, & Kok, 2004). The typical danger control responses include beliefs, positive attitude, and intention to change behaviour following the message recommendation (Witte, 1996b). Self-management of diet, exercise and regular glucose checks are examples of positive attitudes (Arifin et al., 2020) and are atypical of danger control actions.

Fear Control

Fear control is a process which involves an emotion-based coping mechanism that avoids threatening situations or messages as an act of reassurance (Ruiter, Abraham, & Kok, 2001). Individuals who engage in fear-control processing adopts strategies that are intended to diminish the individual's internal emotional strain (Meczowski & Dillard, 2017). The threat is ignored or mitigated, and risky behaviour would go on during the fear control process (Hunter & Rööös, 2016). Typical fear responses involve diminishing fear, such as avoidance, denial and derogation of messages (Witte, 1996b).

Critical Point

The notion critical point is referred to as the point where a message is adopted or rejected (Hullett & Witte, 2001). EPPM posits that the perceived efficacy determines danger control processes or fear control processes and the intensity of responses is determined by perceived threat (Witte, 1992). In EPPM, the critical point will determine the course of action, which is either danger control or fear control. Witte (1995, p. 232) eloquently put it regarding the two appraisal processes as "an appraisal of efficacy in light of the perceived threat." Recent studies have indicated that the danger control, influence behavioural intention through the interaction between EPPM's threat and efficacy constructs (Sarrina Li & Huang, 2020). Danger control or message acceptance in EPPM related to intentions (Witte, 2008a) and therefore have been used in studies to predict health behaviours.

Figure 3-1. The Extended Parallel Process Model (Witte, 1992)

3.2 EPPM Derived Hypotheses

Witte and Allen (2000) posit that the greater the threat perceived, the more motivated a person is to remove negative feelings caused by fear arousal. Simultaneously, when a person feels vulnerable towards a specific condition, a higher threat would motivate the person to do something to deal with the threat (Witte, 2008a). When the perceived threat is low, a person is unlikely to process a message further. In contrast, if the perceived threat is high, the person will begin to appraise their efficacy, which involves evaluating self-efficacy and response efficacy (Birmingham et al., 2015). High levels of efficacy coupled with high threat, would result in adaptive behaviours or danger control, as discussed in EPPM (Witte, 1992, 1994, 1996b). However, certain studies provide room for variability on the threat, where low threat messages could still result in danger control if efficacy remains high, on account of the individual's proactivity (Peters, Ruiter, & Kok, 2013). The caveat in EPPM is that efficacy must be higher than a threat for danger control to happen (Roberto, Meyer, Johnson, & Atkin, 2006). It is also noteworthy that all messages, regardless of the manipulations incorporated, have some inherent degree of efficacy which, coupled with the perceived threat, explains many fear appeal study results (Witte, 1993). Threatening content that arouses fear could raise awareness and lead individuals to relevant resources on a health condition, thus indirectly increasing efficacy (Thrasher et al., 2016). Regarding self-efficacy, it was found that self-efficacy can influence message acceptance in the form of danger control (X. Li, 2018). Similarly, a recent study on breast cancer posits that perceived self-efficacy and perceived response efficacy can affect message acceptance when fear messages are exposed to patients (Totzkay, Silk, & Thomas, 2020).

Witte's & Allen's meta-analysis of EPPM theorised that perceived threat could independently contribute to fear-arousal, thus influencing message acceptance (Witte &

Allen, 2000). According to (Witte, 1994), the contents of health messages could affect the perception of both threat and efficacy with respect to the individual's personal experience, resulting in message acceptance. According to Ralston (2016), perceived threat are typically confounded by third-person effects, which can similarly affect the outcome of message acceptance. Previous studies indicated that perceived susceptibility could influence health messages' impact on health-related decision making (Gallagher, Updegraff, Rothman, & Sims, 2011). However, perceived severity's implications for health messages is more uncommon, and recent studies have concurred its lack of interaction effect (Haase, Schmid, & Betsch, 2020). Several studies posit increasing perceived severity may not be as critical to message acceptance as increasing perceived susceptibility (Lewis, Watson, Tay, & White, 2007). A study did prove the influence of perceived severity on health messages. Still, the effects are likely significant if the behavioural outcomes were adverse, which in the EPPM, is expected for fear control. Given the ambiguity surrounding perceived threat or specifically perceived severity, this Phase attempts to investigate the interaction between perceived threat (which is believed to be an inherent attribute of a person) and the threat itself (derived from the fear-based health messages).

Based on these findings, the following hypotheses were proposed.

H0:

- (a) For Malay patients with diabetes in Singapore, high threat health messages are more likely to result in message acceptance than low threat messages.
- (b) For Malay patients with diabetes in Singapore, health messages in the image format is more likely to result in message acceptance than health messages in text format.

H1:

- a) For Malay patients with diabetes in Singapore, the threat level in fear-based health messages' interaction with perceived severity impacts message acceptance.
- (b) For Malay patients with diabetes in Singapore, the threat level in fear-based health messages' interaction with perceived susceptibility impacts message acceptance.

H2:

- (a) For Malay patients with diabetes in Singapore, the threat level in fear-based health messages' interaction with perceived self-efficacy impacts message acceptance.
- (b) For Malay patients with diabetes in Singapore, the threat level in fear-based health messages' interaction with perceived response efficacy impacts message acceptance.

Extra-message features exclude the content or symbol of a message but can impact the message's intended outcomes (Witte, 2008b). These features could talk about the medium of the message, source/credibility of a message, structure of a message (single versus double-sidedness, recentness, message construct), length/duration of a message etc. Previous studies indicated that messages with graphical content are said to arouse more fear (B. J. Wilson, 2007). Several studies have suggested that the presence of images in health messages increases the impact on behaviour and is considerably more effective than text-based messages (Jain, Hoffman, Beam, & Xu, 2017). The inclusion of images in health messages primarily impact behavioural outcomes (Nagelhout, Janssen, Ruiter, & de Vries, 2016). The impact of the moderating effects on the type of message formats will simultaneously be investigated as the different level of threat.

Based on these findings, the following hypotheses were proposed.

H3:

(a) For Malay patients with diabetes in Singapore, the format type of fear-based health messages' interaction with perceived severity impacts message acceptance.

(b) For Malay patients with diabetes in Singapore, the format type of fear-based health messages' interaction with perceived susceptibility impacts message acceptance.

H4:

(a) For Malay patients with diabetes in Singapore, the format type of fear-based health messages' interaction with perceived self-efficacy impacts message acceptance.

(b) For Malay patients with diabetes in Singapore, the format type of fear-based health messages' interaction with perceived response efficacy impacts message acceptance.

Table 3-1.

Summary of Hypotheses

No.	Hypothesis	Supporting Literature
H0	(a) For Malay patients with diabetes in Singapore, high threat health messages are more likely to result in message acceptance than low threat messages. (b) For Malay patients with diabetes in Singapore, health messages in the image format is more likely to result in message acceptance than health messages in text format.	Witte, 1992, 1993, 1994, 1996b; Witte & Allen, 2000)
H1	(a) For Malay patients with diabetes in Singapore, the threat level in fear-based health messages' interaction with perceived severity impacts message acceptance.	(Witte, 1992, 1993, 1994, 1996b; Witte & Allen, 2000) Peters et al. (2013)

	(b) For Malay patients with diabetes in Singapore, the threat level in fear-based health messages' interaction with perceived susceptibility impacts message acceptance.	Birmingham et al. (2015)
H2	<p>(a) For Malay patients with diabetes in Singapore, the threat level in fear-based health messages' interaction with perceived self-efficacy impacts message acceptance.</p> <p>(b) For Malay patients with diabetes in Singapore, the threat level in fear-based health messages' interaction with perceived response efficacy impacts message acceptance.</p>	
H3	<p>(a) For Malay patients with diabetes in Singapore, the format type of fear-based health messages' interaction with perceived severity impacts message acceptance.</p> <p>(b) For Malay patients with diabetes in Singapore, the format type of fear-based health messages' interaction with perceived susceptibility impacts message acceptance.</p>	Witte (2008b) B. J. Wilson (2007) Jain et al. (2017)
H4	<p>(a) For Malay patients with diabetes in Singapore, the format type of fear-based health messages' interaction with perceived self-efficacy impacts message acceptance.</p> <p>(b) For Malay patients with diabetes in Singapore, the format type of fear-based health messages' interaction with perceived response efficacy impacts message acceptance.</p>	

3.3 Summary

Based on the literature review, the EPPM model was deemed a suitable framework for this research. Operationalisation of the EPPM framework will facilitate the investigation on the type of fear-based health messages that will promote adaptive behaviours in diabetes management. Combining threat and efficacy composite variables will determine if an individual will be swayed towards danger control (adaptive behaviours) or fear control (maladaptive behaviours).

Four main hypotheses were proposed to extricate possible explanations based on the research questions that were introduced in Chapter 1. The hypotheses were centred on two related manipulations of the fear-based health messages, namely 1) high threat vs low threat (to elicit high and low fear arousal) and 2) image vs non-image (text).

CHAPTER FOUR: PHASE I - CURATION OF STIMULI

This chapter sought to elaborate on how a set of diabetes-related stimuli were curated. The first objective of Phase I was to curate a set of fear-based stimuli which is related to diabetes. The second objective of Phase 1 was to validate its appropriateness to be used for experiments with diabetes patients. The fear-based stimuli curated would be part of a broader set of diabetes-related stimuli known as Diabetes Affective Message Stimuli (DAMS) which is currently comprised of fear-based stimuli, enthusiasm-based stimuli and neutral-based stimuli (Kawaja, 2018).

Fear-based stimuli in DAMS is comprised of thirty (30) stimuli in image and text format. For this research, only stimuli which elicit fear emotions were regarded given the specificity of the research. In Phase I of the study, the curated stimuli were presented to a group of patients and healthcare providers in two separate Focus Group Discussions (FGD) to obtain their feedback regarding the stimuli. Based on the feedback received, several of the stimuli in DAMS had to be replaced. The healthcare providers were again consulted regarding the new set of stimuli. One-to-one interviews were conducted with diabetic patients to obtain their feedback regarding the fear-based stimuli.

4.1 Curation and Development of DAMS

The development of the fear-based subset in DAMS is comprised of 15 images and 15 texts. These stimuli were curated with the help of librarians from Nanyang Technological University (NTU), Singapore over two informal meetings in the library. The objective of the research was shared with the librarians to provide context. The librarians were told that the stimuli required were in the form of images and texts, and were supposed to elicit fear-related emotions. The librarians proposed several search terms relevant to diabetes and pointed out

the repositories and databases where the stimuli could be obtained. The librarians were also consulted regarding the copyrights of using the stimuli.

The stimuli were derived from medical-related repositories such as the Access-Medicine, Visual-DX, as well as general academic databases such as EBSCOhost and Google Scholar. The stimuli were also obtained from other resources, which includes diabetes-related pins from Pinterest and HealthXChange, a Singapore-based health and lifestyle portal. The full stimuli curated for fear-based stimuli in DAMS can be found in Annex A.

Each of the stimuli was indexed for unique identification. The indexing convention used in DAMS mimics the existing convention used in the GAPED database, where both the individual stimulus and the folders which contain the stimuli were specifically named (Horvat, Duvnjak, & Jug, 2015). In GAPED, the folders are named under specific semantic categories or alpha characters (“A”, “H”, “N”, “P” “Sn” and “Sp”), while each stimulus file name will begin with each of the semantic category followed by three numeric characters (Dan-Glauser & Scherer, 2011). The GAPED stimuli are accompanied with a text file which lists out the stimuli description, its valence and arousal scores along with the respective standard deviation for both metrics. The convention used in IAPS uses four numeric characters to describe each stimulus. It comes with a text file with scores for valence and arousal plus an additional metric, which is the dominance metric (Ito, Cacioppo, & Lang, 1998).

Each stimulus (file) in DAMS would have a naming convention where there would be two (2) alpha characters followed by six (6) numeric characters. The first two alpha characters represent the first and last letter of an emotion, which is supposed to be elicited from a stimulus. The first two numeric characters represent the stimulus format where 01 represents IMAGE, and 02 represents TEXT. The following four numeric characters based on the auto-increment index. The auto-increment numeric index is to indicate the number of stimuli

curated to date. If the first stimulus is a fear stimulus in the image format, it would be indexed as “FR010001”. If the 16th stimulus is to evoke fear in the text format, then, the stimulus’s index would be “FR020016”. The folder’s naming convention which stores the stimuli of the same emotional category will have the first two alpha-characters of the emotion it represents followed by the two numeric characters to represent the format. As such, the fear folder for image format would be FR01 and FR02 for the text format. The DAMS’ folders would contain a text file with each stimulus’s score for valence, arousal and dominance metrics. Examples of stimuli from each category are depicted in Figure 4-1 (text-based) and Figure 4-2 (image-based).

(a) Give diabetes an inch and it will take a foot.	(b) Don’t let diabetes cut you off at the knees.
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Figure 4-1. Examples of fear-based text stimuli

Figure 4-2. Examples of fear-based image stimuli

4.2 Phase I Data Collection

The objective of Phase I was to verify with both diabetes patients and relevant healthcare providers regarding the suitability of using the stimuli, which have been curated. Suitability here means that the stimuli are contextually relevant to the patients and related to diabetes. Secondly, it is to ensure that the stimuli do not exaggerate or undermine the condition's severity. At the same time, Phase I presents an opportunity to brainstorm with participants for ideas regarding the type of stimuli, which could better elicit the desired emotions for the study. Finally, apart from the stimulus, the different emotions that could impact patients' behaviour were also discussed.

The informed consent was obtained from all participants before Phase I was conducted. Phase I had three versions of informed consent, one for the patients FGD, the second for the healthcare providers FGD and the third for the one-to-one interview with patients. Participants were informed about the significance of the research and were reminded that their participation is voluntary. The participants were told that all information disclosed in this study would be kept strictly confidential and anonymous. Participants for this study were randomly recruited from the hospital's diabetes department to avoid selection bias. Ethical clearance was obtained from Nanyang Technological University's (NTU), Institutional Review Board (IRB) (Ref: 2016-09-045) as well as from Tan Tock Seng Hospital (TTSH) through the NHG's Domain Specific Review Board (DSRB) (Ref: 2016/00939). Please see Annex B for the ethical clearance and Annex C for the Informed Consent forms. All the FGDs and one-to-one interviews that were carried out in Phase I were conducted in English.

4.2.1 Phase I Participants

Eight ($n = 8$) patient-participants and eight ($n = 8$) healthcare providers were recruited for Phase I of the research. All participants recruited were from the endocrinology department in Tan Tock Seng Hospital (TTSH), Singapore. The Phase I patient-participants, and healthcare

providers were recruited between April 2017 to July 2017. The patient-participants were recruited when they attend their scheduled appointments at the hospital. The criteria for patient-participants recruited for the study were Malay diabetes patients with Type 2 diabetes between the ages of 21 and 60. Only participants with reported normal or corrected-to-normal vision were recruited to ensure they could view and comprehend the stimuli presented to them.

Phase I of the study took a conservative approach and set the upper age limit to 60 years old to avoid elderly participants who were above the vulnerable age-group. The reason for such an approach is due to the nature of some of the stimuli, which could potentially elicit negative emotions from elderly patients. While the World Health Organisation (WHO) does not specify the absolute age that a person is considered vulnerable, it considers persons who are 65 years and above to be elderly (WHO, 2018). The Singapore government too, have from time to time, reviewed its elderly age-group, which is manifested through its policies regarding the retirement age (MOH, 2017).

Of the ($n = 8$) patient-participants recruited for Phase I, only four patient-participants ($n = 4$) turned up during the FGD. Due to this unplanned glitch, a one-to-one interview had to be introduced in Phase I to balance out the number of patients and number of healthcare providers participating in Phase I of the study. Four patients ($n = 4$) were recruited and interviewed individually following the FGD. Despite the introduction of the one-to-one interview, the objective of Phase I of the study remains the same, which is to obtain feedback regarding the stimuli, the instrument used to rate the stimuli and future emotions which could be introduced to DAMS. Amendments (2016/00939-AMD0003) to NHG's DSRB were filed together with a new set of informed consent. Approval was obtained from NHG (dated 19th July 2017). Please refer to Annex B.

4.2.2 Phase I Study Design

A mixed-method approach was conducted in Phase I of the study. The plan in Phase I was to form two groups of focus group discussion (FGD). The first group was to represent the patients and the second for the healthcare providers. Typically, FGDs are made up of five to eight participants who are guided by a facilitator to explore a specific domain of knowledge within one to two hours' duration (Robinson, 1999).

The FGD for the patients' group in Phase I only managed to recruit ($n = 4$) participants instead of its target ($n = 8$). To balance the number of patients and healthcare providers participating in Phase I, a one-to-one interview had to be introduced. However, these participants were recruited after the stimuli were replaced based on the feedback received from the patients and the healthcare providers FGDs.

The FGD in Phase I was included in the research to discuss the stimuli's appropriateness for Phase II and Phase III of the research. The tasks for the FGD was to look at the 30 fear-based stimuli, which was curated and proposed changes to the stimuli if required. Due to the amount of effort to conduct Phase I, 50 non-fear-based stimuli were also discussed with the participants. These stimuli were part of the development of DAMS but would not be used in this research. In the initial development stage of DAMS, the endocrinologists from the public hospital were consulted, and it was agreed that for the robustness and applicability of DAMS in other diabetes-related research, positive and neutral emotions should also be considered. For this reason, 30 enthusiasm-based stimuli and 20 neutral stimuli were curated along with the 30 fear-based stimuli.

The total number of stimuli reviewed in Phase I was capped at eighty following several studies, which are related to the formation of affective standards. Standards such as IAPS with 956 number of stimuli (Peter J Lang et al., 1997), GAPED (Dan-Glauser & Scherer, 2011) with about 730 stimuli, Military Affective Picture System (MAPS) (Goodman et al.,

2016) with 240 stimuli, do have significantly higher number of total curated stimuli.

However, during the formation of these standards, the maximum number of stimuli exposed to each participant were typically capped between 50 and 90 stimuli (Szymanska et al., 2015).

4.2.3 Phase I Procedure

Focus Group Discussion (FGD)

The FGD with the healthcare providers was held in a meeting room in the hospital's Annex Building where the participants were recruited. The healthcare providers were directed to the meeting room with a diabetes-nurse help during their lunch break. The PhD student who was the facilitator for the FGD and a student assistant were present to conduct Phase I of the study. After the introduction and obtaining the informed consent, the group was briefed regarding Phase I of the study. The audio recording began at the briefing stage and continued until the FGD ended. The group was then presented with the stimuli via a projector and onto a presentation screen.

The facilitator would pause for a minute after presenting a stimulus to allow participants to give their opinions regarding the stimuli. Apart from validating if, the stimuli were eliciting the desired emotions, the group was queried if an existing stimulus needed to be replaced. If there were no comments or feedback given, the following set of stimuli were presented to the group, and this procedure was repeated until all the stimuli were presented. The healthcare providers were also asked regarding other emotions, which could have an impact on patients' behaviour. The focus group discussions were audio-recorded and transcribed. The transcription is available at Annex D.

The same procedure was used for the patients' FGD. The only difference was that the FGD had to be conducted in the clinic where the patients came for their scheduled appointments instead of the meeting room where the healthcare providers had their FGD. The

patients were approached by a diabetes nurse regarding the study and were then gathered in one of the consultation rooms where the FGD took place.

After the discussions with the patients and the healthcare providers were completed, a second curation process was conducted. The purpose of the second curation was to address certain issues that were brought up during the FGD, and a change of stimulus would take place if the consensus found that a particular stimulus was not appropriate. Stimuli which are not appropriate would be replaced with new stimuli. The newly curated stimulus would then be emailed to the healthcare providers' group to obtain more comments and feedback. Upon completing Phase I, patient-participants were given the patient honorarium and would then sign an acknowledgement form that they have received the honorarium. Funding approvals for patients' honorarium can be found in Annex F.

One-to-One Interviews

Apart from the FGD, Phase I had to introduce one-to-one interviews because the number of patient-participants targeted for the patients' group FGD was not met. After the DSRB was filed and approved for the one-to-one interview, patients were recruited on 22nd July 2017 from the same clinic as patients who were recruited for the FGD. However, unlike in the FGD group where the stimuli were presented onto a screen via a projector, the stimuli here were presented via Apple's iPad with a screen size of 9.4 x 6.6 inches.

The main difference for the one-to-one interview was that the stimulus used were those, which have been replaced based on the feedback gathered from the FGD. Another difference was that only the PhD student was on-hand to conduct the study, unlike the FGD where a student assistant was available to facilitate the study. The student assistant was not required for the one-to-one interviews because the PhD had only one patient to interact regarding the informed consent, the research itself and settling of the patients' honorarium at a single time. Instead, for the FGD, there were more participants at a single time and as such the PhD

student had to focus on carrying out the research while the student assistant facilitated with the informed consent and patients honorarium. The rest of the procedure in the one-to-one interviews remained the same as the FGD. After completing Phase I, patient-participants from both the FGD and the one-to-one interview were given the patient honorarium for their participation.

4.3 Phase I Analysis

In Phase I, eight (n = 8) healthcare providers and four patients (n = 4) were recruited for the FGD. These two groups had their own separate FGDs. Following the FGDs, four (n = 4) other patient-participants were recruited for a one-to-one interview. Table 4-1 depicts the distribution of participants taking part in Phase I. The issue of the overwhelming female participants in Phase I will be discussed in this chapter in Section 4.4.

Table 4-1.

Distribution of Participants According to Sex in Phase I

	Male	Female	Participants' Reference
Healthcare providers FGD	1	7	HP1 – HP8
Patient FGD	0	4	P1 – P4
Patient one-to-one interview	1	3	P5 – P8
Total	2	14	

Guiding questions were used as units of analysis for coding can be found in Annex D. The six transcripts (two from FGD and four from one-to-one interviews) were iteratively read, and re-read, line-by-line to match appropriate segments of the response texts to the relevant codes until the matching iteration reaches a saturation point. Please also see Annex D for all of the transcribed FGDs and interviews.

The transcribed FGDs from the two groups, as well as the one-to-one interviews, were analysed using content-analysis, a technique, which is used to identify key themes in the qualitative data (Dasgupta et al., 2013). In content analysis, there are two main approaches. The “manifest analysis” approach tries to understand the written content, whereas in the “latent analysis” approach expounds on the hidden meaning (Erlingsson & Brysiewicz, 2017).

The codebook for this research was adopted from Bengtsson (2016), which provides a guideline to breakdown the raw data into summary themes which can provide a quick overview of the FGDs and the one-to-one interviews. Table 4-2 depicts the generic code which was used throughout the Phase I’s content analysis. The raw data is the content that was transcribed from the data collected in Phase I and the end product are the themes. The description in the second row of Table 4-2 explains the idea behind each of the column headers in Table 4-2. In the content analysis, not every column headers are used to analyse the data. For this research an additional, “Stimulus Reference (label)” column have been added to allow a quick reference regarding the stimulus, which is being discussed. The full codebook can be found in Annex D.

Table 4-2.

Codebook for content analysis

Meaning Unit	Condensed Meaning Unit (CMU)	Stimulus Reference (label)	Code	Sub-headings	Category	Themes
raw data	summarised raw data	Stimulus reference	a short sentence to represent CMU	optional: could be the same as code	optional: a shorter version of code with one or two words	conclusion is drawn from raw data

An example of how the credibility theme was developed can be seen in Table 4-3. The rest of the themes were derived through the same method. Please refer to the codebook in Annex D for the rest of the themes.

4.4 Phase I Findings

Using the codebook, four themes were derived, namely credibility, relevance, correctness and appropriateness.

Theme 1: Credibility

“Credibility” here refers to the reliability of the source where the stimuli were derived. This subject was most discussed with participants from the healthcare providers’ group during the FGD. The participants were keen to know the source of the stimuli as well as the process of how the stimuli were curated. HP2 asked, “Where did you get all the photos?” whereas HP3 asked, “Do you have the original data that you get from?” Regarding the text-based stimuli, the respondents also queried regarding the stimuli factualness. Of the questions posed were from HP4 who asked, “So the statements are all factual?”

There was no discussion regarding the credibility of stimuli with patient-participants during the FGD. Perhaps the patients felt that the researcher was in the position of authority and hence did not question the credibility of the stimuli presented to them. One of the participants from the one-to-one patient interview felt that the stimuli were credible because the participant has seen some similar pictures. According to the participant, “I have seen these pictures when I first came to the hospital.”

Theme 2: Relevance

“Relevance” was one of the central themes in the discussions. The stimuli curated should be diabetes-related or have relevance to diabetes. One of the patients in the one-to-one interview inquired if the stimuli have relevance to only a group of local patients or generic to the rest of the world. P7 queried “This (referring to the picture), refers to the whole world?” It

was a valid question because a stimulus would have a greater impact on the patients if it has greater relevance to the patient. A stimulus will have a significant impact on the patient if the message from the stimulus is relevant to the local context.

Similarly, the healthcare providers had concerns regarding the relevance of the stimuli used for the patients. Apart from accessing the stimuli visually, the group wanted to find out how some of the stimuli curated were referenced in journals or articles. Of the questions raised were from HP2, “Are we allowed to follow the comments and what the photos are referenced to?” From here, we can infer the need to ensure the relevance of the stimuli used has to be in the context of diabetes.

Theme 3: Correctness

“Correctness” here refers that the stimuli used were not misidentified. For instance, a patient with diabetes may have a particular condition. However, the patient’s condition may not have been caused by diabetes. Hence, that specific condition cannot be used as a stimulus to elicit fear among the patient-participants. In this regard, the fear-based stimuli were extremely scrutinised by the healthcare provider group during the FGD. After presenting the stimuli to these group of participants, a few questions were raised due to concerns regarding the correctness of the stimuli used. Of the questions posed were by HP3, “There are some photos pertaining to diabetes that may not be the correct photos. Where did you all get the photos?” HP5 posed, “...the foot, for instance, the skin changes might not very clinical to diabetes but the foot is something that can happen to a diabetic patient. So it is not entirely reflective.” HP2 identified, “Glaucoma is also wrong image..”

The scrutiny regarding the correctness of the stimuli was not evident during the patients’ FGD or the one-to-one interviews. A patient, P8 instead validated the images by saying, “These are the results from diabetes.” Based on the responses from the FGD and the one-to-one interview, it was noticed that patient-participants cannot verify the correctness of the

message presented to them. Even the researcher and the librarians who were initially involved in the curation of the stimuli could make errors regarding the correctness of the of the stimuli used.

Theme 4: Appropriateness

“Appropriateness” here refers to the acceptable emotion, which a specific stimulus is supposed to evoke from the patient-participants. Fear, apart from enthusiasm was one of the emotions that some of the stimuli from study, tried to elicit from the patients. HP3 highlighted that fear emotion was distinct in the stimuli presented. HP1 mentioned, “The fear, the side of the picture, the one photo which shows the dialysis ...because the dialysis cost a lot of money.” HP3 tried to clarify why there were numerous stimuli, which evokes fear but not other emotions such as guilt. HP3 mentioned during the discussions, “Is there some research done on other emotions such as guilt? Because the main bulk of the photos is about fear.” The researcher explained that fear was one of the emotions being studied in this study but not guilt. While the comment by HP3 questioned why other emotions were not used, the comments did subtly verified that fear was elicited. However, the patients’ group felt that the stimuli presented did not evoke extreme fear. One of the patients, P3 cited, “The pictures are not that scary.” Another patient, P8 in the one-to-one interview mentioned, “Ok lah. Because our family also go through the same situation. So, we know.”

Table 4-3.

Example of content analysis using the codebook

No.	Source	Meaning Unit	Condensed Meaning Unit	Stimulus reference (label)	Code	Subheadings	Category	Themes
1.	FGD-H	<p>HP3: “There are some photos pertaining to diabetes that may not be the correct photos. Where did you all get the photos?”</p> <p>HP3: “OK. Can you help us through theI don’t know.. the skin condition may not be...”</p> <p>HPI: “Ya, correct. I also feel that the skin condition pictures...”</p> <p>“HPI: I think both leg one...”</p> <p>“HP3: Ya, this is a Mollusca Contagiosum”</p> <p>“HP4: Ya, this is Mollusca Contagiosum”</p> <p>“HP3: So it is not really relevant to diabetes.”</p>	<p>Stimuli presented need to be verified for its correctness.</p> <p>Checking the source of the stimuli.</p>	<p>FR010007</p> <p>FR010008</p>	<p>Mistakes in stimulus</p> <p>Stimuli source</p>	<p>Replace stimulus.</p>	<p>Correctness</p> <p>Credibility</p>	<p>Correctness</p> <p>Credibility</p>

Based on the analysis in Phase I, four image-based stimuli were deemed not suitable for Phase II of the study and were replaced with new stimuli. Figure 4-3 presents the seven stimuli which were replaced. Please refer to Annex A for the rest of the stimuli.

Stimuli

Previous

Replaced

FR010007

FR010008

FR010009

FR010010

Figure 4-3. Replaced fear-based stimuli

According to the discussions that were conducted with the healthcare providers, it was deemed that FR010007, FR010008, and FR010010 had issues in terms of “correctness”. The images were taken from patients with diabetes but were not specifically caused by diabetes. There were some ambiguities in terms of the skin conditions depicted in FR010007, FR010008 and FR010010. The healthcare providers preferred to have images of a direct complication caused by diabetes. For FR010009, the healthcare providers felt that the image was not “appropriate” as it does not reflect an actual manifestation of glaucoma. Images of patients undergoing dialysis and finger ulcers provide a greater element of “correctness” and “relevance” with regards to diabetes.

The researcher began curation for the second time from the databases that were recommended by the university librarians with the objective to replace the stimuli which have raised concerns. Once the new stimuli were curated, they were emailed to the diabetes nurse in the hospital who help to facilitate in asking the healthcare provider participants to look at the newly curated stimuli. Once the healthcare providers gave the green light, the stimuli were incorporated into the DAMS’ stimuli set. Due to the logistical constraints, the diabetes nurse could not accede to the request for the patient-participants to check on the newly curated stimuli for a second time. Ideally, the opinions of patient-participants who participated in the FGD should be incorporated. However, the newly curated stimuli were presented to the four patients participating in the one-to-one interview, and their feedback

was documented. There was no further request by the patients or the healthcare provided to change the current stimuli in DAMS.

4.5 Discussion

4.5.1 Curation of Stimuli

Curation can be described as the discriminate selection of materials by ourselves or by a group of people (Davis, 2017). The selection of materials is based on what seems appropriate by the relevant people who are curating the materials based on the narrative that they want to put out. The materials that were curated in this study were the stimuli that are related to diabetes. There can be arguments regarding the starting point of the curation process. Could the starting point be when the researcher and the librarians were looking for the stimuli or at the time when the stimuli were presented to the participants in Phase I. It can be said that in both instances, curation took place. However, limitation exists as the second group of curators (the participants) could only work with the set of stimuli which is presented by the first group of curators (the researcher and the librarians).

The second group of curators have been primarily dominated by the female participants for both the healthcare provider's and the patient's groups. The recruitment of the two groups of participants was administered by a diabetes-nurse in the hospital and was constrained by the participants' availability based on their schedule at the time of the FGD. For the health provider's group, only one male participant was available. For the patient's group, only four patient-participants turned up during the FGD, and all were females.

Apart from the imbalance in terms of the majority of participants recruited were females, there was also a concern that there was also a skewness in terms of the number of participants for the healthcare providers (8) and compared to the number of patient participants (4) during the FGD. A decision was made to re-recruit patients again at a later time after the FGD. It took a while for the diabetes-nurse to help to arrange for a second FGD. To address this

delay, it was decided that a one-to-one interview research design would facilitate the candidate to recruit patients in the clinic immediately, and not wait to have all the patients available at the same time. For consistency, convenience sampling was adopted, and it drew three new female patients and one male patient. Coincidentally just as the healthcare provider's group, the patients' group also drew one male and seven female participants (from the FGD and one-to-one interview).

There is a real concern that the gender composition for both of the groups could have some influence on the curation process. Previous studies which have expected significant gender differences in the ratings of military-related stimuli have yielded no significant outcomes among the military personals (Goodman et al., 2016). The non-significance influence of gender among the military community could be due that they are already accustomed to the contents of the stimuli, regardless of gender. Similarly, healthcare providers are already trained to see the complications in diabetes irrespective of gender. Hence, female healthcare providers are not going to be overawed by the stimuli.

Furthermore, previous studies have indicated that when it comes to fear-based stimuli, fear of body injuries (such as diabetes-related complication) had no significant difference between genders (McLean & Anderson, 2009). Ideally, the participants could be equally represented by both genders. However, due to logistical limitation, the study has to make do with the available participants on hand.

Studies which fail to choose appropriate stimuli based on theoretical framework are exposed to incorrect conclusions of situations where the stimuli are in danger of becoming an intervention (Möttus, 2016). A stimulus chosen from a set of stimuli should be interchangeable if it is based on a theoretical framework. This is in-line with the objective of Phase 1 of the study, which was to determine its suitability in choosing a stimulus.

Interestingly, the FGDs and the one-to-one interviews conducted drew up other themes apart

from “appropriateness”. Themes related to “correctness”, “credibility” and “relevance” were highlighted during the discussions. The amalgamation of these themes would, therefore, provide a strong set of stimuli which is theoretically filtered.

4.5.2 Malay Perspectives Gained During Stimuli Curation

The Malay participants who were recruited in Phase I of the study were receptive about using fear-based health messages as a means to warn other Malay patients with diabetes. During both the FGD (for patients) and the one-to-one interviews, patients indicate that they can relate to the images as they have witnessed various forms of diabetes complications either from other patients or from their own family members. Most Malay participants also acknowledged that the text-based messages are relatable, but some patients enquired if certain texts occurred in the context of Singapore or overseas.

In general, Malay patients do not question the correctness and credibility of the stimuli. They assumed that the stimuli would have the two attributes. It is not known if they have such assumptions because the stimuli were exposed to them in the hospital or because of some other factors. The Malay patients agreed that the stimuli, both in image and text formats, were appropriate to elicit fear emotions. They felt that incorporating fear was good for other patients as well as for themselves. The participants did not feel that the stimuli presented to them were exaggerated and concurred that the stimuli were a common sight. Based on these insights, it seems that fear-based stimuli could impact Malay patients with diabetes to manage their condition better.

4.6 Phase I Summary

The list of known stimuli databases in Table 2-1 was developed to ensure relevance in specific domains. Determining relevance is frequently based on the researchers' intuition and assumptions which can sometimes be problematic (Horst & Hout, 2016). To minimise exposure to such problems, DAMS was curated on a few levels. First, the researcher, with the help of university librarians ascertain several diabetes-related resources where the stimuli can be obtained. With an experiment in mind in the later stages of the study, the stimuli curated were not only relevant to diabetes but intended to be able to elicit fear emotion. Neutral and enthusiasm stimuli were also curated for DAMS but were not incorporated for this research.

Focusing primarily on the fear-based health messages will provide the depth for this research to deeply comprehend the impact of fear-based health messages on influencing patients to manage diabetes. Besides, research supporting the use of fear has received unequivocal support (Nabi & Myrick, 2019), fear have been found to be widely utilised emotion in health messages (Zhang¹ & Zhou², 2020) and, time and again proved to reduce risky health behaviours in communities (Harper, Satchell, Fido, & Latzman, 2020).

Two FGDs were carried out, one with the healthcare providers and the other with patients. The intended number of participants were eight for each group, but only four turned up for the patients' group. To compensate the four patients who did not turn up for the FGD, a one-to-one interview with four patients were incorporated into Phase I. Based on the discussions with the healthcare providers and the patients; four themes emerged regularly. The four themes, namely credibility, relevance, correctness and appropriateness, were used as filters to determine, which stimuli could be applied in Phase II and Phase III of the study.

CHAPTER FIVE: PHASE II - RATING OF STIMULI

Phase I, in Chapter 4, served as a guide to assess the stimuli curated qualitatively. Phase II's objective was to rate (quantitatively) the emotion-based stimuli curated in Phase I using the Self-Assessment-Manikin (SAM). The Self-Assessment Manikin (SAM) introduced by Peter J. Lang (1980), is widely used in emotion-related studies. SAM provides a quick, nonverbal method of quantifying emotional states based on the three dimensions (Bucks, da Silva, & Han, 2005). The three emotion dimensions identified in SAM are valence, arousal, and dominance (Margaret M. Bradley & Lang, 1994).

Via SAM, a research participant could rate the stimuli by choosing a circle under the manikin. The valence dimension ranges from a smiling, happy figure to a frowning, unhappy figure, whereas the arousal dimension ranges from an excited, wide-eyed figure to a relaxed, sleepy figure and the changes in the size of the manikin represent the dominance of a situation: a large figure indicates maximum control of a situation (Morris, 1995). See Figure 5-1.

Phase II uses SAM to evaluate the intensity of the fear emotion. A high threat fear-based stimulus will derive high arousal scores in SAM. The valence scores determine if a stimulus elicit positive or negative emotions. As such, the expected valence for a fear-based stimulus is negative. The SAM scores can help researchers to determine, which stimuli to incorporate into their studies.

Also included in Chapter 5 are two process flows. The first is a process flow to illustrate how the stimuli were rated by 100 Malay diabetes patients with Type 2 diabetes. A second process flow was proposed to explain how stimuli could be chosen for the emotion-related experiments. The deliverable from this chapter would be the rated stimuli with their respective SAM scores.

Valence: positive to negative (1 = "happy", 5 = "unhappy")

	Happy				Unhappy
Valence	☐	☐	☐	☐	☐

Arousal: high to low (1 = "aroused", 5 = "calm")

	Aroused				Calm
Arousal	☐	☐	☐	☐	☐

Dominance: low to high (1 = "dominated", 5 = "dominating")

	Dominated				Dominating
Dominance	☐	☐	☐	☐	☐

Figure 5-1. Self-Assessment Manikin (SAM) to rate the affective dimensions of each stimulus (Morris, 1995).

5.1 Phase II Data Collection

The aftermath of Phase I resulted in 4 fear-based stimuli being replaced as they are deemed to be unsuitable based on the filter (the four themes) which was devised after the FGD and the one-to-one interviews. Informed consent for patient-participants who rated the stimuli for Phase II was obtained. Participants were briefed on how to use the Self-Assessment-Manikin (SAM) to rate the stimuli. Participants were informed regarding the significance of their participation and at the same time, were reminded that their involvement

is voluntary and that all information disclosed in this study would be kept strictly confidential and anonymous.

Ethical clearance was obtained from Nanyang Technological University's (NTU), Institutional Review Board (IRB) (Ref: 2016-09-045) as well as from Tan Tock Seng Hospital (TTSH) through the NHG's Domain Specific Review Board (DSRB) (Ref: 2016/00939). Please see Annex B for the ethical clearance and Annex C for the Informed Consent forms. All of the surveys were conducted in English during Phase II. However, there were small talks in Phase II before and after the data collection, where the conversations were held in both Malay and English.

5.1.1 Phase II Participants

The DAMS stimuli were presented to ($n = 100$) patient-participants who were recruited exclusively for Phase II. The criteria for patient-participants recruited for Phase II were Malay diabetes patients with Type 2 diabetes between the ages of 21 and 60. Only participants with reported normal or corrected-to-normal vision were recruited to ensure they could view and comprehend the stimuli presented to them. No healthcare providers were recruited for Phase II of the study. Participants for this phase were also referred to as the "Rating Group".

Similarly to Phase I, patients were recruited during their scheduled appointment in TTSH's endocrine department. Patients were recruited from September 2017 to March 2018. Patients in Phase II had different informed consent from the ones in Phase I to reflect the different study procedures in the two phases.

5.1.2 Phase II Study Design

A survey-based on SAM was developed to rate the emotion elicited by the DAMS stimuli which were curated from Phase I. The stimuli were uploaded to the Qualtrics server. Each

stimulus was considered as a single question and was organised as a single block in Qualtrics. In the same block, three emotion matrices of pleasure/valence, arousal and dominance with its corresponding scales were uploaded to the server. Thirty fear-based stimuli were rated using the SAM metrics. The blocks presented to the rating group were randomised to minimise biases.

Figure 5-2. Process flow of rating a stimulus using SAM standard

Figure 5-2 presents the process flow which a participant went through in Phase II based on the SAM standard (Margaret M Bradley & Lang, 1994). Each stimulus was presented for 6 seconds after which a participant had to rate the stimulus based on SAM's three matrices. Participants were given 15 seconds to rate the stimulus. After the stimulus had been rated, the participant clicked on the next arrow button to view the subsequent stimuli. A slide informing the participant to prepare to review the next slide (stimulus) appears on the screen for the next 5 seconds, before the next stimulus was presented to the participant. The preparation slide in Figure 5–3 is a standard, which has been incorporated into SAM when rating emotion-based stimuli (Margaret M Bradley & Lang, 1994). The stimuli and the SAM scales

were presented to the participants via a 9.7-inch iPad (Apple) which is similar to existing tablet PCs in the market.

Figure 5-3. The “Get ready” slide (Margaret M Bradley & Lang, 1994).

The participants needed to rate all the stimuli based on the three metrics in SAM. A participant could take less than 15 seconds to rate a stimulus. The 5 seconds for the “Get ready” slides and the 6 seconds for each stimulus had a counter which the participants could see, and the slides would automatically change once the timing was up.

5.1.3 Phase II Procedure

Phase II of the research was held in the same clinic where the patients were recruited for Phase I. After signing the informed consent; a participant would be presented with the stimuli via the iPad tablet device. The patients were given a choice as to whether to hold and click the tablet by themselves or for the researcher to click for them. Before rating the stimuli, the researcher explained the manikins and the emotion scales used in SAM.

The patients were informed that if their queue number were to be called up, the researcher would pause the survey for the patients to proceed with their blood test or follow up with either their doctor or nurse for their appointment. After completing the rating of the stimuli, the participants were debriefed and given the patient honorarium by the researcher for their participation. They were asked to sign a document to acknowledge receiving the honorarium.

5.2 Phase II Analysis

Table 5-1.

Demographics of Type 2 Malay Patients Recruited for Phase II

	Number of participants		
	Male	Female	Mean Age
Rating Group (n = 100)	40	60	49.86

Of the (n = 100) participants recruited for the rating group, 40 were male and 60 female patients with a mean age = 49.86 as featured in Table 5-1. Participants' scores from the rating group were downloaded from the Qualtrics server with the SAM scores. To recap, the matrices based on SAM are pleasure/valence, arousal and dominance/control. Typically, fear-based stimuli elicit high arousal, have negative valence and results in the individual feeling dominated. Each stimulus, for example, FR010001, would have scores for the three matrices, represented as V (valence), A (arousal) and D (dominance) as presented in Table 5.2 which shows the SAM scores for part of the 15 image-based fear stimuli.

Table 5-2.

Part of SAM Scores for Image-based Fear Stimuli

Patients No	FR010001			←→			FR010015		
	V	A	D	V	A	D	V	A	D
1	4	2	1	...	...	...	3	1.7	2
2	4	1.8	3	...	...	...	5	1.9	2.1
3	5	1	1	...	...	...	5	1	1
:	:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:	:
100									

(V = Valence, A = Arousal, D = Dominance), Scores of 1 – 5 for each of the metric

Figure 5-4 shows the process flow on how a stimulus can be selected for emotion-based studies. The first consideration is the valence or pleasure metric. If a stimulus is for negative

emotion, then the “V” score has to be high (above the score of 3 and close to 5). On the contrary, if the stimulus is for positive emotion, the “V” score has to be low (below 3 and close to 1). The second consideration is the arousal metric. The arousal metric score is denoted by the “A” score. To know if a stimulus elicits arousal, the “A” score must be low (below 3 and close to 1). Generally, stimuli which elicit arousal would give a low “A” score (below the median) (Choi et al., 2017).

The third consideration would be the dominance metric. Typically, negative emotion-based stimuli would yield low dominance scores, whereas positive emotion-based stimuli would yield high dominance scores. Hence, the “D” scores should be low for fear-based stimuli. As such, fear-based image stimuli and fear-based text stimuli should have a high “V” scores, low “A” and “D” scores. Based on the rating done by the 100 patients, the mean scores for the three metrics were collated. The full scores derived from the 100 patient participants with the mean averages for the three metrics for each stimulus can be found in Annex E.

Figure 5-4. Process flow when choosing stimuli for experiment

5.3 Phase II Findings

The mean scores for fear-based stimuli for both images and texts can be found in Table 5-3. Each stimulus was ranked from the lowest “A” scores to the highest where the lowest “A” scores represent the highest threat. The high “V” scores for fear-based stimuli indicated unpleasant emotions were elicited from the fear-based messages. The feeling of being dominated by the fear-based stimuli resulted in low “D” scores. The full SAM scores can be found in Annex E.

Table 5-3.

Mean Scores of the Three Emotion Metrics for the Fear-based Messages from 100 Malay Diabetic Patients

Groups	Valence	Arousal	Dominance
FR01 (fear (image))	4.88	1.26	1.27
FR02 (fear (text))	4.71	1.50	1.48

The choice of selecting a stimulus very much depends on the research questions that a researcher is trying to solve. Familiarity with the SAM metrics will facilitate the selection process. SAM scores for all the 30 fear-based stimuli were derived and listed in ascending order for its “A” score (Xie, Cao, & Pan, 2020).

5.4 Phase II Discussion

5.4.1 Ascribing SAM Emotion Metrics on Stimuli

The primary objective of Phase II was to obtain the SAM rating scores for each of the stimulus in DAMS. Each of the stimuli ratings would be comprised of the three metrics’ scores. Figure 5-4 presented with a process flow which provided a methodology to select the stimuli for the experiment.

To select a stimulus, the stimuli were ranked according to the “A” scores. The “V” and “D” scores will correspond to the type of emotion a stimulus is supposed to elicit. Hence in some cases, even if the stimulus provides a high “A” score but the “V” or “D” scores is not in tandem the type of emotion it is supposed to elicit, then the stimulus is rejected.

The process flow in Figure 5-4 demonstrates on how a stimulus can be selected for emotion-based studies. The first consideration is the valence or pleasure metric. If a stimulus is for negative emotion, then the “V” score has to be high (above the score of 3 and close to 5). On the contrary, if the stimulus is for positive emotion, the “V” score has to be low (below 3 and close to 1). The second consideration is the arousal metric. The arousal metric score is denoted by the “A” score. To know if a stimulus elicits arousal, the “A” score must be low (below 3 and close to 1). Generally, stimuli which elicit arousal would give a low “A” score (below the median) (Choi et al., 2017).

The third consideration would be the dominance metric. Typically, negative emotion-based stimuli would yield low dominance scores, whereas positive emotion-based stimuli

would yield high dominance scores. Hence, the “D” scores should be low for fear-based stimuli. As such, fear-based image stimuli and fear-based text stimuli should have a high “V” scores, low “A” and “D” scores. Based on the rating done by the 100 patients, the mean scores for the three metrics were collated. The full scores derived from the 100 patient participants with the mean averages for the three metrics for each stimulus can be found in Annex E.

5.4.2 Perspectives Gained from Rating Fear-based Stimuli

Most of the participants who were involved in rating the 80 stimuli felt fearful regarding diabetes complications. Some of them mentioned that they took some time to cope with their condition, but after a couple of years dealing with diabetes, they have become calm about their condition. Financial issues in dealing with the condition as well as in general have contributed towards anxieties about managing their condition. A number of Malay patients also felt overwhelmed and depressed when dealing with their condition. Some patients blame themselves for not taking care of their health and diet. Most patients attribute their poor glucose control due to the food they consume. Some of these patients are open to their doctors that they cannot control their taste buds.

Some patients related their emotional support comes from their faith in God, while others indicated that they rely on family for emotional support. However, some patients also mentioned that family members could also be a source of stress. A number of patients said that they are also caregivers to their family members who have diabetes. Despite the various issues facing the Malay community, most maintain a positive outlook regarding their condition. In general, the fear that patients feel is not because of diabetes itself, but rather, they fear developing diabetes complications.

Based on RQ1, it seems that fear-based messages related to diabetes complication could evoke a level of threat that could influence Malay patients to manage their diabetes. The fear

of complications manifests even in patients who look healthy. Despite the fear, patients are supportive of campaigns that could benefit other patients with diabetes.

5.5 Phase II Summary

All of the 30 stimuli which were curated in Phase I were rated in Phase II. To rate the stimuli, the participants had to go through the process flow based on SAM as depicted in Figure 5-4. After the rating process, the stimuli were sorted in ascending order in each of the category based on the arousal scores.

For fear-based stimuli, valence score had to be high to reflect an unpleasant emotion. At the same time, the dominance score for fear had to be lower than 3 to reflect that the participants felt dominated by looking at the stimuli. Fifteen of the fear-based stimuli are in the image format, and the other 15 are in the text format.

CHAPTER SIX: PHASE III - EXPERIMENTING WITH THE DIABETES AFFECTIVE MESSAGE STIMULI (DAMS)

The study of lifestyle and behaviour for diabetes prevention is a multidisciplinary pursuit that involves both clinical and non-clinical interventions. The effects of these interventions on health behaviours have led to health restoration and health preservation (Sheeran, Klein, & Rothman, 2017). Diabetes patients have similarly benefitted from psycho-social interventions which have taken place over the past 40 to 50 years, where diabetes-related risks have been mitigated (Venditti, 2016).

Despite its extensive use, tailoring stimuli from existing standards such as IAPS (Peter J Lang et al., 1997) or GAPED (Dan-Glauser & Scherer, 2011) for a group of target participants with diabetes may not be achievable. With DAMS, the current research is empowered, having developed a set of fear-based stimuli relevant to patients with diabetes. Phase III's experiment was conducted to investigate the influence of fear-based messages on patients' intention to manage their diabetes. To recap, the two research questions which were presented in Section 1.3 are as follows:

RQ1: Would fear-based stimuli relevant to diabetes could evoke fear emotion among Malay patients with diabetes to manage their condition better?

RQ2: Does a higher threat fear-based health message have more influence over patients' intentions to manage diabetes compared to a lower threat fear-based health message?

6.1 Stimulus Used in Phase III

The fear-based stimulus in DAMS concerned with several different types of complications that are related to diabetes. Complications associated with foot ulcers, lower extremities amputation, kidney failure leading to dialysis and death statistics were some of the content

that was imbued into the fear-based health messages. Based on the various categories of fear-based stimuli available in DAMS, it was decided that stimuli related to lower extremity amputation (LEA) would be selected to evoke the fear emotion for patients participating in the Phase III experiment. One reason for this is because, in the diabetes literature, LEA is more feared by diabetics compared to death itself (Wukich, Raspovic, & Suder, 2018). These fears are not unfounded since mortality rates for diabetes patients with LEA are higher compared those with cancer where an estimated 50% of patients who have had diabetes-related amputation will not survive in the next five years (Armstrong, Wrobel, & Robbins, 2007).

Another reason was due to the availability of LEA related stimuli in DAMS across the four conditions that have been stipulated in the research questions (high threat/low threat x image/text). The experiment in Phase III would require a set of stimuli which is comparable in context, which is the LEA and where the threat and format could be manipulated.

According to the SAM emotional measurement, the arousal metric measures the intensity of emotion that a stimulus elicits. Fear is the essential emotion in this study, and focusing on the arousal metric could inform the level of threat evoked. As such, the experiment in Phase III will only focus on the arousal metric. The arousal mean scores of the fear-based stimuli were reviewed for both the image and the text formats. As seen in Table 5-3, the mean arousal scores for an image is ($M = 1.26$), whereas the mean arousal scores for the text is ($M = 1.50$). It can be seen from the DAMS scores that in general arousal scores and as with the mean scores, the image arousal scores are higher than the text-based stimuli. The SAM scores for all of the fear-based messages for both image and text can be found in Annex E.

The fear-based stimuli chosen for the Phase III experiment are FR010013 and FR010006 (image-based), and FR020004 and FR020010 (text-based) as these stimuli are conceptually related to LEA. FR010013 “A” score is $A=1.17$ compared to FR010006’s “A” score, which

is $A=1.36$. As such, FR010013 poses a higher threat than FR010006. FR020004 arousal score is $A=1.48$ whereas FR020010 “A” score is $A=1.8$. As such, FR020004 poses a higher threat than FR020010. Of the selected stimuli, FR010013 and FR020004 have lower “A” scores than the arousal mean for both the image and text stimuli indicating that both stimuli elicit higher arousal thus are categorised as high threat stimuli. In contrast, FR010006 and FR020010 both have higher “A” scores than the arousal mean for both the image and text stimuli, indicating that both stimuli elicit lower arousal thus are categorised as low threat stimuli. The selected stimuli are detailed in Table 6-1.

Table 6-1 Showing selected stimuli in a 2 (high threat, low threat) x 2 (image, text) factorial design experiment in Phase III and their corresponding SAM scores

	Image	Text
High Threat	<p>FR010013 Valance = 4.96, Arousal = 1.17, Dominance = 1.19.</p>	<div>Record number of people undergoing amputations because of diabetes.</div> <div>Bilangan orang yang menjalani amputasi kerana diabetes melonjak naik.</div> <p>FR020004 Valance = 4.64, Arousal = 1.48, Dominance = 1.54.</p>
Low Threat	<p>FR010006 Valance = 4.8, Arousal = 1.36, Dominance = 1.35.</p>	<div>Don't let diabetes cut you off at the knees.</div> <div>Jangan biarkan diabetes menjadi punca lutut anda dipotong.</div> <p>FR020010 Valance = 4.47, Arousal = 1.8, Dominance = 1.85.</p>

6.2 Participants in Phase III

Sixty ($n = 60$) patient-participants were recruited for Phase III. All participants recruited were from a local mosque in Singapore. Participants in the earlier phases were recruited from a local hospital in Singapore. Due to the Covid-19 situation, the hospital declined to have its patients recruited for the study due to safety reasons. The Phase III patient-participants were recruited between September 2020 to October 2020. Participants in Phase III are also referred to as the “Experiment Group”. The criteria for patient-participants recruited for Phase III were almost similar to Phase I and Phase II, which includes Malay diabetes patients with Type 2 diabetes. However, there was a slight amendment made in terms of participants’ upper age limit. Participants included for Phase III were between 21 and 75 (instead of 60 as in Phase I and Phase II). Similar to the earlier phases of the research, only participants with reported normal or corrected-to-normal vision were recruited to ensure they could view and comprehend the stimuli presented.

Phase, I and II of the research, took a conservative approach to avoid elderly participants who might be deemed vulnerable. This is due to the nature of some of the stimuli, which could potentially elicit negative emotions from elderly patients. However, a meta-analysis of several studies has indicated that due to stereotyping, elderly patients are unnecessarily left-out of health-related studies (D. M. Wilson et al., 2017). It was observed in Phase I and Phase II of this study that some patients who were above 60 years old were cognitively more aware than their younger counterparts. Based on this observation and the fact that the World Health Organisation WHO (2018) does not specify the absolute vulnerable age, the upper age limit was increased.

Informed consent specifically for Phase III was obtained from all participants involved in the experiment. Participants were informed regarding the significance of their participation and at the same time, were reminded that their involvement is voluntary and that all

information disclosed in this study would be kept strictly confidential and anonymous. Ethical clearance was obtained from Nanyang Technological University's (NTU), Institutional Review Board (IRB) (Ref: 2016-09-046). Unlike the in previous phases where the participants were recruited from the hospital, Phase III participants were recruited from a local mosque in Singapore and as such, the NHG DSRB was not required for ethical clearance. Please see Annex B for the ethical clearance and Annex C for the Informed Consent forms. The experiments in Phase III were conducted in English. However, there were small talks before and after the data collection in Phase III, where the conversations were held in Malay and English.

6.3 Phase III Study Design

A 2 x 2 between-subjects, factorial design experiment was conducted in Phase III. Four conditions were created by crossing two levels of message threats (high, low) against two types of message formats (image, text). Each condition had one stimulus to elicit (i) high level of threat in image format, (ii) low level of threat in image format, followed by (iii) high threat in text format, and (iv) low threat in text format. According to EPPM, higher the threat messages would result in higher message acceptance. The two levels of threat proposed will facilitate testing the EPPM's theory and ascertain if threat levels can influence message acceptance among the Malay participants with diabetes.

There have been contrasting views regarding the influence of the health messages' type of formats delivered on message acceptance. While some studies say that there is no statistical difference between the type of formats (Ruiter, Kessels, Peters, & Kok, 2014), certain studies promote the use of images as being more effective (Bastien, 2011) whereas others posit texts can result in greater message acceptance (Boshoff & Toerien, 2017). Incorporating the image versus text debate into the experiment could give some hints about the type of format that could influence the Malay participants towards message acceptance. The ongoing debate

regarding the image and text message formats, along with EPPM's discourse on threat levels, contributed towards the 2 x 2 design experiment.

Fifteen (15) participants were assigned to each group. Participants were assigned to each group using block randomisation to ensure that each group has the same number of participants. Block randomisation works by randomising participants within blocks to assign an equal number of participants to each group or treatment (Efird, 2011). Table 6-2 shows the four factors with each factor having 15 participants.

Based on the rule-of-thumb approach, 30 participants would have been the minimum number per group to detect a small effect size (Betsy & Carmen, 2007). However, due to the Covid-19 pandemic and time limitation, increasing the number of participants represents a real challenge.

A set of demographic and personality traits questionnaires were given to all patient participants, followed by exposure to a stimulus. This is followed by another set of questionnaires based in the EPPM constructs.

Table 6-2.

Sixty between subject participants categorised into four experimental groups based on the 2 x 2 factorial design.

Threat	Format	
	Image	Text
High Threat	15	15
Low Threat	15	15

6.4 Phase III Procedure

Malay congregants from a local mosque in Singapore were approached to enquire if they have Type 2 diabetes. If they have diabetes, they will be informed about the research and its

objectives. If potential participants agree to take part in the study, informed consent would be obtained. Participants would then complete a set of demographics and personality questionnaires. Using the Qualtrics software, participants were randomised into the four groups.

Participants were asked to view a message stimulus based on the four groups in Phase III. Participants were not told the specific group they were assigned as a masking technique. Masking the treatment is intended to avoid participants' bias which could impact the internal validity of the study (Jacobsen et al., 2004). After viewing the messages, participants were then required to respond to the second part of the survey questionnaire, which follows an exposure to a stimulus consisted of EPPM's construct variables. After completing the survey, participants were given the honorarium, followed debriefing. Figure 6-1 illustrates the participants' procedure in Phase III once they were recruited.

Figure 6-1. Phase III experiment process flow

6.5 Measurements for Phase III

The EPPM framework, which was reported in Chapter 3 provides the primary measurements to investigate the type of fear-based health messages that will influence patients to manage diabetes. Not all of the measures will be used for the current phase's

analysis. Still, the data collected from these measurements will help analyse the other potential relationships in the future. Selected DAMS stimuli were presented to the participants, and then data was recorded based on the threat and efficacy constructs in EPPM. The current research opted for a 5-point Likert-scale for each item within a variable construct where (1 = “Strongly Disagree”, 5 = “Strongly Agree”).

6.5.1 Perceived Severity

Three items ($\alpha = .80$) were adapted from previous studies to measure perceived severity (Popova, 2012; Witte, 1996b). Participants were asked regarding the following statements: (1) I believe that diabetic amputation is severe; (2) I believe that diabetic amputation is serious; (3) I believe that diabetic amputation is significant.

6.5.2 Perceived Susceptibility

Pertaining perceived susceptibility was measure using three items ($\alpha = .85$) from previous studies (Popova, 2012; Witte, 1996b). Participants were asked regarding the following statements: (1) I am at risk for getting diabetic amputation; (2) It is likely that I will be afflicted with diabetic amputation; (3) It is possible that I will have diabetic amputation.

6.5.3 Perceived Self-Efficacy

Regarding perceived self-efficacy, participants were asked regarding the following statements: (1) I am able to do self-screening of foot to prevent getting diabetic amputation; (2) Self-screening of foot is easy to do to prevent diabetic amputation; (3) Doing self-screening of foot to prevent diabetic amputation is convenient. These three items ($\alpha = .83$) were derived from previous studies (Popova, 2012; Witte, 1996b).

6.5.4 Perceived Response Efficacy

Regarding perceived response efficacy, participants were asked regarding the following statements: (1) Self-screening of foot helps in preventing diabetic amputation; (2) Self-screening of foot is effective in preventing diabetic amputation; (3) If I do self-screening of

foot, I am less likely to get diabetic amputation. These three items ($\alpha = .85$) were derived from previous studies (Popova, 2012; Witte, 1996b).

6.5.5 Danger Control

Based on the EPPM framework, message acceptance is when an individual takes the danger control route. The danger control construct is measure by asking participants the following statements: (1) Reducing the risks of diabetic amputation would be good; (2) I plan to do self-screening of foot to reduce my risk of having diabetic amputation; (3) I currently practice self-screening of foot to reduce my risk of getting diabetic amputation. These three items ($\alpha = .71$) were adopted from multiple studies (McMahan, Witte, & Meyer, 1998; Popova, 2012).

6.5.6 Fear Control

Message rejection is represented by fear control in EPPM. The three following statements were presented to measure fear control: (1) When I hear about diabetic amputation, I spend additional time thinking about it; (2) The image/text about diabetic amputation are exaggerated; (3) The image/text was misleading. These three items ($\alpha = .94$) were adapted from previous studies (McMahan et al., 1998; Popova, 2012). Item (1) was reversed coded.

6.5.7 Fear of Diabetic Amputation

Three items were adapted from McMahan et al. (1998). These three items ($\alpha = .94$) were used to measure fear or specifically, fear of amputation. The statements presented to the participants to measure this construct are as follows: (1) I feel frightened about diabetic amputation; (2) I feel scared about diabetic amputation; (3) I feel anxious about diabetic amputation.

6.5.8 Individual Differences

One of the measurements that have been widely used to evaluate personality traits and individual differences is known as the Big Five Inventory (John & Srivastava, 1999). The measure assesses five main personality traits: extraversion (e.g., “enthusiastic”), agreeableness (e.g., “compliance”), conscientiousness (e.g., “competence”), neuroticism (e.g., “anxiety”), and openness to experience (e.g., “wide interest”) (Bolton, Becker, & Barber, 2010). For this research, two traits were chosen, namely, conscientiousness and neuroticism. Neuroticism was selected because it is a trait which has been simultaneously investigated in numerous fear appeals studies (Obschonka et al., 2018). Likewise, the conscientiousness was also incorporated as it is evident in previous studies that it is a trait which could influence fear appeals (Terblanche-Smit & Terblanche, 2011). A previous study had similarly used these two traits together to assess personality traits (Costa, McCrae, & Kay, 1995).

Neuroticism

Four items were adapted from previous studies to measure neuroticism (Shiota, Keltner, & John, 2006; Tkach & Lyubomirsky, 2006). The four items to measure neuroticism ($\alpha = .71$) used the following statements: (1) I see myself as someone who is depressed; (2) I see myself as someone who is relaxed, handles stress well; (3) I see myself as someone who can be moody and (4) I see myself as someone who remains calm in tense situation. Items (2) and (4) were reverse coded.

Conscientiousness

Four conscientiousness items were adapted from the same study as the neuroticism measurement (Shiota et al., 2006; Tkach & Lyubomirsky, 2006). The four items to measure conscientiousness ($\alpha = .77$) used the following statements: (1) I see myself as someone who does a thorough job. (2) I see myself as someone who can be somewhat careless. (3) I see

myself as someone who tends to be lazy and (4) I see myself as someone who preserves until the task is finished. Items (2) and (3) were reverse coded.

6.5.9 Demographics

Participants' demographics were also sought. Specifically, they were asked to provide three demographics items, namely, (1) age, (2) gender and (3) education level. For education level, participants were given eight options to choose from “no school” to “post-graduate”.

Table 6-3 lists out all the variables that are used in Phase III experiment.

Table 6-3.

Control (CV), Independent (IV) and Dependent (DV) variables

No.	Name of Variable	Abbreviation	Variable Type	Range
1.	Age	Age	CV	21-75
2.	Sex	Sex	CV	Male/Female
3.	Education	Education	CV	0-7
4.	Perceived Severity	SEV	IV	1-5
5.	Perceived Susceptibility	SUS	IV	1-5
6.	Perceived Self-Efficacy	SE	IV	1-5
7.	Perceived Response Efficacy	RE	IV	1-5
8.	Fear of Amputation	FEAR	IV	1-5
9.	Danger Control	DC	DV	1-5
10.	Fear Control	FC	DV	1-5
11.	Neuroticism	NEU	IV	1-5
12.	Conscientiousness	CON	IV	1-5

6.6 Manipulation Checks

Manipulation checks were conducted to assess the threat levels which the selected stimuli evoked. Two items were used to conduct the manipulation check. The statements are as follows: (1) The image/text makes me feel fearful and (2) The image/text makes me feel afraid. These items were derived from multiple studies where fear-based stimuli were incorporated (Dillard, Plotnick, Godbold, Freimuth, & Edgar, 1996; Meadows, 2020).

Based on the items above, an independent sample t-test was conducted to examine the fear emotion evoked by manipulating the levels of threat (high threat vs low threat) evoked by the stimuli as conducted in previous studies (L. Chen & Yang, 2019). A second independent t-test was conducted to examine the fear emotion elicited by manipulating the two formats (image vs text). The higher threat group reported a higher mean fear ($M = 7.3$, $SD = 2.0$) compared to the lower threat group which reported ($M = 6.9$, $SD = 2.1$) but the difference between the threat groups were not statistically significant, $t(58) = 0.8$, $p = .447$.

In comparing the format groups, the image group reported a lower mean fear ($M = 6.9$, $SD = 2.0$) compared to the text group which reported ($M = 7.2$, $SD = 2.1$) but the difference between the threat groups were similarly not statistically significant, $t(58) = -0.5$, $p = .612$. A one-way ANOVA was conducted on the four groups which were derived from the 2 x 2 factorial experiment. Group 1 (high threat / image) recorded the highest mean ($M = 7.3$, $SD = 2.1$) compared to Group 2 (low threat / image) ($M = 6.7$, $SD = 1.9$), Group 3 (high threat / text) ($M = 7.3$, $SD = 2.3$) and Group 4 (low threat / text) ($M = 7.1$, $SD = 2.0$). However, the ANOVA showed no statistical difference between the four groups in terms of how fear was elicited from the stimuli, ($F(3,56) = 0.323$, $p = 0.809$).

6.7 Phase III Analysis

The quantitative data was exported from the Qualtrics server into Microsoft Excel file. The Excel file is then uploaded to RStudio Version 1.1.463 for Macintosh; Intel Mac OS X 10_14_1. The reliability test, independent sample t-test and ANCOVA were conducted using the cloud-based IBM SPSS statistical software.

6.8 Phase III Findings

Table 6.4 refers to the demographics of the patient-participants recruited for Phase III. Of the ($n = 60$) participants recruited for the experiment group, 43 were males, and 17 were females with a mean age ($M = 61.7$, $SD = 9.95$). Singapore's national survey found that 12.3% of the male population and 10.4% of its female population were diagnosed with diabetes (MOH, 2010). From the same survey it was found that unlike the national average in terms of patients diagnosed with diabetes according to gender, the Malay ethnic group had fewer males (16.2%) than females (16.9%) with diabetes. The mean age was higher for Phase III participants than Phase II because the maximum age of patients recruited was increased from 60 years old (for Phase I and Phase II) to 75 years old. Reasons explaining the increase in maximum age limit have been detailed in Section 6.2. Education reported ($M = 2.8$, $SD = 1.7$) whereas the individual difference traits reported as (Neuroticism, $M = 9.48$, $SD = 2.43$) and (Conscientiousness, $M = 15.6$, $SD = 2.3$).

Table 6-4.

Demographics of Phase III Patient-participants Recruited

Factors	(n= 60)		Mean	Standard Deviation
Age	33-75		61.7	9.95
Sex	Male 43 (71.7%)	Female 17 (28.3%)	-	-
Education	0-7		2.8	1.65
Neuroticism (Individual Difference)	4-16		9.48	2.43
Conscientiousness (Individual Difference)	9-20		15.57	2.30

Apart from the demographics, an analysis was carried out to compare the distribution participants' demographics in each of the four groups based on the 2 x 2 factorial design. Table 6-5 reflects the comparison between the groups. A one-way ANOVA was carried out to compare the participants' age and education across the four groups. It was found that there was no condition differences on age and education. However, the Chi-Square test revealed a statistically significant difference between the four groups when it comes to the participants' sex. As, such, the sex variable will be controlled when analysis of main effects and interactions effects are carried out.

Table 6-5.

Demographics of Phase III Patient-participants compared across four treatment groups

Demographics		High Threat & Image	Low Threat & Image	High Threat & Text	Low Threat & Text	<i>p</i>
Age		M=62.2, SD=10.2	M= 60.9, SD=11.7	M=62.5, SD=9.4	M= 60.1, SD=9.1	.901
Edu		M=3.1, SD=10.2	M= 2.7, SD=11.7	M=2.3, SD=9.4	M= 2.9, SD=9.1	.650
Sex*	Male	14	8	8	13	.018*
	Female	1	7	7	2	

*The numbers represent absolute numbers of participants in each condition for both sexes (male and female participants).

One-way ANCOVA was carried to assess the main effects (high/low threats x image/text) to answer the research questions directly. This is followed by the two-way ANCOVA analysis on both the interaction effects and main effects of EPPM's perceived threat and perceived efficacy constructs with health messages on message acceptance. In the analysis, danger control (DC) is the dependent variable (DV). The independent variables from the

EPPM constructs, which include the perceived severity (SEV), perceived susceptibility (SUS), perceived response efficacy (RE) and perceived self-efficacy (SE) were individually tested as the independent variable (IV) as covariates with either threat levels (Threat) or format types (Format). EPPM posits that when a message is accepted, the individual is adopting danger control. For statistically significant interaction effects, conditional moderation analysis was carried out to investigate the simple effects at 1SD above and below the mean of IVs using Andrew Hayes Process macro (Hayes, 2018).

Main Effects of Threat Levels and Format Types on Message Acceptance

For threat: The effect of threat levels in the health messages effect on danger control reported as ($F(1, 54) = 1.56, p = .217, \text{partial } \eta^2 = .03$) was not statistically significant indicating that the difference between high and low threats had no impact on message acceptance with the sex variable being controlled.

For format: The effect of different message formats on danger control reported as ($F(1, 54) = 0.11, p = .917, \text{partial } \eta^2 = .00$) was also not statistically significant indicating that the difference between image and text formats in health messages had no impact of message acceptance with the sex variable being controlled.

Effects of Threat Levels and EPPM constructs on Message Acceptance

Perceived severity: There was no significant interaction between threat levels and perceived severity, ($F(4, 46) = 1.08, p = .378, \text{partial } \eta^2 = .09$). There was also no main effects of threat levels ($F(1, 46) = 1.70, p = .201, \text{partial } \eta^2 = .04$) and perceived severity ($F(7, 46) = 0.93, p = .490, \text{partial } \eta^2 = .12$).

Perceived susceptibility: There was a significant interaction between threat levels and perceived susceptibility, ($F(3, 46) = 3.08, p = .036, \text{partial } \eta^2 = .17$) with the sex variable

being controlled but no main effects of threat levels ($F(1, 46) = 0.01, p = .937$, partial $\eta^2 = .00$) and perceived susceptibility ($F(8, 46) = 1.10, p = .439$, partial $\eta^2 = .15$).

Since the interaction for threat levels and perceived susceptibility was statistically significant, further probing was conducted to better interpret the interaction between the constructs. Among those who perceived low susceptibility ($-1SD$), high threat condition ($M=11.82$) led to greater message acceptance than low threat condition ($M = 10.46$), $p = .04$. In contrast, for those who perceived high susceptibility ($+1SD$), high threat condition ($M=10.19$) led to lower message acceptance than low threat condition ($M=11.71$), $p = .02$. This relationship is depicted in Figure 6-2.

Figure 6-2

Graph indicating the conditional effect of message acceptance based on $-1SD$ and $+1SD$ of threat level with perceived susceptibility as moderator. (Threat values: 0 (high threat); 1 (low threat)).

Perceived self-efficacy: There was no significant interaction between threat levels and perceived severity, ($F(5, 44) = 1.07, p = .39$, partial $\eta^2 = .11$). There was also no main effects for threat levels ($F(1, 44) = 1.10, p = .301$, partial $\eta^2 = .02$) but self-efficacy indicated main effects ($F(8, 44) = 2.90, p = .011$, partial $\eta^2 = .34$).

Perceived response efficacy: There was a significant interaction between threat levels and perceived response efficacy, ($F(5, 43) = 3.30, p = .013$, partial $\eta^2 = .28$) with the sex variable being controlled. No main effects of threat levels ($F(1, 43) = 0.37, p = .546$, partial $\eta^2 = .01$) and perceived response efficacy indicated main effects ($F(9, 43) = 1.89, p = .080$, partial $\eta^2 = .28$).

Since the interaction for threat levels and perceived response efficacy was statistically significant, further probing was conducted to interpret the moderator relationship between the constructs better. Among those who perceived low response efficacy ($-1SD$), high threat condition ($M=10.89$) led to greater message acceptance than low threat condition ($M = 9.31$), $p = .05$. Instead, those who perceived high response efficacy ($+1SD$), high threat condition ($M=11.23$) led to a lower message acceptance than low threat condition ($M=12.28$), $p = .14$. This relationship is depicted in Figure 6-3.

Figure 6-3

Graph indicating the conditional effect of message acceptance based on $-1SD$ and $+1SD$ of threat level with perceived response efficacy as moderator. (Threat values: 0 (high threat); 1 (low threat))

Effects of Format Types and EPPM constructs on Message Acceptance

Perceived severity: There was a significant interaction between format types and perceived severity, ($F(6, 44) = 2.77, p = .023$, partial $\eta^2 = .27$) with the sex variable being controlled. However, there was no main effects for format types ($F(1, 44) = 0.00, p = .991$, partial $\eta^2 = .00$) and for perceived severity ($F(7, 44) = 0.90, p = .518$, partial $\eta^2 = .13$).

Since the interaction for format types and perceived severity was statistically significant, further probing was conducted to better interpret the nature of the moderator relationship between the constructs. Among those who perceived low severity ($-1SD$), image-based messages ($M=10.75$) led to lower message acceptance than text-based messages ($M=11.12$). Similarly, those who perceived high severity ($+1SD$), image-based messages ($M=10.71$) had a lower message acceptance than text-based messages ($M=12.07$). This relationship is depicted in Figure 6-4.

Figure 6-4

Graph indicating conditional effect of message acceptance based on -1SD and +1SD of format type with perceived severity as moderator. (Format values: 0 (image); 1 (text))

Perceived susceptibility: There was no significant interaction between format types and perceived susceptibility, ($F(5, 44) = 0.43, p = .829$, partial $\eta^2 = .05$) with the sex variable being controlled. No main effects was reported for format types ($F(1, 44) = 0.38, p = .539$, partial $\eta^2 = .01$) and for perceived susceptibility ($F(8, 44) = 0.57, p = .793$, partial $\eta^2 = .09$).

Perceived self-efficacy: There was no significant interaction between format types and self-efficacy, ($F(4, 45) = 0.77, p = .550$, partial $\eta^2 = .06$). No significant main effects was reported for format types ($F(1, 45) = 0.03, p = .871$, partial $\eta^2 = .01$) but significant main effects was found for perceived self-efficacy ($F(8, 45) = 2.88, p = .011$, partial $\eta^2 = .34$).

Perceived response efficacy: There was no significant interaction between format types and response efficacy, ($F(6, 42) = 1.28, p = .287$, partial $\eta^2 = .16$). No main effects was

reported for format types ($F(1, 42) = 0.30, p = .588$, partial $\eta^2 = .01$) and for response efficacy ($F(9, 42) = 2.11, p = .051$, partial $\eta^2 = .31$).

Results of the analysis for the main effects and the interaction effects is summarised in Table 6-6.

Table 6-6.

Results from ANCOVA to show the interaction effects of severity, susceptibility, self-efficacy and response efficacy on (i) threat (high/low) levels, (ii) format (image/text) and danger control (message acceptance).

	Interaction Effects	<i>df</i>	<i>F</i>	<i>p</i>
1.	Threat * Perceived Severity	4,46	1.08	0.378
2.	Threat * Perceived Susceptibility	3,46	3.08	*0.036
3.	Threat * Perceived Self-Efficacy	5,44	1.07	0.39
4.	Threat * Perceived Response Efficacy	5,43	3.30	*0.013
5.	Format * Perceived Severity	6,44	2.77	*0.023
6.	Format * Perceived Susceptibility	5,44	0.43	0.829
7.	Format * Perceived Self-Efficacy	4,45	0.77	0.550
8.	Format * Perceived Response Efficacy	6,42	1.28	.287

A summary of the hypotheses based on the ANCOVA results to predict the patient-participants intention to accept the message and thus manage their diabetes is depicted in Table 6-7.

Table 6-7.

Summary of Hypotheses Results

No.	Hypotheses	Results
H0	(a) For Malay patients with diabetes in Singapore, high threat health messages are more likely to result in message acceptance than low threat messages.	Not Supported
	(b) For Malay patients with diabetes in Singapore, health messages in the image format is more likely to result in message acceptance than health messages in text format.	Not Supported
H1	(a) For Malay patients with diabetes in Singapore, the threat level in fear-based health messages' interaction with perceived severity impacts message acceptance.	Not Supported
	(b) For Malay patients with diabetes in Singapore, the threat level in fear-based health messages' interaction with perceived susceptibility impacts message acceptance.	Supported
H2	(a) For Malay patients with diabetes in Singapore, the threat level in fear-based health messages' interaction with perceived self-efficacy impacts message acceptance.	Not Supported
	(b) For Malay patients with diabetes in Singapore, the threat level in fear-based health messages' interaction with perceived response efficacy impacts message acceptance.	Supported
H3	(a) For Malay patients with diabetes in Singapore, the format type of fear-based health messages' interaction with perceived severity impacts message acceptance.	Supported

	(b) For Malay patients with diabetes in Singapore, the format type of fear-based health messages' interaction with perceived susceptibility impacts message acceptance.	Not Supported
H4	(a) For Malay patients with diabetes in Singapore, the format type of fear-based health messages' interaction with perceived self-efficacy impacts message acceptance.	Not Supported
	(b) For Malay patients with diabetes in Singapore, the format type of fear-based health messages' interaction with perceived response efficacy impacts message acceptance.	Not Supported

6.9 Phase III Discussion

Results from the ANCOVA indicated that the two main factors, (i) threat levels and (ii) format did not influence message acceptance (danger control). These findings indicate that H0a and H0b were not supported. As such, the answers to the two research questions would be “No.” The analysis reveals that the higher threat fear-based health message does not have more influence over patients’ intentions to manage diabetes compared to a lower threat fear-based health message. Similarly, image-based health message format do not have more influence on patients’ intentions to manage diabetes compare to a text-based health message.

Following the analysis of the main effects, the proposed interaction effects were analysed. The analysis indicates no interaction between perceived severity and threat levels was not statistically significant to influence message acceptance. One possible reason for this could be that the participants see the threat conceptually as a single block and did not consider the different threat levels. Their perceived severity does not change their perception of the threat. To the participants, whether the stimuli are related to early-stage lower limb amputation symptoms (lower threat) or later stage symptoms (high threat), in their minds, the message still touches on the concept of lower limb amputations and the difference in threat levels did

influence the participants' perception of the threat about amputation. Therefore, H1a is not supported.

However, the interaction effects between threat levels and perceived susceptibility on message acceptance showed statistical significance, thus indicating H1b is supported. The difference between perceived severity and perceived susceptibility could be due to oneself's cognitive loci to the two constructs. A person can consider a message to be severe or otherwise. Still, the perception generally will not impact if he or she does not feel the relevance of the threat elicited by the message. Conversely, perceived susceptibility deals with a person's evaluation of being exposed to the similar harm that is depicted in the fear-based message. The air of vulnerability probably explains the statistical significance of perceived susceptibility as a moderator. The results indicated that a higher threat message had a marginally better message acceptance than a lower threat message when moderated by perceived susceptibility thus supporting the EPPM's claims that high threat messages lead to better message acceptance. However, it should be noted that many studies incorporating the EPPM's framework have found that lower threat health messages could be more appropriate in some context. Lower threat in health messages has been supported in previous studies which indicate that such message will receive more attention and be better recalled compared to the emotionally charged threat that will stimulate defensive reflexes (fear control) leading to reduced concentration and poor memory about the message (Bailey, Wang, & Kaiser, 2018). Another reason for the statistically significant interaction involving perceived susceptibility could be due to the participants' higher mean age ($M = 61.7$), thus increasing the perceived susceptibility component.

Interaction effects of perceived self-efficacy with the threat levels on message acceptance did not show statistical significance. Previous studies on smoking cessation indicated the impact of perceived self-efficacy on threat-based messages were significant in non-smokers

but not significant in smokers (Chun et al., 2018). Perhaps, as an analogy to the current study, interaction effects might be statistically significant for non-diabetics but not the case for diabetics (which is the case here). This indicates that improvement to the messages for diabetics can be made by incorporating information which could increase self-efficacy. However, based on the results, H2a was not supported.

Response efficacy interaction effects with the threat levels in messages demonstrated statistical significance indicating that incorporation of information related to the type of appropriate actions for diabetes management in health message could lead to message acceptance. Several studies have recently indicated that the impact of response efficacy in messages would result in adaptive behaviours due to message acceptance (Miraja, Persada, Prasetyo, Belgiawan, & Redi, 2019; Xiaofei Zhang et al., 2017). As such, future directives developing health messages should view response efficacy as a critical component of health messages. However, as indicated in previous studies, response efficacy alone is not enough to encourage message acceptance and adopt adaptive behaviours (Wou, Silarova, Griffin, & Usher-Smith, 2018).

The interaction effects of the perceived threat and perceived efficacy constructs in EPPM on the relationship with message formats on message acceptance were not significant across the board except for perceived severity. It appears the diabetic participants were not concerned in the format which the messages were presented to them. Possibly, the way they distinguish one format from the other is not by seeing if it is presented as an image or text except if the health message presented to the patients could evoke higher perceived severity. The type of formats' interaction effect may not have an impact could be due to the participants' higher mean age of the participants. The older Malay participants perhaps could not see the difference between image and text formats when the messages were presented using the tablets. To the participants, the tablet is seen as a form of "computer" or

“technology”. Possibly, the participants could distinguish between the formats if they were given a hardcopy version of the image and text.

As described by Witte (2008b) which is comprised of message content, stylistic, and extra-features has its confounding factors. These variables would need a separate in-depth investigation. There could be interactions between the message structure and the threats/efficacy variables which were not captured by the EPPM constructs.

Since the results from the ANCOVA analysis did not show any significant main and interaction effects for the threat group and format group, and it provided an impetus to analyse the data from another angle considering individual variables. A correlation analysis was conducted, and the results can be seen in Table 6-8. The correlation analysis indicates a few interesting relationships between the measure constructs.

Table 6-8

Correlation between EPPM constructs and individual differences (neuroticism and conscientiousness) controlled with Age, Sex and Education variables

Control	Measures	1	2	3	4	5	6	7	8	9
Age, Sex and Edu	1. Neuroticism									
	2. Conscientious	-.21								
	3. Perceived Severity	.11	.10							
	4. Perceived Susceptibility	.01	-.12	-.14						
	5. Perceived Self-Efficacy	-.51**	.33*	.02	-.08					
	6. Perceived Response Efficacy	-.15	.12	.02	.01	.29*				
	7. Danger Control	-.19	.33*	.01	-.01	.51**	.27*			

	8. Fear Control	-.01	.09	.07	-.39*	.02	-.15	-.03		
	9. Fear of Amputation	.09	-.02	.08	.10	.02	.09	.08	-.35**	

Perceived self-efficacy is negatively correlated to the personality trait neuroticism, and it has a positively correlated to another personality trait conscientiousness. Likewise, danger control is positively correlated to conscientiousness, indicating that individual difference does have an impact on the EPPM constructs.

Perceived susceptibility is negatively correlated to fear control. This indicates that the more a person feels that he or she is likely to suffer from diabetes complications, the less likely the person is to reject the message pertaining to the complication. On the contrary, message acceptance (danger control) is positively correlated to the personality trait, conscientiousness, perceived self-efficacy and perceived response efficacy.

The ANCOVA analysis indicates a positive relationship between message acceptance and perceived response efficacy, while most literature suggests that message acceptance has a positive relationship with self-efficacy. Perceived self-efficacy, at the same time, has a positive correlation with perceived response efficacy. The correlation analysis indicates that the higher the fear of amputation, the less likely the person will reject health messages. This result supports Witte (1994) assertions that fear of a specific condition could result in message rejection.

6.10 Phase III Summary

Chapter 6 had presented how DAMS stimuli can be used in an experiment. An experiment was conducted across the four groups, with each group having 15 participants. This chapter initially describes how the experiment's measurements were constructed based on the

conceptual model, which was proposed in Chapter 3. Having developed the measures, this chapter detailed how the Phase III experiment was designed and carried out.

The analysis indicated that manipulating threat levels in messages could influence message acceptance when moderated by perceived susceptibility and perceived response efficacy. Moderation effects were only found in the threat group for perceived susceptibility and perceived response efficacy. No moderation effects were found in the format group. The correlation analysis did find relationships between some of the constructs to explain further what could lead to message acceptance and message rejection. The findings were inconclusive, but it can be deduced that manipulating the threat level is more likely to influence message acceptance or message rejection which leads to a particular behaviour.

CHAPTER SEVEN: DISCUSSION

Theorists have posited two main views regarding emotion, where it could either be seen as dimensional or discrete (Nabi, 2015). Dimensional perspective sees emotion as a generalised motivational state characterised over broad affective dimensions, typically labelled as positive or negative (Bush, Privratsky, Gardner, Zielinski, & Kilts, 2018). Instead, discrete emotion perspectives focus on categorical or unique emotional states (Kragel & LaBar, 2016). The current research leans towards the discrete emotion's camp, and the use of the fear emotion portrays this perspective.

The current research investigates how perceived threat and efficacy can moderate the relationship between health messages and message acceptance. These messages are categorised into four groups based on 2 x 2 factorial design where different levels of threat (high/low) through fear emotion and the type format (image/text) were manipulated. To carry out the 2 x 2 factorial design experiment, the initial process of curating stimuli that is relevant for diabetes patients began in Phase I of this research.

7.1 Guidelines to Curation

Phase I have contributed to the body of research related to emotion-based health messages by developing DAMS. Despite numerous studies pointing out the influence of emotions towards health behaviours (DeSteno, Gross, & Kubzansky, 2013), scholars conducting emotion-based research still depended on using stimuli standards from generic databases. The IAPS standard has been widely used in health domains such as in mental health (Brodeur et al., 2010), addiction-related (Houben, Havermans, & Wiers, 2010) and diabetes (Hermanns, Kubiak, Kulzer, & Haak, 2003). Based on the literature review, no stimuli were developed with an overarching focus on healthcare or specifically diabetes. The current research has

developed diabetes-specific stimuli which could benefit both clinical and psychosocial research in diabetes.

The current literature on emotion-related databases does not demonstrate how these databases were developed. The curation processes were not disclosed. Perhaps the major contribution of Phase I to the affective-related literature was to provide a guideline on how these databases were curated in the first place. The widely used IAPS and GAPED did not include nor report the existence of Phase I. Lesser-known databases, which were also listed in Table 2-1 similarly did not report any study design as proposed in Phase I.

The themes generated from the discussions with the healthcare providers and the patients recruited during Phase I of the research could be used as a protocol to curate diabetes-related stimuli of other types of emotions such as anger, guilt or excitement. At the same time, other medical conditions such as asthma, AIDS, myopia, among others, could adopt the same methodology as presented in Phase I. The development of DAMS in Phase I could act as a precedent as to how emotion-related databases should be created in the future, specifically in the healthcare domain.

7.2 Assigning Emotion Metrics to Stimuli

Several lessons and concerns could be derived based on the experience gained in Phase II of this research, where the focus is on fear-based stimuli. A crucial component in the curation process involves assigning the emotion metrics to the stimuli (Racine, 2018). In Phase II, the DAMS stimuli were rated based on the widely used Self-Assessment-Manikin (SAM) rating scale which is comprised of three emotion metrics namely valence, arousal and dominance parameters (Murdoch, Partin, Vang, & Kehle-Forbes, 2018). Before the widespread use of the SAM scale, the Mehrabian and Russell's Semantic Differential Scale was a well-established measurement tool using 18 different rating metrics (Russell & Mehrabian, 1977). These 18 metrics were simplified and condensed into the three metrics found in SAM. The

three SAM metrics are also known as the PAD for Pleasure, Arousal and Dominance (Margaret M Bradley & Lang, 1994). Pleasure and valence are interchangeably used in the literature. A majority of stimuli found in existing databases primarily adopted the metrics used in SAM.

SAM has been widely used because it is deemed to be less complicated due to the use of visual manikins (J. Cho et al., 2018). However, research participants still found issues with the manikins in SAM. Participants sometimes do not understand that the big stars on the manikin mean a person feels aroused and contrastingly when the stars are smaller; it means that the person feels calm.

However, not all standards and related studies use the three metrics found in SAM (Danglauser & Scherer, 2011). The arousal and valence metrics are more commonly used than the dominance metric (Imbault, Shore, & Kuperman, 2018). The dominance metric usually has a lower significance value in regression, and research participants find the concept of dominance, more challenging to grasp to use it effectively (Szymanska et al., 2019). Most patient-participants did not know how to relate the stimuli presented to them to the dominance metric. To make them understand, the researcher explained that any emotion they feel negative would make a person feel small. In contrast, any stimuli, which they feel is positive, should make them feel big.

Apart from the relatively confusing dominance metric, there were calls to augment SAM by integrating more interactive user interfaces to enhance user experience. A digital self-reporting application composed of two slider controls is known as the “Affective Slider” (AS) for the quick assessment of pleasure and arousal have been developed by Betella and Verschure (2016b). For Phase II, the current research adopted a middle-ground approach. The standard manikins were still used but were converted into an online form with corresponding radio buttons for participants to select the appropriate manikins. The manikins and the radio

buttons could be seen in Figure 4-3 in Chapter 4. The online form was developed using the Qualtrics software, and the Microsoft MS Paint software facilitated minor image edits. The online version of SAM expedites the data collection process. Ratings of stimuli were done via tablet devices and data of the rated stimuli was automatically saved on the cloud, ready for analysis.

The SAM used in Phase II included a small text on top of the manikins. The three texts included in the SAM measurements were as follows:

1. Valence: positive to negative (1 = “happy” and 5 = “unhappy”),
2. Arousal: high to low (1 = “aroused” and 5 = “calm”), and
3. Dominance: low to high (1 = “dominated and 5 “dominating”).

The reason for adding these texts was to guide participants to logically think about how to rate their stimuli during the rating process in case they get distracted and forget what the manikins represent. The way how the scale was displayed could be confusing, and at times the metrics would require reverse coding depending on the research questions or hypotheses formulated.

It should be noted that there were several impediments in rating the stimuli that could affect emotion metrics. It was reported that persons with psychotic disorders tend to view positive and neutral stimuli as negative and rate them accordingly (Strauss, Visser, Keller, Gold, & Buchanan, 2018). Participants who were sleep-deprived similarly rated neutral stimuli with negative valence scores (Daniela et al., 2010). Stimuli which are supposed to elicit negative emotions such as fear are usually more immune to judgements which are hampered due to sleep depravations compared to positive-eliciting stimuli. According to Backs, da Silva, and Han (2005), young adults who are under stress could exaggerate rating scores as they are not good at regulating their emotions compared to older adults. These were some of the critical limitations that affect all of the affective and emotion-based databases.

Metrics' scores of the stimuli curated should be triangulated through psycho-physio analysis to derive objective scores instead of solely relying on self-report scores (Peter J. Lang, Greenwald, Bradley, & Hamm, 1993). Schreiner and Riedl (2019) remonstrated a need to include neurophysiological methods to self-report methods like SAM to evaluate emotion responses. Part of these physiological methods include measurements such as startle reflex, skin conductance, heart rate, functional magnetic resonance imaging (fMRI) or the electroencephalography (EEG) to measure the brain activity (Lin, Cross, & Childers, 2018). Combining affective scores through physiological measurements and self-report scores potentially triangulate the emotional metrics associated with a specific stimulus.

7.3 Designating Stimuli for Experiments

Choosing stimuli for experiments depends on the objective of specific research. A researcher has to decide if the research requires stimuli which are supposed to elicit high or low arousal, negative or positive valence, and in some cases consider the dominance factor of the stimuli. That is to say, do the stimuli evoke a sense of dominance due to an object, person or environment? The process flow proposed in Figure 5-3 could be set as a protocol for future research when selecting a set of emotion-based stimuli.

The main idea behind the process flow was that the three main emotion metrics in emotion-related scales like SAM were evaluated. It was also suggested that after determining the RQs and hypotheses, a researcher should determine which affective database could be adopted (Marchewka, Żurawski, Jednoróg, & Grabowska, 2014b). However, the current research solely focused on the DAMS database for two main reasons, (1) DAMS' relevance with diabetes-related stimuli, and (2) to evaluate the effectiveness of DAMS in Phase III.

7.4 Individual Differences

The analysis done in Chapter 6 found that most of the hypotheses proposed were not validated. In the EPPM model, individual differences are depicted to moderate perceived threat and perceived efficacy. Investigating how individual differences impact the EPPM constructs could help explain drivers of messages acceptance or message rejection.

Previous studies and meta-analyses indicated that individual differences do not impact how fear is being processed (Witte & Allen, 2000). However, there are studies which argue that individual differences and personality traits do make a difference on how the fear message is being assessed (V. L. Lawson, C. Bundy, & J. N. Harvey, 2007). Some studies are in the opinion that not only that base levels of efficacy and threat vary between individuals but also differs across the different population (Peters et al., 2013).

The risk perception attitude framework conceptualise individual differences into four main groups and the type of messages that will resonate with each group, namely the responsive (high threat, high efficacy), the proactive (low threat, low efficacy), the avoidant (high threat, low efficacy) and the indifferent (low threat, low efficacy) groups (Rimal & Real, 2003). Terblanche-Smit and Terblanche (2011) posit that the interaction between individual difference and self-efficacy could influence message acceptance or rejection. The widespread view is that individual differences can impact both threat and efficacy (Ooms, Jansen, & Hoeks, 2015; Popova, 2012). Scholars have found evidence that perceptions of threat and efficacy are associated with behavioural outcomes when there are interactions with individual difference (Witte & Morrison, 2000).

Due to opposing opinions, it was decided that evaluating the interaction effects of individual differences would provide useful feedback to message designers and communicators. Based on previous studies cited, the following propositions were proposed in

Table 7-1 to investigate the moderating effects on message acceptance and messages rejection. The results of the analysis can be found in Table 7-2.

Table 7-1.
Propositions regarding the influence of individual differences

No.	Proposition	Reference
1	Individual difference interaction with a) perceived severity impacts message acceptance, b) perceived susceptibility impacts message acceptance, c) perceived self-efficacy impacts message acceptance, and d) perceived response efficacy impacts message acceptance.	V. L. Lawson et al. (2007) Terblanche-Smit and Terblanche (2011) Ooms et al. (2015) Witte and Morrison (2000)
2	Individual difference interaction with a) perceived severity impacts message rejection, b) perceived susceptibility impacts message rejection, c) perceived self-efficacy impacts message rejection, and d) perceived response efficacy impacts message rejection.	

Table 7-2.
ANOVA Results of the Propositions where threats and efficacy constructs interacted with individual differences (conscientiousness and neuroticism).

No.	Interactions	<i>dF</i>	<i>F</i>	<i>Sig</i>
	DV = Danger Control			
1.	SEV * CON	18,24	1.12	0.392
2.	SUS * CON	16, 25	1.16	0.358
3.	SE * CON	11,30	0.78	0.655

4.	RE * CON	16,24	1.74	0.107
5.	SEV * NEU	18,23	0.73	0.746
6.	SUS * NEU	16,24	1.26	0.300
7.	SE * NEU	9,31	0.42	0.916
8.	RE * NEU	10,29	0.64	0.771
	DV = Fear Control			
9.	SEV*CON	18,24	0.57	0.887
10.	SUS * CON	16,25	0.93	0.554
11.	SE * CON	11,30	0.69	0.738
12.	RE * CON	16,24	0.43	0.958
13.	SEV * NEU	118,23	1.09	0.415
14.	SUS * NEU	16,24	0.64	0.822
15.	SE * NEU	9,31	0.61	0.782
16.	RE * NEU	10,29	2.30	0.039

Evaluation of individual differences was based on the Big Five Inventory (John & Srivastava, 1999), where two of the personality traits: conscientiousness and neuroticism were measured. Details of the measurements were discussed in Section 6.5.8. ANOVA was used to analyse the propositions in Table 7-2. The analysis indicated that the personality traits which represented the individual differences did not have any effect on the influence of threat and efficacy that can lead to message acceptance or message rejection. McAndrew (2018) argued that there are too many personality traits which are themselves affected by the context of time and event, thus making it arduous to predict behaviour specifically in cross-sectional empirical studies. The individual differences in the analysis might not be statistically

significant, but previous studies which incorporated both quantitative and qualitative techniques demonstrated that the inclusion of deductive methods could illustrate the impact of personality traits which quantitative methods could not (Nelson, Huprich, Shankar, Sohnleitner, & Paggeot, 2017).

7.5 The Malays Diabetes Conundrum

According to Man et al. (2017), one in five and one in ten ethnic Malays in Singapore aged 40 years and over, developed prediabetes and Type 2 diabetes. A study found that the Malays have higher diabetes-related complications associated with heart and renal diseases compared to the two other major ethnic groups in Singapore (Low et al., 2016). Obesity which is thought to contribute toward diabetes is highest among Malays (24.0%) compared to Indians (16.9%) and Chinese (7.9%) (P. C. Lee et al., 2018). Huang et al. (2009) documented poor awareness of diabetes among Malay Singaporeans diagnosed with diabetes where nearly one in eight are oblivious of their condition and its complications.

These studies were indicative of the gravity of diabetes, which has plagued the community. As such, the focus of this research on the Malays is apt and validated. The findings from this research could also provide insights into our neighbours in Malaysia, Brunei and Indonesia, where the Malays are the dominant ethnic group. In 2014, a study estimated the number of diabetics in Malaysia to be 2.48 million by 2030 (Chung, Chua, Lai, & Chan, 2014). However, the number of diabetics in Malaysia has already reached a staggering 3.5 million, according to its Health Ministry in 2017 (NHMS, 2017).

Previous studies indicated that most psychosocial interventions in diabetes have mostly been focused on patient education with the aim to allay certain perception of medication or treatment (Hassali et al., 2014). Malaysia, for instance, has been trying to ramp up its diabetes education centres for its predominant Malay population (Ahmad, Ramadas, Kia Fatt, & Zain, 2014). However, results from the same study showed minimal improvement in

patients' HbA1C (3 months glucose average in the body), and these improvements were not sustained. One perspective is that, if it is not working for Malays in Malaysia, it might not work for Malays in Singapore. This perspective is taken from a previous study which indicated that specific characteristics of the Malays in Singapore concerning health could be identified with other urban populations within Southeast Asia (Foong et al., 2007). However, studies have also argued certain uniqueness about Singapore Malays who have incorporated certain "Chineseness" or Chinese values in terms of work ethics, discipline etc. (Barr & Low, 2005).

Witte and Allen (2000) argued when individuals perceive messages as having low threat, they will not process the message. However, the findings in Phase III indicated that manipulating the threat levels did not directly affect message acceptance. The correlation analysis did suggest that fear of amputation is inversely related to message rejection. A plausible explanation is that the Malay patients understood that the stimulus presented to them were meant to serve as a fear message which is related to diabetes. The varying level of threats was not significant. The concept of diabetic-related amputation may cognitively have elicited the same level of arousal despite the varying threat.

Another point to note is that based on Table 6-1, the arousal scores for the selected stimuli may not have an adequate variance for (i) the high threat versus the low threat and (i) the image versus the text stimuli. The option is to select stimuli which have higher arousal score to heighten the fear emotion for the high threat stimulus or choose a lower arousal score to reduce the fear emotion for low threat stimulus. The same can be done when comparing the image versus text stimuli.

Following the experiment in Phase III, participants, apart from answering the questionnaires, would offer their opinions or shared some stories regarding their experiences with diabetes. Their stories were noted by the researcher informally. During these informal

discussions, the researcher would document the duration the participants were diagnosed with diabetes and who were accompanying the participants. Based on the informal talks, several narratives highlighted the fatalistic beliefs in patients. Patients believed that if their parents' or siblings have diabetes, they would be expected to have diabetes and not fret about it.

Most of the Malay patients who participated leave their condition to God and consider it to be beyond their control. This is understandable since the patients recruited were from a local mosque in Singapore. They accept their condition as their fate, and these beliefs were consistent with previous studies (Abolfathi Momtaz, Hamid, Ibrahim, Yahaya, & Abdullah, 2012). They generally attributed their situation to fate and could form an emotion-anaesthesia towards any health messages. However, according to How, Ming, and Chin (2011) Malays who are religious and understand the concept of fate and the responsibility of taking care of themselves tend to fare better in controlling their diet and HbA1c. Regardless of religiosity, their belief in God and fate, the fear of having diabetes-related complications were consistently present during the informal discussions with the participants.

Previous studies have indicated that fear-mongering has "always been the way" to ensure conformity among the Malays as seen through its cinematic and TV productions (Rahman, 2018). Saidi et al. (2018) posited that fatalistic beliefs, faith and fear are three main driving factors motivating Malays in Malaysia when dealing with diabetes. Saidi's study was the first of its kind to highlight the use of fear on Malay patients with diabetes. In lieu of such literature, the idea of developing fear-based health messages to impact the Malays should not be given up.

H. J. Kim and Shin (2018) opined that there is a difference between the messages created by the government sector and the private sector, which includes private companies and NGOs. According to their study, Singaporeans (75%) have greater trust in messages coming from the government compared to populations from other countries such as the United States

(37%), United Kingdom (42%) and Hong Kong (45%). However, specifically for health information, Singaporeans' trust is reported lower at 59.2% (Tai et al., 2007). Nevertheless, it could still be inferred that Singaporeans are more likely to believe in the messages, which were conceived by its health authorities compared to populations from other countries. If the health messages were aimed to elicit fear, then the Singapore authorities would have a higher chance of achieving its aim and influence peoples' health behaviours. In this regard, Singaporean Malays are of no exception.

Discussions with the recruited Malay patients seems to support this view. Given the trust that the public has in the Singapore government, relevant authorities could devise personalised and relevant messages for Malay diabetes patients through the Malay grassroots, as these organisations would understand the nuances faced by the community. The three organisations which have been earmarked to help the Malay community include the Islamic Religious Council of Singapore (MUIS), self-help group MENDAKI and the People's Association Malay Activity Executive Committees Council (MESRA) or otherwise known as M³ (Baharudin, 2018). Findings in Phase I where credibility, relevance, correctness and appropriateness became the basis of the stimuli curated in DAMS, could be the hallmark of the health messages devised by the relevant authorities.

7.6 Ethical Implications

There is always a possibility for health messages to be misunderstood by patients (Sude, 2013). Health messages in no particular order involve encouraging, exposing, predicting, promising, recommending, threatening and warning, and each comes with its ethical implications (Cheng & Lee, 2012). Emotion-based health messages which adopt the 'cookie-cutter' or utilitarian 'health for all' ideas may have consequences, and their moral underpinnings can sometimes be neglected (Lupton, 2015).

After a study is completed, limited or no follow-up is done on patient participants to evaluate how the negative emotions may have affected the target audience. For this reason, patient-participants from Phase I till Phase III were debriefed regarding the objective of exposing the stimuli and the possibility of experiencing carry-over effects. Ideally, these participants should receive several follow-up calls over several month-period to monitor their well-being after the stimuli exposure. However, due to resource limitation issues, follow-up actions may not be feasible. However, patients were given the contact numbers and emails of the PI and the researcher if the patient-participants feel they need to follow-up or have anxieties due to the stimuli exposed to them.

Most of the concerns centre on emotion-based health messages which are aversive, which involves eliciting negative emotions such as fear. Evoking such emotions could have ethical connotations by over-emphasising the dangers which surround a disease or a condition such as diabetes (Hastings, Stead, & Webb, 2004). The issue of over-exaggeration in an appetitive-based message can be minimised by curating appropriate stimuli through the help of experts such as the healthcare providers in FGD formed in Phase I of the research. Practitioners are advised to avoid using health messages that could (1) harm individuals, (2) restrict individuals' autonomy, and (3) compromise social equity (Brown & Whiting, 2014). Depending on the context, emotions incorporated into health messages should consider the

target audience. Particular attention should be given to the vulnerable group such as the elderly (above 65), children (below 18) or those who are cognitively impaired.

Research ethics is often a contentious area with researchers and individuals from different background and disciplines wanting to protect their interest (Saks & Allsop, 2007). At times, the committee could be dominated by assertive individuals or could be influenced by sponsors or grant bodies, which could hamper efforts in conducting a particular research. Similarly, this research could also be affected and might take significant effort to get the ethical board to approve the related studies. For these reasons, the FGDs for the healthcare providers and the patient's group were proposed in Phase I to verify the appropriateness of exposing the stimuli to the patient-participants. At the same time, senior clinicians were added to be part of this research advisory panel to act as check-and-balance with regards to how the patients would participate in the research.

7.7 Summary of Discussion

Chapter 7 discussed the guidelines for curation based on Phase I and the assigning of metrics to stimuli based on Phase II. The findings from Phase III in Chapter 6 motivated the discussions in Section 7.4 which considers the impact of individual differences as a moderating effect. Evaluation on diabetes-related studies on Malays in Malaysia were also incorporated to understand the Malay behaviour and identity, which might have implications on the Malays in Singapore deal with diabetes. Section 7.6 put forward the various ethical implications that might arise from this research as some of the patients were exposed to the gruesome images and scary texts related to diabetes complications.

CHAPTER EIGHT: CONCLUSION

This chapter concludes the research on fear-based messages on Malay diabetes patients in Singapore. The Malay ethnic group in Singapore was chosen given the community's current plight with diabetes due to the community's diet and food consumption patterns (Khalik, 2018). The research starts with the understanding that there is a real need to incorporate non-clinical interventions to address the growing number of people with diabetes. Emotion-based or specifically fear-based health messages have been mooted as a potential approach to change patients' behaviours concerning diabetes. To conduct an experiment using fear-based health messages, some preparation of stimuli which is relevant to the diabetes patients had to be undertaken. The set of curated stimuli were collectively called the Diabetes Affective Message System (DAMS).

The stimulus curated and used for the research took into account the three metrics in SAM, which are valence, arousal and dominance. As a rule-of-thumb, arousal would be the first metric to be evaluated because it indicates the degree of emotion by the stimulus. Evaluating the stimuli metrics could be complex. Studies have indicated that negative-related stimuli such as fear-based messages can achieve high arousal scores, but positive-related stimuli have a lower baseline for arousal scores (Van Dongen, Van Strien, & Dijkstra, 2016). Depending on the objective of a study, researchers using DAMS first need to determine if they need to have stimuli which elicit a high level of arousal or low level of arousal.

While DAMS has a total of 80 stimuli, only 30 stimuli are fear-based stimuli. 15 fear-based are in the image format and the other 15 are in the text format. Fear-based stimuli from DAMS touches on the various complications that people with diabetes can experience. For Phase III, 4 stimuli were chosen that are related to lower extremities amputation (LEA) which is comprised of 2 images (1 high threat & 1 low threat), and 2 texts (1 high threat and 1 low threat).

8.1 Summary of Research Findings

The focus group discussions (FGD) in Phase I of the research conducted with both the healthcare providers and patients with diabetes provided several insights regarding the stimuli, which were curated. The main aim in Phase I was to consider the appropriateness of the stimuli, which will be used in the experiment in Phase III of the research. Since the stimuli will be used on patients with diabetes, the stimuli have to be appropriate for the patients. However, during the FGD, several other concerns were raised.

The healthcare providers indicated that "appropriateness" of the stimuli is not the only factor which has to be given considerable attention. Other factors such as "credibility", "correctness" and "relevance" were also brought up during the FGD. The healthcare providers insisted that these factors were paramount when choosing the stimuli for the patients. The healthcare providers were more vocal in need to incorporate such themes compared to the patients' group. The patients' group tend to agree that the stimuli were appropriate and believed that all the pictures were credible. Based on the FGD, seven stimuli were replaced, and the health providers were consulted again regarding the new stimuli added. The new set of stimuli (based on the seven replaced), were shown to patients in a one-to-one interview, and they similarly agreed that the stimuli were appropriate.

In Phase II of the research, a new set of 30 fear-based stimuli were rated using the Self-Assessment Manikin (SAM) based on the three emotion metrics, which are valence (pleasure), arousal and dominance. The rated scores of the stimuli indicated that the stimuli in DAMS elicited the correct and appropriate kind of emotion, which in this case is fear. The rated scores of the fear-based stimuli can be found in Annex A.

The results from Phase III analysis lack a conclusive outcome to claim that varying the message threat or the message format could lead to message acceptant or messages rejection. An acceptance of rejection of a message would indicate the behaviour that a patient might

adopt. Moderation effects were effective in the threat manipulation group but were significant only for perceived susceptibility and perceived response efficacy. Varying the format did not have an impact on message acceptance or rejection. The correlation analysis did suggest several interesting relationships among the constructs. Message acceptance is correlated to a personality trait (conscientiousness), self-efficacy and response efficacy while fear of amputation would reduce the likelihood of message rejection.

8.2 Contributions

8.2.1 Theoretical Contribution

This research has several theoretical contributions. First, this research is among the first to focus on fear-based health messages for Malay patients in Singapore. The development of the DAMS database which is comprised of both image-based and text-based stimuli related to diabetes, could set a precedence for future research in the area. Previous emotion-related stimuli databases developed were generic and may not be relevant and appropriate for diabetes-related research. Conversely, the DAMS database were specifically developed using a group of Malay participants with diabetes to evaluate each stimulus qualitatively which was then followed by another group of participants with the same criteria to rate the stimuli according to the SAM emotion metrics. The two approaches used in Phase I and Phase II of this research could also set a standard procedure on how emotion-based stimuli databases could be developed.

The findings from the research contribute to the EPPM by demonstrating that fear-based health messages on different formats such as image and text can offer similar behavioural outcomes. Another contribution is this research debunks the idea that fear-based messages work best with high levels of threat and efficacy behaviours (S.-C. S. Li, Lu, & Chen, 2020).

The findings demonstrated that message threats could be partially moderated by perceived threat and perceived efficacy. Specifically, it was found that perceived susceptibility and perceived response efficacy moderates the threat in fear-based messages, thus influencing people with diabetes to accept the messages and better manage their diabetes. Although perceived self-efficacy was found to be a more common moderator in the EPPM literature (Shim, Lee, & Min, 2018), this study highlights the importance of perceived response efficacy has on message acceptance. The idea that perceived response efficacy is critical to message acceptance is empowering to healthcare communicators and public health practitioners. This is because enhancing response efficacy entails incorporating guidelines on what to do, is far easier than to influence self-efficacy, which is a psychological construct and cognitive in nature (Schönfeld, Preusser, & Margraf, 2017). A possible recommendation to content writers and designers if they are working on health messages for the Malays with diabetes could be, is to focus on enhancing the elements in the health messages which are related to perceived susceptibility and perceived response efficacy since both of these variables moderated message acceptance among the Malay participants when they were exposed to the fear-based health messages.

8.2.2 Practical Contribution

Research regarding health communications finds that the most persuasive messages are those, which evoke an emotional response (Ramsay, Yzer, Luciana, Vohs, & MacDonald, 2013). Emotion, such as fear, is a powerful mechanism, which can affect a person's cognitive process and behavioural outcomes. Widely used in marketing, advertisement and political campaigns, emotion is less often used in health strategy to change health behaviours apart from specific domains such as AIDS, smoking cessation etc.

A better understanding of fear-based emotion in the context of diabetes could potentially have a significant impact on implementing effective health messages for people with diabetes. As Singapore and the rest of the world are grappling to manage the economic and social toll caused by diabetes, the use of fear-based emotion could provide an alternative strategy towards better management of the condition. Findings from this study could be used as a guideline to create effective messages for diabetes patients, which in turn could influence their health-related behaviours towards better management of their conditions.

Findings from this study could initiate policy-making decisions from health-related authorities to regulate food corporations in terms of their marketing and advertisements, particularly those targeted towards the vulnerable population such as children, adolescents, and the elderly. To date, Singapore's Ministry of Health (MOH) has attempted to use subtle health messages to nudge Singaporeans towards preservation behaviours in the context of diabetes. However, recent studies have indicated that some of these messages seem unreal and are somewhat confusing (Lai Meng Ow & Ling Wan Pearline, 2020). Another initiative by MOH, Singapore, was to set up a Diabetes Task Force to develop a list of recommendations for the various stakeholders in Singapore to deal with the management of diabetes (NMRC, 2019). Some of the proposed recommendations are setting up a sub-task force to develop better quality health messaging and food labelling, which is in line with this research's objectives. The novelty of this research focuses on the Malays, thus considering the findings from this research would make these messages more targeted and streamlined for the Malay ethnic group.

In his National Day rally in 2017, Singapore's Prime Minister, Lee Hsien Loong expressed his concern that 17% of Malay Singaporeans have diabetes, despite the national average across other ethnic groups stands at 10% (BH, 2017). He is, however hopeful that health messages can be disseminated to the community via Malay organisations and

mosques. The Minister for Muslim Affairs, Mr Masagos echoed this view and encouraged more grassroot-leaders within the Malay community to do more to inform the community about diabetes (Rosebi, 2017). However, he laments that the attitude towards diabetes is still found wanting. Merely to use factual information to bring about changes in the community may not have the desired effect. The perspective of this research is to use emotion and affect the attitudes of the Malay community. Fear-based messages with the focus on susceptibility and response efficacy, as indicated in this research have shown potential in swaying attitudes through message acceptance. The proposed health messages here are emotion-driven instead of just limiting these messages to be informational which does not ride on the power of arousal from fear-based health messages.

Large corporations have been employ marketing consultants who deeply understand the use of emotion and have successfully leveraged the motivation system to influence food consumption and lifestyles. Creators of health messages should harness the same motivational system via the use of fear-based health messages to encourage self-preservation behaviours not only for the Malay community but across other ethnic groups in Singapore as well.

One example of how fear-based messages can change perception in consumption is the use of colour-coded labels on sugary drinks to act as a warning for consumers on high-sugar unhealthy beverages. These colour coded labels have been implemented in more than 30 countries with significant success, and in Chile, sales of such beverages fell by 25 per cent after 18 months (SPH, 2019). Singapore is the first country to ban advertisements for sugary drinks, and perhaps this policy is based on the understanding that ads on such drinks influence consumption through the use of emotion and motivation (Cang, 2019). However, the bill to ban such drinks is still defensive or reactionary in nature, and more aggressive and targeted health messages in the form of fear-based health messages could be introduced.

The initiative to combat diabetes in the Malay community perhaps could mirror the efforts that have been put in for anti-drug campaigns specific to the Malays. It is well documented that the Malay community struggles in dealing with drug-abuse forming 49% of abusers in Singapore (C. Wong, 2020). The “Dadah Itu Haram (DIH)” campaign was launched in April 2017 with the support of the community involving more than 300 community volunteers, and over 300 Malay-Muslim organisations and businesses (Shanmugam, 2019). Multiple outreach programmes have been conducted at main community touchpoints such as at eateries, mosques during Friday prayers, at jamming studios and motor vehicle companies. Although the problems of drug abuse still persist in the community, the vigour by the authorities, Malay organisations and grassroot leaders should at least match and be coherent in the war against diabetes. The use of health messages could be widely adopted in the 72 mosques in Singapore. Health messages at hawker centres and other Malay eateries could also play a key role in providing the platform for these messages to be disseminated. The guidelines provided in Phase I and the insights gained in Phase II and Phase III of this research should be incorporated to tailor the fear-based health messages for the Malay community in Singapore.

8.3 Limitations

Bias Sample Population in Phase III

The patient-participants for Phase III were recruited from a local mosque unlike in Phase I and Phase II, where the participants were recruited from a public hospital in Singapore. In general, most of the mosque congregants are males compared to females. In the Islamic tradition, the men are encouraged to pray in congregation in the mosque while the women are encouraged to pray at home (Chowdhury & Jusoh, 2017). The participants’ mean age from the mosque is also higher ($M = 61.7$) compared to participants recruited from the hospital at ($M = 49.9$) because the elderly are more inclined to spend their time in the mosque to do their

congregational prayers and other religious-related activities (Mohsen, 2020). The age construct implies the personality traits for instance, when sex and education are controlled, age and the neuroticism trait is negatively correlated, $r(56) = -.30$, $p = .024$, while age is positively correlated with the conscientiousness trait, $r(56) = .34$, $p = .009$. As such, the response from the sample participants may have certain bias related to sex and age.

As described in Section 7.5, there are general fatalistic tendencies among the Malays, and such tendencies would be higher for Malays who are religious and those who frequent the mosques. Given that most of our participants were recruited from the mosque, it is more likely that the sample population recruited for Phase III have such tendencies which may affect their perceived threat and perceived efficacy. Past research has indicated that people with fatalistic tendencies are less likely to adhere to preventive behaviours (H. K. Kim & Lwin, 2017) and are therefore more prone to poor management of HbA1c (Asuzu, Walker, Williams, & Egede, 2017). On the bright side, the fatalistic understanding with regards to the Malays may be different from the general understanding of fatalism. While the Malays hold onto the beliefs that what happens to them is predetermined, a common characteristic of fatalistic tendencies, there is great emphasis on the religious duty (for Muslims in general) to seek remedy and not give up. Ahaddour and Broeckaert (2018) posit that the belief in predetermination and God goes hand in hand with relying on medicine. The understanding of fatalism may differ and would be culturally sensitive concerning the Malays. As such, their attitudes towards health preservation, and their perception of threat and efficacy would not be severely impacted despite their religiosity.

Failed Manipulation Check

Although the manipulation effect in Section 6.6 showed no statistical difference between the four groups or conditions for Phase III experiment, the mean score did show that higher

fear was experienced in Group 1 (high threat x image) and Group 3 (high threat x image). Coincidentally, the low threat groups in Group 2 and Group 4 both have lower fear mean scores. Despite the failed manipulation check, the qualitative analysis in Phase I indicates that the fear-based stimuli exposed to the patients did elicit fear emotions. This was confirmed in both the FGDs for the healthcare providers and the patients. Phase II's SAM scores, specifically the arousal metric scores, demonstrated the threat level in each stimulus. The arousal scores for each stimulus affirms the intensity of the fear emotion that each stimulus elicits.

The failed manipulation check could be attributed to the small sample size recruited for the experiment in Phase III. Previous studies have proposed thirty participants for each experimental condition for a better effect-size (Betsy & Carmen, 2007). However, since the research was conducted during the Covid-19 pandemic, recruitment of patients was challenging. In hindsight, perhaps the use of within-subjects research design could have been adopted. However, such research design presents its own bias, such as sequence and order-effects (Diegelmann, Ninaus, & Terlutter, 2020). The fact that participants were recruited from a local mosque could have also affected the manipulation check. Most of the mosque participants hold firmly to their faith which may moderate the level of fear. While most fear what diabetes complication could mean for them, they believe in the concept of *Qada' and Qadar* (predestination) (Zul Hasymi Firdaus, Hatthakit, Kongsuwan, & Che Hasan, 2020). This concept moderates fear by relying upon God instead of mitigating fear through self-efficacy or response efficacy. Muslims who study the religion believe that Islam provides adherents from the prophet Muhammad, which encourage (Malay) Muslims to adopt coping strategies when faced with a calamity (Zul Hasymi Firdaus et al., 2020). Combining the belief in predestination and the duty to adopt coping strategies may have impacted the manipulation checks.

Future studies should note the bias that can take effect from recruiting Malay patient-participants solely from mosques. The Malays are not a significantly homogeneous community, and there can be many diverse opinions among the Malays just as with other ethnic groups. According to AL Khan (2020), such a view is a misinterpretation, and to do so is simplistic, which creates an imbalance narrative about the Malays. The rise of Malay liberalism in Malaysia (Olivier, 2020) and to a certain extent in Singapore, indicates that changes in the Malay mindset, particularly among the millennials are happening. The recruitment should try to be more inclusive by going to the various Malay organisations or the community's stomping grounds such as places in Geylang Serai, Joo Chiat Complex, and Arab Street among others where the more hippie Malays might be accessible.

Presumed Similarity with Message Framing

The use of emotion-based health messages has been mooted as a potential intervention to help patients' improve health-related behaviours in the context of diabetes. There have been critics, and there have been queries. One of the common queries is whether the use of positive and negative emotions are similar to the concept of message framing? According to critics, positive and negative framing of messages have been widely used in health communications, and as such, there is nothing new proposed by the current study. This is a legitimate critic and query.

The response is that while message framing can elicit emotions, message framing encapsulates all positive and negative emotions into two discrete emotions. In another analogy, the message framing lumps all emotions into positive and negative emotions without consideration that emotions have multiple facets and are complex. The current research takes the view of the fear emotion being a discrete emotion. However, within the fear emotion is a continuum from a high level of arousal (high threat) to a low level of arousal (low threat)

which could be utilised to cajole the desired response or behaviour in studies within and outside the context of diabetes.

8.4 Future Research Directions

Neuroscientists have suggested that the amygdala, which is part of the brain, which is shown to play a vital role in processing emotion, can detect stimulus valence extremely fast (Strack & Deutsch, 2004). Methods such fMRI can decipher the amygdala activities and hence measure the impact of specific stimuli (Boubela et al., 2015). Future studies should facilitate the physiological measurements of these impulsive variables using psycho-physio methods and analysis such as the fMRI.

The current research uses the Self-Assessment Manikin (SAM), which is based on three emotion metrics introduced by P. J. Lang (1980) (Margaret M Bradley & Lang, 1994). SAM is a non-verbal self-report to assess emotional response to an event or object (Bynion & Feldner, 2017). Several online variants of the SAM measurement have been introduced, to allow researchers to use mobile devices when conducting the assessment (Betella & Verschure, 2016a). However, the manikins used in SAM remains the same. SAM is primarily used for image-based stimuli, however, with more online videos generated through social platforms such as YouTube, DailyMotion, and text messages via Twitter, WhatsApp, SAM should be extended to stimuli of other formats such as the one attempted by this research. During a conference, an academic scholar from the communication field suggested that SAM should be revised to include artificial intelligence (AI) techniques such as machine learning to capture users' objective responses. Much work and thinking would be required to enhance SAM to make it more robust, having served the academic circles for around forty years in emotion-related studies.

The curated stimuli for this research known as Diabetes Affective Message Stimuli (DAMS) was developed with the help of Malay patients in Singapore. There were relevant factors why the research focused on the Malay ethnic group. Nevertheless, the themes raised ("appropriateness", "correctness", "credibility" and "relevance") by the healthcare and patient FGD groups regarding the stimuli seems applicable to most cultures. It is worth to investigate DAMS' relevance across cultures and different communities. Singapore's multi-ethnic composition would facilitate understanding DAMS across the main ethnic groups in Singapore before DAMS is exported beyond the local communities.

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ANNEX A: PHASE 1 – STIMULI

Diabetes Affective Message System: <http://tinyurl.com/wkwsci-dams>

Fear – Texts

1. Give diabetes an inch and it will take a foot. Source: (Moore & Harris, 1996) (FR020001)
2. Diabetes kills. More than breast cancer and AIDS combined. Source: (Phillips, 2013) (FR020002)
3. Diabetes can lead to stroke, blindness and kidney problems. Source: (diabetes.org.uk, 2015) (FR020003)
4. Don't let diabetes cut you off at the knees. Source: (Minora, 2010) (FR020004)
5. If you have diabetes, take a closer look at your eyes. Source: (nebraska.aoa.org, 2009) (FR020005)
6. Diabetes - one death every seven seconds. Source: (International Business, 2011) (FR020006)
7. Diabetes is the 7th leading cause of death. Source: (Heidari & Myers) (FR020007)
8. Type 2 diabetes mellitus: 'the silent killer'. Source: (I. W. Campbell, 2001) (FR020008)
9. Diabetes – Let you think that you are in control. Then reminds you that you don't. Source: (Monte, 2015) (FR020009)
10. Record number of people undergoing amputations because of diabetes. Source: (D. Campbell, 2015) (FR020010)
11. Increasing costs: Non-adherence to medications among patients with diabetes. Source: (Kurlander, Kerr, Krein, Heisler, & Piette, 2009) (FR020011)
12. Your brain matters – Type 2 diabetes. Source: (DCRC, 2014) (FR020012)
13. Diabetes increases your risk for many serious health problems. Source: (ADA, 2016) (FR020013)
14. In people with diabetes, risk factors for cardiovascular diseases are elevated. Source: (Harris, 1998) (FR020014)
15. Poorly managed diabetes may lead to sexual dysfunction. Source: (Forbes & Cooper, 2013) (FR020015)

Fear – Images

Source: Access-Medicine McGraw-Hill (2016), EBSCOHOST

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ANNEX B – ETHICAL CLEARANCE

5/4/2017

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3 Fusionopolis Link
#03-08 Nexus@one-north
Singapore 138543
Tel 6496 6600 Fax 6486 6870
www.nhg.com.sg
RCB No 200002150H

NHG DSRB Ref: **2016/00939**

09 February 2017

Dr. Rinkoo Dalan
Department of Endocrinology
Tan Tock Seng Hospital

Dear Dr Dalan

NHG DOMAIN SPECIFIC REVIEW BOARD (DSRB) APPROVAL

STUDY TITLE: Emotion-Based Messages for Malay Diabetes Patients in Singapore

We are pleased to inform you that the NHG Domain Specific Review Board has approved the application as titled above to be conducted in **Tan Tock Seng Hospital**.

The approval period is from **09 February 2017** to **08 February 2018**. The NHG DSRB reference number for this study is **2016/00939**. Please use this reference number for all future correspondence.

The documents reviewed are:

- a) NHG DSRB Application Form: **Version No. 1**
- b) Annex A: Phase 1 – Stimuli: **Version 1.0 dated 16 November 2016**
- c) Annex B: Phase 2 – Survey: **Version 1.0 dated 16 November 2016**
- d) Arousing Diabetics Confirmation Report: **Version 1.4 dated 25 August 2016**
- e) FGD Patients Informed Consent Form: **Version 1.0 dated 29 November 2016**
- f) FGD Health Providers Informed Consent Form: **Version 1.0 dated 29 November 2016**
- g) Rating Patients Informed Consent Form: **Version 1.0 dated 29 November 2016**
- h) Experiment Patients Informed Consent Form: **Version 1.0 dated 29 November 2016**
- i) SAM Instructions: **Version 1.0 dated 23 November 2016**

Continued approval is conditional upon your compliance with the following requirements:

1. Only the approved Informed Consent Form should be used. It must be signed by each subject prior to initiation of any protocol procedures. In addition, each subject should be given a copy of the signed consent form.
2. No deviation from or changes to the study should be implemented without documented approval from the NHG DSRB, except where necessary to eliminate apparent immediate hazard(s) to the study subjects.
3. Any deviation from or changes to the study to eliminate an immediate hazard should be promptly

https://www.research.nhg.com.sg/sop/process/ROMP/Show_Email_Template?submissionId=289712

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reported to the NHG DSRB within seven calendar days.

4. Please note that for studies requiring CTA/CTN/CTC, apart from the approval from NHG DSRB, no deviation from, or changes of the Research Protocol and Informed Consent Form should be implemented without documented approval from the Health Sciences Authority unless otherwise advised by the Health Sciences Authority.

5. Please submit the following to the NHG DSRB:

a. All Unanticipated Problems Involving Risk To Subjects Or Others (UPIRTSOs) must be reported to the NHG DSRB. For more than minimal risk studies, all problems involving local deaths must be reported as soon as possible, but not later than **7 calendar days** after first knowledge by the Investigator, regardless of the causality and expectedness of the death event, and any additional relevant information about the death should be reported within **8 calendar days** of making the initial report. For no more than minimal risk studies, only problems involving local deaths that are related or possibly related to the study must be reported as soon as possible, but not later than **7 calendar days** after first knowledge by the Investigator, and any additional relevant information about the death should be reported within **8 calendar days** of making the initial report. For problems which are life threatening, it should be reported as soon as possible, but not later than **7 calendar days** after first knowledge by the investigator, and any additional relevant information about the problems should be reported within **8 calendar days** of making the initial report. All other problems that fulfil the UPIRTSOs reporting criteria must be reported as soon as possible but not later than **15 calendar days** after first knowledge by the Investigator.

b. Report(s) on any new information that may adversely affect the safety of the subject or the conduct of the study.

c. NHG DSRB Study Status Report Form – this is to be submitted 4 to 6 weeks prior to expiry of the approval period. The study cannot continue beyond **08 February 2018** until approval is renewed by the NHG DSRB.

d. Study completion – this is to be submitted using the NHG DSRB Study Status Report Form within 4 to 6 weeks of study completion.

Established since May 2006, the NHG Research Quality Management (RQM) Program seeks to promote the responsible conduct of research in a research culture with high ethical standards, identify potential systemic weaknesses and make recommendations for continual improvement. Hence, this research study may be randomly selected for a review by the Research Quality Management (RQM) team. For more information, please visit www.research.nhg.com.sg.

The NHG DSRB operates in accordance to the ICH GCP and all applicable laws and regulations.

Yours Sincerely

Dr Patricia Yap
Chairperson
NHG Domain Specific Review Board F2

Cc: Institutional Representative, TTSH
c/o Clinical Research Unit, TTSH
Departmental Representative of Endocrinology, TTSH

(This is an electronic-generated letter. No signature is required.)

3 Fusionopolis Link
#03-08 Nexus@one-north
Singapore 138543
Tel 6496 6600 Fax 6486 6870
www.nhg.com.sg
RCB No. 200002150H

NHG DSRB Ref: **2016/00939**

23 January 2018

Dr Rinkoo Dalan
Department of Endocrinology
Tan Tock Seng Hospital

Dear Dr Dalan

RENEWAL OF NHG DOMAIN SPECIFIC REVIEW BOARD (DSRB) APPROVAL

STUDY TITLE: Emotion-Based Messages for Malay Diabetes Patients in Singapore

We are pleased to inform you that the NHG DSRB has renewed the approval for the application as titled above, being conducted in **Tan Tock Seng Hospital**. The approval period is from **23 January 2018 to 22 January 2019**.

The documents reviewed are:

- a) NHG DSRB Study Status Report Form ID: **2016/00939-SRF0001**
- b) NHG DSRB Application Form: **Version No. 4**
- c) Patients One-to-One Interview Informed Consent Form: Version 1.0 dated 13 July 2017
- d) One-to-One Interview Facilitator Guideline (for Patient) Form: Version 1.0 dated 13 July 2017
- e) Annex A: Phase 1 – Stimuli: Version 2.0 dated 20 June 2017
- f) FGD Health Providers Informed Consent Form: Version 1.1 dated 15 February 2017
- g) FGD Facilitator Guideline (for Healthcare Providers) Form: Version 1.0 dated 10 February 2017
- h) FGD Facilitator Guideline (for Patient) Form: Version 1.0 dated 10 February 2017
- i) FGD Patients Informed Consent Form: Version 1.1 dated 15 February 2017
- j) Annex B: Phase 2 – Survey: Version 1.0 dated 16 November 2016
- k) Arousing Diabetics Confirmation Report: Version 1.4 dated 25 August 2016
- l) Rating Patients Informed Consent Form: Version 1.0 dated 29 November 2016
- m) Experiment Patients Informed Consent Form: Version 1.0 dated 29 November 2016
- n) SAM Instructions: Version 1.0 dated 23 November 2016

Continued approval is conditional upon your compliance with the following requirements:

1. Only the approved Informed Consent Form should be used. It must be signed by each subject prior to initiation of any protocol procedures. In addition, each subject should be given a copy of the signed consent form.
2. No deviation from, or changes of the protocol should be implemented without documented approval from the NHG DSRB, except where necessary to eliminate apparent immediate hazard(s) to the study

subjects.

3. Any deviation from, or a change of, the protocol to eliminate an immediate hazard should be promptly reported to the NHG DSRB within seven calendar days.
4. Please note that for studies requiring CTA/CTN/CTC, apart from the approval from NHG DSRB, no deviation from, or changes of the Research Protocol and Informed Consent Form should be implemented without documented approval from the Health Sciences Authority unless otherwise advised by the Health Sciences Authority.
5. Please submit the following to the NHG DSRB:
 - a. All Unanticipated Problems Involving Risk To Subjects Or Others (UPIRTSOs) must be reported to the NHG DSRB. For more than minimal risk studies, all problems involving local deaths must be reported as soon as possible, but not later than **7 calendar days** after first knowledge by the Investigator, regardless of the causality and expectedness of the death event, and any additional relevant information about the death should be reported within **8 calendar days** of making the initial report. For no more than minimal risk studies, only problems involving local deaths that are related or possibly related to the study must be reported as soon as possible, but not later than **7 calendar days** after first knowledge by the Investigator, and any additional relevant information about the death should be reported within **8 calendar days** of making the initial report. For problems which are life threatening, it should be reported as soon as possible, but not later than **7 calendar days** after first knowledge by the investigator, and any additional relevant information about the problems should be reported within **8 calendar days** of making the initial report. All other problems that fulfil the UPIRTSOs reporting criteria must be reported as soon as possible but not later than **15 calendar days** after first knowledge by the Investigator.
 - b. Report(s) on any new information that may adversely affect the safety of the subject or the conduct of the study.
 - c. NHG DSRB Study Status Report Form – this is to be submitted 4 to 6 weeks prior to expiry of the approval period. The study cannot continue beyond **22 January 2019** until approval is renewed by the NHG DSRB.
 - d. Study completion – this is to be submitted using the NHG DSRB Study Status Report Form within 4 to 6 weeks of study completion or termination.

Established since May 2006, the NHG Research Quality Management (RQM) Program seeks to promote the responsible conduct of research in a research culture with high ethical standards, identify potential systemic weaknesses and make recommendations for continual improvement. Hence, this research study may be randomly selected for a review by the Research Quality Management (RQM) team. For more information, please visit www.research.nhg.com.sg.

The NHG DSRB operates in accordance to the ICH GCP, and all applicable laws and regulations.

Yours Sincerely

A/Prof Adeline Seow
Chairperson
NHG Domain Specific Review Board F1

Cc: Institutional Representative, TTSH
c/o Clinical Research & Innovation Office, TTSH
Departmental Representative of Endocrinology, TTSH

(This is an electronic-generated letter. No signature is required.)

Research Support Office

Ref. No: 200604393R

IRB-2016-09-045

15 November 2016

Professor Theng Yin Leng
Wee Kim Wee School of Communication and Information

NTU INSTITUTIONAL REVIEW BOARD APPROVAL
Project Title: AROUSAL-BASED MESSAGES FOR DIABETES PATIENTS (STUDY 1)

I refer to your application for ethics approval with respect to the above project.

The Board has considered your application and noted from your application that your research involves collecting behavioral data from participants using computer stimuli.

You have also confirmed that informed consent will be obtained from the participants and you have guaranteed the confidentiality of your participants' biodata obtained from them.

The documents reviewed are:

- a) NTU IRB application form dated **26 September 2016**
- b) Participant information sheet and consent form: version 1 dated **26 September 2016**
- c) Data collection form: version 1 dated **26 September 2016**

The Board is therefore satisfied with the bioethical consideration for the project and approves the ethics application under **Expedited** review. The approval period is from **11/15/2016 to 9/8/2016**. The NTU IRB reference number for this study is **IRB-2016-09-045**. Please use this reference number for all future correspondence.

The following protocol and compliances are to be observed upon NTU IRB approval

1. All research involving procedures greater than minimal risk on minors (individuals who are less than the legal age of 21 years old) requires IRB approved written Parental Consent and assent from the participant to be obtained before any research protocols can be administered. Minimal risk refers to an anticipated level of harm and discomfort that is no greater than that ordinarily encountered in daily life, or during the performance of routine educational, physical, or psychological examination.
2. Only the approved Participants Information Sheet and Consent Form should be used. It must be signed by each subject prior to initiation of any protocol procedures. In addition, each subject should be given a copy of the signed consent form.

Blk N2.1, B4-01, 76 Nanyang Drive, Singapore 637331 Nanyang Avenue, Singapore 636798
Tel : +65 6791 9857, Fax: 6793 2019
www.ntu.edu.sg

Research Support Office

Reg. No. 200604383R

IRB-2016-09-046

15 November 2016

Professor Theng Yin Leng
Wee Kim Wee School of Communication and Information

NTU INSTITUTIONAL REVIEW BOARD APPROVAL
Project Title: AROUSAL-BASED MESSAGES FOR DIABETES PATIENTS (STUDY 2)

I refer to your application for ethics approval with respect to the above project.

The Board has considered your application and noted from your application that your research involves collecting behavioral data from participants using computer stimuli.

You have also confirmed that informed consent will be obtained from the participants and you have guaranteed the confidentiality of your participants' biodata obtained from them.

The documents reviewed are:

- a) NTU IRB application form dated **26 September 2016**
- b) Participant information sheet and consent form: version 1 dated **26 September 2016**
- c) Data collection form: version 1 dated **26 September 2016**

The Board is therefore satisfied with the bioethical consideration for the project and approves the ethics application under **Expedited** review. The approval period is from **15 November 2016** to **14 November 2017**. The NTU IRB reference number for this study is **IRB-2016-09-046**. Please use this reference number for all future correspondence.

The following protocol and compliances are to be observed upon NTU IRB approval

1. All research involving procedures greater than minimal risk on minors (individuals who are less than the legal age of 21 years old) requires IRB approved written Parental Consent and assent from the participant to be obtained before any research protocols can be administered. Minimal risk refers to an anticipated level of harm and discomfort that is no greater than that ordinarily encountered in daily life, or during the performance of routine educational, physical, or psychological examination.
2. Only the approved Participants Information Sheet and Consent Form should be used. It must be signed by each subject prior to initiation of any protocol procedures. In addition, each subject should be given a copy of the signed consent form.

Blk N2.1, B4-01, 76 Nanyang Drive, Singapore 637331 Nanyang Avenue, Singapore 639798
Tel : +65 6791 9857, Fax: 6793 2019
www.ntu.edu.sg

3 Fusionopolis Link
#03-08 Nexus@one-north
Singapore 138543
Tel 6496 6600 Fax 6486 6870
www.nhg.com.sg
RCB No 200001150H

NHG DSRB Ref: **2016/00939**

19 July 2017

Dr Rinkoo Dalan
Department of Endocrinology
Tan Tock Seng Hospital

Dear Dr Dalan

NHG DOMAIN SPECIFIC REVIEW BOARD (DSRB) APPROVAL OF AMENDMENT

STUDY TITLE: Emotion-Based Messages for Malay Diabetes Patients in Singapore

We are pleased to inform you that the NHG Domain Specific Review Board has reviewed and approved the amendments submitted for the application as titled above.

The documents reviewed are:

- a) NHG DSRB Study Amendment ID: **2016/00939-AMD0003**
- b) NHG DSRB Application Form: **Version No. 4**
- c) Patients One-to-One Interview Informed Consent Form: **Version 1.0 dated 13 July 2017**
- d) One-to-One Interview Facilitator Guideline (for Patient) Form: **Version 1.0 dated 13 July 2017**

The NHG DSRB operates in accordance to the ICH GCP and all applicable laws and regulations.

Yours Sincerely

Dr Patricia Yap
Chairperson
NHG Domain Specific Review Board F2

Cc: Institutional Representative, TTSH
c/o Clinical Research Unit, TTSH
Departmental Representative of Endocrinology, TTSH

IRB-2016-09-046-03

15 September 2020

Prof Theng Yin Leng
Wee Kim Wee School of Communication and Information

Dear Prof Theng Yin Leng

NTU INSTITUTIONAL REVIEW BOARD (NTU-IRB) APPROVAL

Project Title: Emotion-based Health Messages for Malay Diabetes Patients in Singapore

We refer to your application for ethics approval with respect to the above project.

The Board has deliberated on this application and accepted the change in:

- 1) Title of study
- 2) Fund source
- 3) Number of subjects
- 4) Protocol

The Board is therefore satisfied with the bioethical considerations for the project and approves the ethics application.

Dr Lim Jui
Chair, NTU Institutional Review Board
encl.

ANNEX C – INFORMED CONSENT

FGD for Healthcare Providers

OFFICIAL USE ONLY	
Doc Name : Informed Consent Form Template	
Doc Number : 207-001	
Doc Version : 7.1	Date : 10 Jun 2016

INFORMED CONSENT FORM

1. Study Information

Protocol Title:

Emotional-Based Messages for Malay Diabetes Patients in Singapore

Principal Investigator & Contact Details:

PI: Dr. Rinkoo Dalan, rinkoo_dalan@ttsh.com.sg, Telephone Number: 8126 3170
Tan Tock Seng Hospital, Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes
(Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes (Clinic B2B), 11 Jalan Tan
Tock Seng, Singapore 308433

CO-PI: Mr. Ariffin Kawaja, mohamed002@e.ntu.edu.sg, Telephone Number: 9026 9196
Wee Kim Wee, Scholl of Communication and Information, Nanyang Technological University,
31 Nanyang Link, WKWSCI Building, Singapore 637718

Study Sponsor:

WKWSCI 3K grant from NTU.

2. Purpose of the Research Study

You are invited to participate in a research study. It is important to us that you first take time to read through and understand the information provided in this sheet. Nevertheless, before you take part in this research study, the study will be explained to you and you will be given the chance to ask questions. After you are properly satisfied that you understand this study, and that you wish to take part in the study, you must sign this informed consent form. You will be given a copy of this consent form to take home with you.

You are invited because this study is investigating health interventions for Type 2 diabetes patients. This study is carried out to find out how health-related messages can affect the behaviours of diabetes patients.

This study will recruit up to 250 patients and 6 healthcare providers from the Diabetes Clinic in Tan Tock Seng Hospital (TTSH) over a period of one year.

3. What procedures will be followed in this study

If you take part in this study, you will be asked to view several messages, rate the messages and then you may be asked to take part in a survey.

Your participation in the study will last for about 45 minutes. You will view 80 stimuli (health-related messages) within the 45-minute period. You will take part in this study on the same day you are visiting the doctor for your scheduled appointment in the diabetes clinic in TTSH.

If you agree to take part in this study, you are required to do the following tasks:

Your task is to determine if the 80 stimuli (health messages) to be used in the experiment is suitable for diabetes patients during a Focus Group Discussion (FGD). The researcher/moderator will explain the reasons behind the stimuli chosen, and participants will give their opinions such as to whether they agree or disagree with the choices made by the researcher. The discussion will be conducted in one of the Tan Tock Seng Hospital's (TTSH) meeting rooms. The participants would also be presented with the Self-Assessment-Manikin (SAM), a non-verbal pictorial assessment technique that will be used to rate the stimuli by another. Pseudo names will be used during the FGD, so that the participants remain anonymous and non-identifiable. The researcher will act as the moderator during the FGD.

The step-by-step procedure for you are as follows:

1. Give consent.
2. Get briefed regarding the study.
3. Presented with the 80 stimuli (via a tablet PC) consisting of the (fear, enthusiasm and neutral arousal-based stimuli) where they will be asked regarding their opinion on the stimuli proposed for the study as well as the SAM technique to be used when rating the stimuli.

After the discussions regarding the 80 stimuli:

4. Get debriefing where you will be provided with the contact details of the researcher and the institution for further clarifications, feedback or questions.

When your participation in the study ends, you will no longer have access to the diabetes-related messages used in the study, unless special additional arrangements are made by the Principal Investigator.

The FGD will be audio-recorded and the recordings will be transcribed for analysis.

4. Your Responsibilities in This Study

If you agree to participate in this study, you should follow the advice given to you by the study team. You should be prepared during your scheduled visits to the hospital to undergo all the procedures that are outlined above.

5. What Is Not Standard Care or is Experimental in This Study

The study is being conducted because the use of diabetes-related messages is not yet proven to be a standard intervention in subjects with Type 2 diabetes. We hope that your participation will help us to determine whether diabetes-related messages is equal or superior to existing behavioural (or non-clinical) intervention.

Use of a placebo (neutral messages), blinding (one or more parties unaware of the treatment assignment), and randomization (selection of patient participants by chance) are only done for research studies.

Diabetes-related messages are not part of standard medical care as it is used in this study. This/these procedure(s) are only being performed for the purposes of the research, and are not part of routine care for existing patients.

6. Possible Risks and Side Effects

Rarely, can the use of health-related messages cause a severe and possibly life-threatening reaction to a person. A person may experience certain psychological-related reaction which may include: anxieties, depression among others. If you have any of these symptoms, call your clinic at once.

The health-related messages for diabetes patients are still being tested; therefore, you may experience other side effects that have not yet been reported. However, you will be kept informed of any significant new findings that may relate to your willingness to continue to take part in this study.

If you experience any new psychological-related symptoms, you should contact your doctor or the Principal Investigator as soon as possible.

7. Possible Benefits from Participating in the Study

There is no assurance you will benefit from participation in this study. However, your participation in this study may add to the medical knowledge about the use of health-related messages for diabetes patients.

8. Important Information for Women Subjects

The psychological effects of health-related messages on pregnant women and on a baby's development is not known. Therefore, patients who are pregnant and breast-feeding may wish to re-consider taking part in this study.

9. Alternatives to Participation

You will not be penalized if you choose not to take part in this study.

10. Costs & Payments if Participating in the Study

If you take part in this study, the procedures performed during the study will be at no charge to you. Any costs involved will be borne by Wee Kim Wee, School of Communication and Information (WKWSCI), Nanyang Technological University (NTU), Singapore.

You will not be compensated for participating in this study.

11. Voluntary Participation

Your participation in this study is voluntary. You may stop participating in this study at any time. If you decide to stop taking part in this study, you should tell the Principal Investigator. However, the data that have been collected until the time of your withdrawal will be kept and analysed.

The Investigator and/or the Sponsor of this study may stop your participation in the study at any time if they decide that it is in your best interests. They may also do this if you do not follow instructions required to complete the study adequately.

In the event of any new information becoming available that may be relevant to your willingness to continue in this study, you (*or your legally acceptable representative, if relevant*) will be informed in a timely manner by the Principal Investigator or his/her representative.

12. Compensation for Injury

If you follow the directions of the doctors in charge of this study and you are physically injured due to the trial substance or procedure given under the plan for this study, Tan Tock Seng Hospital (TTSH) and Nanyang Technological University (NTU) / Wee Kim Wee School of Communication and Information (WKWSCI) will pay the medical expenses for the treatment of that injury.

Payment for management of the normally expected consequences of your treatment will not be provided by the TTSH or NTU/WKWSCI.

TTSH and NTU/WKWSCI without legal commitment will compensate you for the injuries arising from your participation in the study without you having to prove TTSH or NTU/WKWSCI is at fault. There are however conditions and limitations to the extent of compensation provided. You may wish to discuss this with your Principal Investigator.

By signing this consent form, you will not waive any of your legal rights or release the parties involved in this study from liability for negligence.

13. Confidentiality of Study and Medical Records

Information collected for this study will be kept confidential. Your records, to the extent of the applicable laws and regulations, will not be made publicly available.

However, the Regulatory Agencies (HAS, FDA if relevant), NHG Domain Specific Review Board and Ministry of Health will be granted direct access to your original medical records to check study procedures and data, without making any of your information public. By signing the Informed Consent Form attached, you (*or your legally acceptable representative, if relevant*) are authorizing (i) collection, access to, use and storage of your “Personal Data”, and (ii) disclosure to authorised service providers and relevant third parties.

“Personal Data” means data about you which makes you identifiable (i) from such data or (ii) from that data and other information which an organisation has or likely to have access. This includes medical conditions, medications, investigations and treatment history.

Research arising in the future, based on this “Personal Data”, will be subject to review by the relevant institutional review board. Data collected and entered into the Case Report Forms are the property of NTU. In the event of any publication regarding this study, your identity will remain confidential.

By participating in this research study, you are confirming that you have read, understood and consent to the Personal Data Protection Notification available at (provide hyperlink to institution’s website on Personal Data Protection Notification).

In order to protect your identity and the confidentiality of your information, all information and audio files that concern you will be stored on a central computer. Access to this information will be strictly controlled with the aid of a security code system.

14. Who to Contact if You Have Questions

If you have questions about this research study, you may contact the Principal Investigator: Dr. Rinkoo Dalan, rinkoo_dalan@ttsh.com.sg, Telephone Number: 8126 3170
Tan Tock Seng Hospital, Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes (Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes (Clinic B2B), 11 Jalan Tan Tock Seng, Singapore 308433

In case of any injuries during the course of this study, you may contact the Principal Investigator based on the contact listed above.

The study has been reviewed by the NHG Domain Specific Review Board (the central ethics committee) for ethics approval.

If you want an independent opinion to discuss problems and questions, obtain information and offer inputs on your rights as a research subject, you may contact the NHG Domain Specific Review Board Secretariat at 6471-3266. You can also find more information about participating in clinical research, the NHG Domain Specific Review Board and its review processes at www.research.nhg.com.sg.

If you have any complaints or feedback about this research study, you may contact the Principal Investigator or the NHG Domain Specific Review Board Secretariat.

CONSENT FORM

Protocol Title:

Emotional-Based Messages for Malay Diabetes Patients in Singapore

Principal Investigator & Contact Details:

Dr. Rinkoo Dalan, rinkoo_dalan@ttsh.com.sg, Telephone Number: 8126 3170
Tan Tock Seng Hospital, Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes
(Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes (Clinic B2B), 11 Jalan Tan
Tock Seng, Singapore 308433

I voluntarily consent to take part in this research study. I have fully discussed and understood the purpose and procedures of this study. This study has been explained to me in a language that I understand. I have been given enough time to ask any questions that I have about the study, and all my questions have been answered to my satisfaction.

By participating in this research study, I confirm that I have read, understood and consent to the (Institution) Personal Data Protection Notification. I also consent to the use of my Personal Data for the purposes of engaging in related research arising in the future.

Consent for the Use of Data for Future Research

☐ Yes, I agree to donate my data for future research as long as the research is related to diabetes-related research.

☐ No, I do not agree to donate my data for future research.

Name of Participant

Signature

Date

Impartial Witness Statement

I, the undersigned, certify to the best of my knowledge that the participant signing this informed consent form had the study fully explained in a language understood by him / her and clearly understands the nature, risks and benefits of his / her participation in the study.

Name of Impartial Witness

Signature

Date

Investigator Statement

I, the undersigned, certify that I explained the study to the participant and to the best of my knowledge the participant signing this informed consent form clearly understands the nature, risks and benefits of his / her participation in the study.

Name of Investigator /
Person administering consent

Signature

Date

FGD for Patients

OFFICIAL USE ONLY	
Doc Name : Informed Consent Form Template	
Doc Number : 207-001	
Doc Version : 7.1	Date : 10 Jun 2016

INFORMED CONSENT FORM

1. Study Information

Protocol Title:

Emotional-Based Messages for Malay Diabetes Patients in Singapore

Principal Investigator & Contact Details:

PI: Dr. Rinkoo Dalan, rinkoo_dalan@ttsh.com.sg, Telephone Number: 8126 3170
Tan Tock Seng Hospital, Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes
(Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes (Clinic B2B), 11 Jalan Tan
Tock Seng, Singapore 308433

CO-PI: Mr. Ariffin Kawaja, mohamed002@e.ntu.edu.sg, Telephone Number: 9026 9196
Wee Kim Wee, Scholl of Communication and Information, Nanyang Technological University,
31 Nanyang Link, WKWSCI Building, Singapore 637718

Study Sponsor:

WKWSCI 3K grant from NTU.

2. Purpose of the Research Study

You are invited to participate in a research study. It is important to us that you first take time to read through and understand the information provided in this sheet. Nevertheless, before you take part in this research study, the study will be explained to you and you will be given the chance to ask questions. After you are properly satisfied that you understand this study, and that you wish to take part in the study, you must sign this informed consent form. You will be given a copy of this consent form to take home with you.

You are invited because this study is investigating health interventions for Type 2 diabetes patients. This study is carried out to find out how health-related messages can affect the behaviours of diabetes patients.

This study will recruit up to 250 patients and 6 healthcare providers from the Diabetes Clinic in Tan Tock Seng Hospital (TTSH) over a period of one year.

3. What procedures will be followed in this study

If you take part in this study, you will be asked to view several messages, rate the messages and then you may be asked to take part in a survey.

Your participation in the study will last for about 45 minutes. You will view 80 stimuli (health-related messages) within the 45-minute period. You will take part in this study on the same day you are visiting the doctor for your scheduled appointment in the diabetes clinic in TTSH.

If you agree to take part in this study, you are required to do the following tasks:

Your task is to determine if the 80 stimuli (health messages) to be used in the experiment is suitable for diabetes patients during a Focus Group Discussion (FGD). The researcher/moderator will explain the reasons behind the stimuli chosen, and participants will give their opinions such as to whether they agree or disagree with the choices made by the researcher. The discussion will be conducted in one of the Tan Tock Seng Hospital's (TTSH) meeting rooms. The participants would also be presented with the Self-Assessment-Manikin

(SAM), a non-verbal pictorial assessment technique that will be used to rate the stimuli by another. Pseudo names will be used during the FGD, so that the participants remain anonymous and non-identifiable. The researcher will act as the moderator during the FGD.

The step-by-step procedure for you are as follows:

1. Give consent.
2. Get briefed regarding the study.
3. Presented with the 80 stimuli (via a tablet PC) consisting of the (fear, enthusiasm and neutral arousal-based stimuli) where they will be asked regarding their opinion on the stimuli proposed for the study as well as the SAM technique to be used when rating the stimuli.

After the discussions regarding the 80 stimuli:

4. Get debriefing where you will be provided with the contact details of the researcher and the institution for further clarifications, feedback or questions.

When your participation in the study ends, you will no longer have access to the diabetes-related messages used in the study, unless special additional arrangements are made by the Principal Investigator.

4. Your Responsibilities in This Study

If you agree to participate in this study, you should follow the advice given to you by the study team. You should be prepared during your scheduled visits to the hospital to undergo all the procedures that are outlined above.

5. What Is Not Standard Care or is Experimental in This Study

The study is being conducted because the use of diabetes-related messages is not yet proven to be a standard intervention in subjects with Type 2 diabetes. We hope that your participation will help us to determine whether diabetes-related messages is equal or superior to existing behavioural (or non-clinical) intervention.

Use of a placebo (neutral messages), blinding (one or more parties unaware of the treatment assignment), and randomization (selection of patient participants by chance) are only done for research studies.

Diabetes-related messages are not part of standard medical care as it is used in this study. This/these procedure(s) are only being performed for the purposes of the research, and are not part of your routine care.

The FGD will be audio-recorded and the recordings will be transcribed for analysis.

6. Possible Risks and Side Effects

Rarely, can the use of health-related messages cause a severe and possibly life-threatening reaction to a person. A person may experience certain psychological-related reaction which may include: anxieties, depression among others. If you have any of these symptoms, call your clinic at once.

The health-related messages for diabetes patients are still being tested; therefore, you may experience other side effects that have not yet been reported. However, you will be kept informed of any significant new findings that may relate to your willingness to continue to take part in this study.

If you experience any new psychological-related symptoms, you should contact your doctor or the Principal Investigator as soon as possible.

7. Possible Benefits from Participating in the Study

There is no assurance you will benefit from participation in this study. However, your participation in this study may add to the medical knowledge about the use of health-related messages for diabetes patients.

8. Important Information for Women Subjects

The psychological effects of health-related messages on pregnant women and on a baby's development is not known. Therefore, patients who are pregnant and breast-feeding may wish to re-consider taking part in this study.

9. Alternatives to Participation

If you choose not to take part in this study, you will still receive standard care for your condition.

10. Costs & Payments if Participating in the Study

If you take part in this study, the procedures performed during the study will be at no charge to you. Any costs involved will be borne by Wee Kim Wee, School of Communication and Information (WKWSCI), Nanyang Technological University (NTU), Singapore.

For participating in this study, you will be compensated with a sum of SGD\$20.

11. Voluntary Participation

Your participation in this study is voluntary. You may stop participating in this study at any time. Your decision not to take part in this study or to stop your participation will not affect your medical care or any benefits to which you are entitled. If you decide to stop taking part in this study, you should tell the Principal Investigator.

If you withdraw from the study, you may not be fully compensated with the SGD\$25. However, the data that have been collected until the time of your withdrawal will be kept and analysed.

Your doctor, the Investigator and/or the Sponsor of this study may stop your participation in the study at any time if they decide that it is in your best interests. They may also do this if you do not follow instructions required to complete the study adequately. If you have other medical problems or side effects, the doctor and/or nurse will decide if you may continue in the research study.

In the event of any new information becoming available that may be relevant to your willingness to continue in this study, you (*or your legally acceptable representative, if relevant*) will be informed in a timely manner by the Principal Investigator or his/her representative.

12. Compensation for Injury

If you follow the directions of the doctors in charge of this study and you are physically injured due to the trial substance or procedure given under the plan for this study, Tan Tock Seng Hospital (TTSH) and Nanyang Technological University (NTU) / Wee Kim Wee School

of Communication and Information (WKWSCl) will pay the medical expenses for the treatment of that injury.

Payment for management of the normally expected consequences of your treatment will not be provided by the TTSH or NTU/WKWSCI.

TTSH and NTU/WKWSCI without legal commitment will compensate you for the injuries arising from your participation in the study without you having to prove TTSH or NTU/WKWSCI is at fault. There are however conditions and limitations to the extent of compensation provided. You may wish to discuss this with your Principal Investigator.

By signing this consent form, you will not waive any of your legal rights or release the parties involved in this study from liability for negligence.

13. Confidentiality of Study and Medical Records

Information collected for this study will be kept confidential. Your records, to the extent of the applicable laws and regulations, will not be made publicly available.

However, the Regulatory Agencies (HAS, FDA if relevant), NHG Domain Specific Review Board and Ministry of Health will be granted direct access to your original medical records to check study procedures and data, without making any of your information public. By signing the Informed Consent Form attached, you (*or your legally acceptable representative, if relevant*) are authorizing (i) collection, access to, use and storage of your “Personal Data”, and (ii) disclosure to authorised service providers and relevant third parties.

“Personal Data” means data about you which makes you identifiable (i) from such data or (ii) from that data and other information which an organisation has or likely to have access. This includes medical conditions, medications, investigations and treatment history.

Research arising in the future, based on this “Personal Data”, will be subject to review by the relevant institutional review board. Data collected and entered into the Case Report Forms are the property of NTU. In the event of any publication regarding this study, your identity will remain confidential.

By participating in this research study, you are confirming that you have read, understood and consent to the Personal Data Protection Notification available at (provide hyperlink to institution’s website on Personal Data Protection Notification).

In order to protect your identity and the confidentiality of your information, all information and audio files that concern you will be stored on a central computer. Access to this information will be strictly controlled with the aid of a security code system.

14. Who to Contact if You Have Questions

If you have questions about this research study, you may contact the Principal Investigator: Dr. Rinkoo Dalan, rinkoo_dalan@ttsh.com.sg, Telephone Number: 8126 3170
Tan Tock Seng Hospital, Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes (Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes (Clinic B2B), 11 Jalan Tan Tock Seng, Singapore 308433

In case of any injuries during the course of this study, you may contact the Principal Investigator based on the contact listed above. The study has been reviewed by the NHG Domain Specific Review Board (the central ethics committee) for ethics approval.

If you want an independent opinion to discuss problems and questions, obtain information and offer inputs on your rights as a research subject, you may contact the NHG Domain Specific Review Board Secretariat at 6471-3266. You can also find more information about

participating in clinical research, the NHG Domain Specific Review Board and its review processes at www.research.nhg.com.sg.

If you have any complaints or feedback about this research study, you may contact the Principal Investigator or the NHG Domain Specific Review Board Secretariat.

CONSENT FORM

Protocol Title:

Emotional-Based Messages for Malay Diabetes Patients in Singapore

Principal Investigator & Contact Details:

Dr. Rinkoo Dalan, rinkoo_dalan@ttsh.com.sg, Telephone Number: 8126 3170
Tan Tock Seng Hospital, Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes
(Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes (Clinic B2B), 11 Jalan Tan
Tock Seng, Singapore 308433

I voluntarily consent to take part in this research study. I have fully discussed and understood the purpose and procedures of this study. This study has been explained to me in a language that I understand. I have been given enough time to ask any questions that I have about the study, and all my questions have been answered to my satisfaction.

By participating in this research study, I confirm that I have read, understood and consent to the (Institution) Personal Data Protection Notification. I also consent to the use of my Personal Data for the purposes of engaging in related research arising in the future.

Consent for the Use of Data for Future Research

☐ Yes, I agree to donate my data for future research as long as the research is related to diabetes-related research.

☐ No, I do not agree to donate my data for future research.

Name of Participant

Signature

Date

Impartial Witness Statement

I, the undersigned, certify to the best of my knowledge that the participant signing this informed consent form had the study fully explained in a language understood by him / her and clearly understands the nature, risks and benefits of his / her participation in the study.

Name of Impartial Witness

Signature

Date

Investigator Statement

I, the undersigned, certify that I explained the study to the participant and to the best of my knowledge the participant signing this informed consent form clearly understands the nature, risks and benefits of his / her participation in the study.

Name of Investigator /
Person administering consent

Signature

Date

One-to-One Interview with Patients

OFFICIAL USE ONLY	
Doc Name : Informed Consent Form Template	
Doc Number : 207-001	
Doc Version : 7.1	Date : 10 Jun 2016

INFORMED CONSENT FORM

1. Study Information

Protocol Title:

Emotional-Based Messages for Malay Diabetes Patients in Singapore

Principal Investigator & Contact Details:

PI: Dr. Rinkoo Dalan, rinkoo_dalan@ttsh.com.sg, Telephone Number: 8126 3170
Tan Tock Seng Hospital, Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes
(Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes (Clinic B2B), 11 Jalan Tan
Tock Seng, Singapore 308433

CO-PI: Mr. Ariffin Kawaja, mohamed002@e.ntu.edu.sg, Telephone Number: 9026 9196
Wee Kim Wee, Scholl of Communication and Information, Nanyang Technological University,
31 Nanyang Link, WKWSCI Building, Singapore 637718

Study Sponsor:

WKWSCI 3K grant from NTU.

2. Purpose of the Research Study

You are invited to participate in a research study. It is important to us that you first take time to read through and understand the information provided in this sheet. Nevertheless, before you take part in this research study, the study will be explained to you and you will be given the chance to ask questions. After you are properly satisfied that you understand this study, and that you wish to take part in the study, you must sign this informed consent form. You will be given a copy of this consent form to take home with you.

You are invited because this study is investigating health interventions for Type 2 diabetes patients. This study is carried out to find out how health-related messages can affect the behaviours of diabetes patients.

This study will recruit up to 250 patients and 8 healthcare providers from the Diabetes Clinic in Tan Tock Seng Hospital (TTSH) over a period of one year.

3. What procedures will be followed in this study

If you take part in this study, you will be asked to view several messages, rate the messages and then you may be asked to take part in a survey.

Your participation in the study will last for about 30 minutes. You will view 80 stimuli (health-related messages) within the 30-minute period. You will take part in this study on the same day you are visiting the doctor for your scheduled appointment in the diabetes clinic in TTSH.

If you agree to take part in this study, you are required to do the following tasks:

Your task is to determine if the 80 stimuli (health messages) to be used in the study is suitable for diabetes patients during a one-to-one interview with the researcher. The researcher/moderator will explain the reasons behind the stimuli chosen, and participants will give their opinions such as to whether they agree or disagree with the choices made by the researcher. The discussion will be conducted in one of the Tan Tock Seng Hospital's (TTSH) meeting rooms. The participants would also be presented with the Self-Assessment-Manikin (SAM), a non-verbal pictorial assessment technique that will be used to rate the stimuli by another. Your participation will remain anonymous and non-identifiable.

The step-by-step procedure for you are as follows:

1. Give consent.
2. Get briefed regarding the study.
3. Presented with the 80 stimuli (via a tablet PC) consisting of the (fear, enthusiasm and neutral arousal-based stimuli) where they will be asked regarding their opinion on the stimuli proposed for the study as well as the SAM technique to be used when rating the stimuli.

After the discussions regarding the 80 stimuli:

4. Get debriefing where you will be provided with the contact details of the researcher and the institution for further clarifications, feedback or questions.

When your participation in the study ends, you will no longer have access to the diabetes-related messages used in the study, unless special additional arrangements are made by the Principal Investigator.

4. Your Responsibilities in This Study

If you agree to participate in this study, you should follow the advice given to you by the study team. You should be prepared during your scheduled visits to the hospital to undergo all the procedures that are outlined above.

5. What Is Not Standard Care or is Experimental in This Study

The study is being conducted because the use of diabetes-related messages is not yet proven to be a standard intervention in subjects with Type 2 diabetes. We hope that your participation will help us to determine whether diabetes-related messages is equal or superior to existing behavioural (or non-clinical) intervention.

Use of a placebo (neutral messages), blinding (one or more parties unaware of the treatment assignment), and randomization (selection of patient participants by chance) are only done for research studies.

Diabetes-related messages are not part of standard medical care as it is used in this study. This/these procedure(s) are only being performed for the purposes of the research, and are not part of your routine care.

The FGD will be audio-recorded and the recordings will be transcribed for analysis.

6. Possible Risks and Side Effects

Rarely, can the use of health-related messages cause a severe and possibly life-threatening reaction to a person. A person may experience certain psychological-related reaction which may include: anxieties, depression among others. If you have any of these symptoms, call your clinic at once.

The health-related messages for diabetes patients are still being tested; therefore, you may experience other side effects that have not yet been reported. However, you will be kept informed of any significant new findings that may relate to your willingness to continue to take part in this study.

If you experience any new psychological-related symptoms, you should contact your doctor or the Principal Investigator as soon as possible.

7. Possible Benefits from Participating in the Study

There is no assurance you will benefit from participation in this study. However, your participation in this study may add to the medical knowledge about the use of health-related messages for diabetes patients.

8. Important Information for Women Subjects

The psychological effects of health-related messages on pregnant women and on a baby's development is not known. Therefore, patients who are pregnant and breast-feeding may wish to re-consider taking part in this study.

9. Alternatives to Participation

If you choose not to take part in this study, you will still receive standard care for your condition.

10. Costs & Payments if Participating in the Study

If you take part in this study, the procedures performed during the study will be at no charge to you. Any costs involved will be borne by Wee Kim Wee, School of Communication and Information (WKWSCl), Nanyang Technological University (NTU), Singapore.

For participating in this study, you will be compensated with a sum of SGD\$20.

11. Voluntary Participation

Your participation in this study is voluntary. You may stop participating in this study at any time. Your decision not to take part in this study or to stop your participation will not affect your medical care or any benefits to which you are entitled. If you decide to stop taking part in this study, you should tell the Principal Investigator.

If you withdraw from the study, you may not be fully compensated with the SGD\$20. However, the data that have been collected until the time of your withdrawal will be kept and analysed.

Your doctor, the Investigator and/or the Sponsor of this study may stop your participation in the study at any time if they decide that it is in your best interests. They may also do this if you do not follow instructions required to complete the study adequately. If you have other medical problems or side effects, the doctor and/or nurse will decide if you may continue in the research study.

In the event of any new information becoming available that may be relevant to your willingness to continue in this study, you (*or your legally acceptable representative, if relevant*) will be informed in a timely manner by the Principal Investigator or his/her representative.

12. Compensation for Injury

If you follow the directions of the doctors in charge of this study and you are physically injured due to the trial substance or procedure given under the plan for this study, Tan Tock Seng Hospital (TTSH) and Nanyang Technological University (NTU) / Wee Kim Wee School of Communication and Information (WKWSCI) will pay the medical expenses for the treatment of that injury.

Payment for management of the normally expected consequences of your treatment will not be provided by the TTSH or NTU/WKWSCI.

TTSH and NTU/WKWSCI without legal commitment will compensate you for the injuries arising from your participation in the study without you having to prove TTSH or NTU/WKWSCI is at fault. There are however conditions and limitations to the extent of compensation provided. You may wish to discuss this with your Principal Investigator.

By signing this consent form, you will not waive any of your legal rights or release the parties involved in this study from liability for negligence.

13. Confidentiality of Study and Medical Records

Information collected for this study will be kept confidential. Your records, to the extent of the applicable laws and regulations, will not be made publicly available.

However, the Regulatory Agencies (HAS, FDA if relevant), NHG Domain Specific Review Board and Ministry of Health will be granted direct access to your original medical records to check study procedures and data, without making any of your information public. By signing the Informed Consent Form attached, you (*or your legally acceptable representative, if relevant*) are authorizing (i) collection, access to, use and storage of your “Personal Data”, and (ii) disclosure to authorised service providers and relevant third parties.

“Personal Data” means data about you which makes you identifiable (i) from such data or (ii) from that data and other information which an organisation has or likely to have access. This includes medical conditions, medications, investigations and treatment history.

Research arising in the future, based on this “Personal Data”, will be subject to review by the relevant institutional review board. Data collected and entered into the Case Report Forms are the property of NTU. In the event of any publication regarding this study, your identity will remain confidential.

By participating in this research study, you are confirming that you have read, understood and consent to the Personal Data Protection Notification available at (provide hyperlink to institution’s website on Personal Data Protection Notification).

In order to protect your identity and the confidentiality of your information, all information and audio files that concern you will be stored on a central computer. Access to this information will be strictly controlled with the aid of a security code system.

14. Who to Contact if You Have Questions

If you have questions about this research study, you may contact the Principal Investigator: Dr. Rinkoo Dalan, rinkoo_dalan@ttsh.com.sg, Telephone Number: 8126 3170
Tan Tock Seng Hospital, Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes (Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes (Clinic B2B), 11 Jalan Tan Tock Seng, Singapore 308433

In case of any injuries during the course of this study, you may contact the Principal Investigator based on the contact listed above. The study has been reviewed by the NHG Domain Specific Review Board (the central ethics committee) for ethics approval.

If you want an independent opinion to discuss problems and questions, obtain information and offer inputs on your rights as a research subject, you may contact the NHG Domain Specific Review Board Secretariat at 6471-3266. You can also find more information about participating in clinical research, the NHG Domain Specific Review Board and its review processes at www.research.nhg.com.sg.

If you have any complaints or feedback about this research study, you may contact the Principal Investigator or the NHG Domain Specific Review Board Secretariat.

CONSENT FORM

Protocol Title:

Emotional-Based Messages for Malay Diabetes Patients in Singapore

Principal Investigator & Contact Details:

Dr. Rinkoo Dalan, rinkoo_dalan@ttsh.com.sg, Telephone Number: 8126 3170
Tan Tock Seng Hospital, Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes
(Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes (Clinic B2B), 11 Jalan Tan
Tock Seng, Singapore 308433

I voluntarily consent to take part in this research study. I have fully discussed and understood the purpose and procedures of this study. This study has been explained to me in a language that I understand. I have been given enough time to ask any questions that I have about the study, and all my questions have been answered to my satisfaction.

By participating in this research study, I confirm that I have read, understood and consent to the (Institution) Personal Data Protection Notification. I also consent to the use of my Personal Data for the purposes of engaging in related research arising in the future.

Consent for the Use of Data for Future Research

☐ Yes, I agree to donate my data for future research as long as the research is related to diabetes-related research.

☐ No, I do not agree to donate my data for future research.

Name of Participant

Signature

Date

Impartial Witness Statement

I, the undersigned, certify to the best of my knowledge that the participant signing this informed consent form had the study fully explained in a language understood by him / her and clearly understands the nature, risks and benefits of his / her participation in the study.

Name of Impartial Witness

Signature

Date

Investigator Statement

I, the undersigned, certify that I explained the study to the participant and to the best of my knowledge the participant signing this informed consent form clearly understands the nature, risks and benefits of his / her participation in the study.

Name of Investigator /
Person administering consent

Signature

Date

OFFICIAL USE ONLY	
Doc Name : Informed Consent Form Template	
Doc Number : 207-001	
Doc Version : 7.1	Date : 10 Jun 2016

INFORMED CONSENT FORM

1. Study Information

Protocol Title:

Emotional-Based Messages for Malay Diabetes Patients in Singapore

Principal Investigator & Contact Details:

PI: Dr. Rinkoo Dalan, rinkoo_dalan@ttsh.com.sg, Telephone Number: 8126 3170
Tan Tock Seng Hospital, Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes
(Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes (Clinic B2B), 11 Jalan Tan
Tock Seng, Singapore 308433

CO-PI: Mr. Ariffin Kawaja, mohamed002@e.ntu.edu.sg, Telephone Number: 9026 9196
Wee Kim Wee, Scholl of Communication and Information, Nanyang Technological University,
31 Nanyang Link, WKWSCI Building, Singapore 637718

Study Sponsor:

WKWSCI 3K grant from NTU.

2. Purpose of the Research Study

You are invited to participate in a research study. It is important to us that you first take time to read through and understand the information provided in this sheet. Nevertheless, before you take part in this research study, the study will be explained to you and you will be given the chance to ask questions. After you are properly satisfied that you understand this study, and that you wish to take part in the study, you must sign this informed consent form. You will be given a copy of this consent form to take home with you.

You are invited because this study is investigating health interventions for Type 2 diabetes patients. This study is carried out to find out how health-related messages can affect the behaviours of diabetes patients.

This study will recruit up to 250 patients and 6 healthcare providers from the Diabetes Clinic in Tan Tock Seng Hospital (TTSH) over a period of one year.

3. What procedures will be followed in this study

If you take part in this study, you will be asked to view several messages, rate the messages and then you may be asked to take part in a survey.

Your participation in the study will last for about 45 minutes. You may view up to 100 messages within the 45-minute period. You will take part in this study on the same day you are visiting the doctor for your scheduled appointment in the diabetes clinic in TTSH.

If you agree to take part in this study, you are required to do the following tasks:

Rate 80 stimuli (health messages) using the Self-Assessment-Manikin (SAM), a non-verbal pictorial assessment technique that directly measures the pleasure, arousal, and dominance

associated with a person's affective reaction to a wide variety of stimuli. The procedure may take 45 minutes. 5 minutes is for briefing, 35 minutes to rate the 80 stimuli [(5 secs + 6 secs + 15 secs = 26 secs) x 80 = 34.66 minutes] and 5 minutes for debriefing. The researcher and a student assistant will be on hand during the data collection procedure which includes to provide briefing and de-briefing, and to facilitate the patients.

The step-by-step procedure for you are as follows:

1. Give consent.
 2. Get briefed regarding the study.
 3. You will be provided with a tablet PC for you to enter your demographics-related details.
 4. The patient will then be presented with a preparation slide ("Get ready to rate the slide.") for 5 seconds.
 5. A stimulus to be rated will be presented for 6 seconds.
 6. Participants to rate a stimulus's valence, arousal, and dominance using SAM for 15 seconds.
 7. Repeat Step 4 to Step 6 if any (of the 80) stimulus is not rated.
- After rating all the 80 stimuli:

8. A debriefing screen to be presented to the participants which includes the contact details of the researcher and the institution for further clarifications, feedback or questions.

When your participation in the study ends, you will no longer have access to the diabetes-related messages used in the study, unless special additional arrangements are made by the Principal Investigator.

4. Your Responsibilities in This Study

If you agree to participate in this study, you should follow the advice given to you by the study team. You should be prepared during your scheduled visits to the hospital to undergo all the procedures that are outlined above.

5. What Is Not Standard Care or is Experimental in This Study

The study is being conducted because the use of diabetes-related messages is not yet proven to be a standard intervention in subjects with Type 2 diabetes. We hope that your participation will help us to determine whether diabetes-related messages is equal or superior to existing behavioural (or non-clinical) intervention.

Use of a placebo (neutral messages), blinding (one or more parties unaware of the treatment assignment), and randomization (selection of patient participants by chance) are only done for research studies.

Diabetes-related messages are not part of standard medical care as it is used in this study. This/these procedure(s) are only being performed for the purposes of the research, and are not part of your routine care.

6. Possible Risks and Side Effects

Rarely, can the use of health-related messages cause a severe and possibly life-threatening reaction to a person. A person may experience certain psychological-related reaction which may include: anxieties, depression among others. If you have any of these symptoms, call your clinic at once.

The health-related messages for diabetes patients are still being tested; therefore, you may experience other side effects that have not yet been reported. However, you will be kept informed of any significant new findings that may relate to your willingness to continue to take part in this study.

If you experience any new psychological-related symptoms, you should contact your doctor or the Principal Investigator as soon as possible.

7. Possible Benefits from Participating in the Study

There is no assurance you will benefit from participation in this study. However, your participation in this study may add to the medical knowledge about the use of health-related messages for diabetes patients.

8. Important Information for Women Subjects

The psychological effects of health-related messages on pregnant women and on a baby's development is not known. Therefore, patients who are pregnant and breast-feeding may wish to re-consider taking part in this study.

9. Alternatives to Participation

If you choose not to take part in this study, you will still receive standard care for your condition.

10. Costs & Payments if Participating in the Study

If you take part in this study, the procedures performed during the study will be at no charge to you. Any costs involved will be borne by Wee Kim Wee, School of Communication and Information (WKWSCI), Nanyang Technological University (NTU), Singapore.

For participating in this study, you will be compensated with a sum of SGD\$20.

11. Voluntary Participation

Your participation in this study is voluntary. You may stop participating in this study at any time. Your decision not to take part in this study or to stop your participation will not affect your medical care or any benefits to which you are entitled. If you decide to stop taking part in this study, you should tell the Principal Investigator.

If you withdraw from the study, you may not be fully compensated with the SGD\$20. However, the data that have been collected until the time of your withdrawal will be kept and analysed.

Your doctor, the Investigator and/or the Sponsor of this study may stop your participation in the study at any time if they decide that it is in your best interests. They may also do this if you do not follow instructions required to complete the study adequately. If you have other medical problems or side effects, the doctor and/or nurse will decide if you may continue in the research study.

In the event of any new information becoming available that may be relevant to your willingness to continue in this study, you (*or your legally acceptable representative, if*

relevant) will be informed in a timely manner by the Principal Investigator or his/her representative.

12. Compensation for Injury

If you follow the directions of the doctors in charge of this study and you are physically injured due to the trial substance or procedure given under the plan for this study, Tan Tock Seng Hospital (TTSH) and Nanyang Technological University (NTU) / Wee Kim Wee School of Communication and Information (WKWSCI) will pay the medical expenses for the treatment of that injury.

Payment for management of the normally expected consequences of your treatment will not be provided by the TTSH or NTU/WKWSCI.

TTSH and NTU/WKWSCI without legal commitment will compensate you for the injuries arising from your participation in the study without you having to prove TTSH or NTU/WKWSCI is at fault. There are however conditions and limitations to the extent of compensation provided. You may wish to discuss this with your Principal Investigator.

By signing this consent form, you will not waive any of your legal rights or release the parties involved in this study from liability for negligence.

13. Confidentiality of Study and Medical Records

Information collected for this study will be kept confidential. Your records, to the extent of the applicable laws and regulations, will not be made publicly available.

However, the Regulatory Agencies (HAS, FDA if relevant), NHG Domain Specific Review Board and Ministry of Health will be granted direct access to your original medical records to check study procedures and data, without making any of your information public. By signing the Informed Consent Form attached, you (*or your legally acceptable representative, if relevant*) are authorizing (i) collection, access to, use and storage of your “Personal Data”, and (ii) disclosure to authorised service providers and relevant third parties.

“Personal Data” means data about you which makes you identifiable (i) from such data or (ii) from that data and other information which an organisation has or likely to have access. This includes medical conditions, medications, investigations and treatment history.

Research arising in the future, based on this “Personal Data”, will be subject to review by the relevant institutional review board. Data collected and entered into the Case Report Forms are the property of NTU. In the event of any publication regarding this study, your identity will remain confidential.

By participating in this research study, you are confirming that you have read, understood and consent to the Personal Data Protection Notification available at (provide hyperlink to institution’s website on Personal Data Protection Notification).

14. Who to Contact if You Have Questions

If you have questions about this research study, you may contact the Principal Investigator: Dr. Rinkoo Dalan, rinkoo_dalan@tts.com.sg, Telephone Number: 8126 3170
Tan Tock Seng Hospital, Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes (Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes (Clinic B2B), 11 Jalan Tan Tock Seng, Singapore 308433

In case of any injuries during the course of this study, you may contact the Principal Investigator based on the contact listed above.

The study has been reviewed by the NHG Domain Specific Review Board (the central ethics committee) for ethics approval.

If you want an independent opinion to discuss problems and questions, obtain information and offer inputs on your rights as a research subject, you may contact the NHG Domain Specific Review Board Secretariat at 6471-3266. You can also find more information about participating in clinical research, the NHG Domain Specific Review Board and its review processes at www.research.nhg.com.sg.

If you have any complaints or feedback about this research study, you may contact the Principal Investigator or the NHG Domain Specific Review Board Secretariat.

CONSENT FORM

Protocol Title:

Emotional-Based Messages for Malay Diabetes Patients in Singapore

Principal Investigator & Contact Details:

Dr. Rinkoo Dalan, rinkoo_dalan@ttsh.com.sg, Telephone Number: 8126 3170
Tan Tock Seng Hospital, Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes
(Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes (Clinic B2B), 11 Jalan Tan
Tock Seng, Singapore 308433

I voluntarily consent to take part in this research study. I have fully discussed and understood the purpose and procedures of this study. This study has been explained to me in a language that I understand. I have been given enough time to ask any questions that I have about the study, and all my questions have been answered to my satisfaction.

By participating in this research study, I confirm that I have read, understood and consent to the (Institution) Personal Data Protection Notification. I also consent to the use of my Personal Data for the purposes of engaging in related research arising in the future.

Consent for the Use of Data for Future Research

☐ Yes, I agree to donate my data for future research as long as the research is related to diabetes-related research.

☐ No, I do not agree to donate my data for future research.

Name of Participant

Signature

Date

Impartial Witness Statement

I, the undersigned, certify to the best of my knowledge that the participant signing this informed consent form had the study fully explained in a language understood by him / her and clearly understands the nature, risks and benefits of his / her participation in the study.

Name of Impartial Witness

Signature

Date

Investigator Statement

I, the undersigned, certify that I explained the study to the participant and to the best of my knowledge the participant signing this informed consent form clearly understands the nature, risks and benefits of his / her participation in the study.

Name of Investigator /
Person administering consent

Signature

Date

INFORMED CONSENT FORM

1. Study Information

Protocol Title:

Fear-Based Messages for Malay Diabetes Patients in Singapore

Principal Investigator & Contact Details:

PI: Prof Theng Yin Leng, tyltheng@ntu.edu.sg, Telephone Number: 9757 0161
Wee Kim Wee School of Communication and Information (WKWSCI), Nanyang Technological University, 31 Nanyang Link, Singapore 637718

CO-PI: Mr Ariffin Kawaja, mohamed002@e.ntu.edu.sg, Telephone Number: 9026 9196
Wee Kim Wee, School of Communication and Information, Nanyang Technological University, 31 Nanyang Link, WKWSCI Building, Singapore 637718

Study Sponsor:

WKWSCI 3K grant from NTU.

2. Purpose of the Research Study

You are invited to participate in a research study. It is important to us that you first take time to read through and understand the information provided in this sheet. Nevertheless, before you take part in this research study, the study will be explained to you and you will be given the chance to ask questions. After you are properly satisfied that you understand this study and that you wish to take part in the study, you must sign this informed consent form. You will be given a copy of this consent form to take home with you.

You are invited because this study is investigating health interventions for Type 2 diabetes patients. This study is carried out to find out how health-related messages can affect the behaviours of diabetes patients.

This study will recruit up to 60 patients over a period of 3 months.

3. What procedures will be followed in this study

If you take part in this study, you will be asked to view several messages, and then you will be asked to take part in a survey.

Your participation in the study will last for about 15 minutes. You will view one health-related messages within the 15-minute period. You will take part in this study online.

If you agree to take part in this study, you are required to do the following tasks:

1. Give consent online.
2. Get briefed regarding the study.
3. Enter your demographics-related details.
4. You will be presented with one stimulus.
5. After each stimulus you will answer the survey questions.
6. You will be debriefed regarding the contact details of the researcher and the institution for further clarifications, feedback or questions.

When your participation in the study ends, you will no longer have access to the diabetes-related messages used in the study, unless special additional arrangements are made by the Principal Investigator.

4. Your Responsibilities in This Study

If you agree to participate in this study, you should follow the advice given to you by the study team and answer the survey questions accordingly.

5. What Is Not Standard Care or is Experimental in This Study

The study is being conducted because the use of diabetes-related messages is not yet proven to be a standard intervention in subjects with Type 2 diabetes. We hope that your participation will help us to determine whether diabetes-related messages is equal or superior to existing behavioural (or non-clinical) intervention.

Use of a placebo (neutral messages), blinding (one or more parties unaware of the treatment assignment), and randomization (selection of patient participants by chance) are only done for research studies.

Diabetes-related messages are not part of standard medical care as it is used in this study. This/these procedure(s) are only being performed for the purposes of the research and are not part of your routine care.

6. Possible Risks and Side Effects

Rarely, can the use of health-related messages cause a severe and possibly life-threatening reaction to a person. A person may experience certain psychological-related reaction which may include anxieties, depression among others. If you have any of these symptoms, call your clinic at once.

The health-related messages for diabetes patients are still being tested; therefore, you may experience other side effects that have not yet been reported. However, you will be kept informed of any significant new findings that may relate to your willingness to continue to take part in this study.

If you experience any new psychological-related symptoms, you should contact your doctor or the Principal Investigator as soon as possible.

7. Possible Benefits from Participating in the Study

There is no assurance you will benefit from participation in this study. However, your participation in this study may add to the medical knowledge about the use of health-related messages for diabetes patients.

8. Important Information for Women Subjects

The psychological effects of health-related messages on pregnant women and on a baby's development are not known. Therefore, patients who are pregnant and breastfeeding may wish to reconsider taking part in this study.

9. Alternatives to Participation

If you choose not to take part in this study, you will still receive standard care for your condition.

10. Costs & Payments if Participating in the Study

If you take part in this study, the procedures performed during the study will be at no charge to you. Any costs involved will be borne by Wee Kim Wee, School of Communication and Information (WKWSCI), Nanyang Technological University (NTU), Singapore.

For participating in this study, you will be compensated with a sum of SGD\$10.

11. Voluntary Participation

Your participation in this study is voluntary. You may stop participating in this study at any time. Your decision not to take part in this study or to stop your participation will not affect your medical care or any benefits to which you are entitled. If you decide to stop taking part in this study, you should tell the Principal Investigator.

If you withdraw from the study, you may not be fully compensated with the SGD\$10. However, the data that have been collected until the time of your withdrawal will be kept and analysed.

Your doctor, the Investigator and/or the Sponsor of this study may stop your participation in the study at any time if they decide that it is in your best interests. They may also do this if you do not follow instructions required to complete the study adequately. If you have other medical problems or side effects, the doctor and/or nurse will decide if you may continue in the research study.

In the event of any new information becomes available that may be relevant to your willingness to continue in this study, you (*or your legally acceptable representative, if relevant*) will be informed in a timely manner by the Principal Investigator or his/her representative.

12. Compensation for Injury

If you follow the directions of the PI and Co-PI in charge of this study and you are physically injured due to the trial substance or procedure given under the plan for this study, Nanyang Technological University (NTU) / Wee Kim Wee School of Communication and Information (WKWSCI) will pay the medical expenses for the treatment of that injury.

Payment for management of the normally expected consequences of your treatment will not be provided by NTU/WKWSCI.

NTU/WKWSCI without legal commitment will compensate you for the injuries arising from your participation in the study without you having to prove NTU/WKWSCI is at fault. There are however conditions and limitations to the extent of compensation provided. You may wish to discuss this with your Principal Investigator.

By signing this consent form, you will not waive any of your legal rights or release the parties involved in this study from liability for negligence.

13. Confidentiality of Study and Medical Records

Information collected for this study will be kept confidential. Your records, to the extent of the applicable laws and regulations, will not be made publicly available.

However, the Regulatory Agencies (HAS, FDA if relevant), NTU Institutional Review Board and Ministry of Health will be granted direct access to your original medical records to check study procedures and data, without making any of your information public. By signing the Informed Consent Form attached, you (*or your legally acceptable representative, if relevant*) are authorizing (i) collection, access to, use and storage of your “Personal Data”, and (ii) disclosure to authorised service providers and relevant third parties.

“Personal Data” means data about you which makes you identifiable (i) from such data or (ii) from that data and other information which an organisation has or likely to have access. This includes medical conditions, medications, investigations and treatment history.

Research arising in the future, based on this “Personal Data”, will be subject to review by the relevant institutional review board. Data collected and entered into the Case Report Forms are the property of NTU. In the event of any publication regarding this study, your identity will remain confidential.

By participating in this research study, you are confirming that you have read, understood and consent to the Personal Data Protection Notification available at (<http://www.ntu.edu.sg/pdpa/Pages/AboutNTUDataProtectionPolicy.aspx>).

14. Who to Contact if You Have Questions

If you have questions about this research study, you may contact the Co-Principal Investigator: Mr Ariffin Kawaja, mohamed002@e.ntu.edu.sg, Telephone Number: 90269196

In case of any injuries during the course of this study, you may contact the Co-Principal Investigator based on the contact listed above.

The study has been reviewed by the NTU Institutional Review Board (the central ethics committee) for ethics approval.

If you want an independent opinion to discuss problems and questions, obtain information and offer inputs on your rights as a research subject, you may contact the NTU Institutional Review Board Manager, Dr. Bhuvana Raghavan at 6592-6956. You can also find more information about the NTU's Institutional Review Board and its review processes at <https://research.ntu.edu.sg/>.

If you have any complaints or feedback about this research study, you may contact the Principal Investigator Specific Review Board Secretariat.

CONSENT FORM

Protocol Title:

Fear-Based Health Messages for Malay Diabetes Patients in Singapore

Principal Investigator & Contact Details:

PI: Prof Theng Yin Leng, tyltheng@ntu.edu.sg, Telephone Number: 9757 0161
Wee Kim Wee School of Communication and Information (WKWSCI), Nanyang
Technological University, 31 Nanyang Link, Singapore 637718

I voluntarily consent to take part in this research study. I have fully discussed and understood the purpose and procedures of this study. This study has been explained to me in a language that I understand. I have been given enough time to ask any questions that I have about the study, and all my questions have been answered to my satisfaction.

By participating in this research study, I confirm that I have read, understood and consent to the (Institution) Personal Data Protection Notification. I also consent to the use of my Personal Data for the purposes of engaging in related research arising in the future.

Consent for the Use of Data for Future Research

☐ Yes, I agree to donate my data for future research as long as the research is related to diabetes-related research.

☐ No, I do not agree to donate my data for future research.

Name of Participant

Signature Date

ANNEX D – GUIDING QUESTIONS, CODE BOOK & TRANSCRIPTION

Guiding Questions

A Study on Emotion-based Messages for Malay Diabetes Patients in Singapore

Background

The focus group discussion (FGD) is intended to know the opinions of healthcare providers and patients (Type 2, Malay ethnicity) regarding a group of text-based and image-based messages which have been curated. These 80 messages will be used in a study to understand the role of emotions in motivating patients towards healthy behaviour. These messages are intended to cause either fear or elicit enthusiasm in the patient. Some of these messages are neutral in nature. Our discussions would include the appropriateness of using the messages which have been collected and what other related areas that we should look at either in terms of the messages or other emotions which could be used in future research. A discussion on the rating-tool which patients will use during the study will also be presented to the participants.

Ground rules

- These messages will be shown on a screen and then we discuss after 10 to 15 messages.
- The most important rule is that only one person speaks at a time. There may be a temptation to jump in when someone is talking but please wait until they have finished.
- There are no right or wrong answers
- You do not have to speak in any particular order
- When you do have something to say, please do so. There are many of you in the group and it is important that I obtain the views of each of you
- You do not have to agree with the views of other people in the group

Guiding questions

- Do you think these messages can elicit fear?
- Do you these messages can elicit enthusiasm?
- Do you think we should include more emotions?
- What kind of emotion should we include?
- Should we include more formats like video and audio?
- Are there any concerns?

Code Book

Emotion-based Messages for Malay Diabetes Patients in Singapore Code Book for Transcribed Data

- (Stimulus) Which stimulus are not appropriate? Does the stimulus for each of the category elicit the appropriate emotions? What kind of stimulus should such be replaced with?

No.	Source	Meaning Unit	Condensed Meaning Unit	Stimulus Reference (label)	Code	Subheadings	Category	Themes
1.	FGD-H	<i>HP3</i> : “There are some photos pertaining to diabetes that may not be the correct photos. Where did you all get the photos?”	Stimuli presented need to be verified for its correctness.	FR010007 FR010008	Mistakes in stimulus	Replace stimulus.	Correctness	Correctness
		<i>HP3</i> : “OK. Can you help us through theI don’t know.. the skin condition may not be...”	Checking the source of the stimuli.		Stimuli source		Credibility	Credibility
		<i>HPI</i> : “Ya, correct. I also feel that the skin condition pictures...”						
		<i>“HPI</i> : I think both leg one...”						
		<i>“HP3</i> : Ya, this is a Mollusca Contagiosum”						
		<i>“HP4</i> : Ya, this is Mollusca Contagiosum”						

		<p>“HP3: So it is not really relevant to diabetes.”</p>						
2.	FGD-H	<p>HP2: “Glaucoma is also wrong image.. “</p> <p>Researcher: “So just now, you were mentioning as well as number 9...”</p> <p>HP2: “Ya... this is not appropriate..”</p>	<p>Suggested to use the correct glaucoma image.</p> <p>Stimuli not appropriate</p>	FR010009	Mistake in stimulus.	Replacement of stimulus.	<p>Correctness</p> <p>Appropriateness</p>	<p>Correctness</p> <p>Appropriateness</p>
3.	FGD-H	<p>HP4: “I mean, certain things ..like the skin condition are not diabetes related. I mean the skin condition.”</p> <p>HP5: “Ya.. the foot, for instance the skin changes might not very clinical to diabetes but the foot is something that can happen to a diabetic patient. So it is not entirely reflective.”</p>	<p>Suggested that skin conditions in some of the stimulus are not due to diabetes complications per se.</p>	FR010010				Correctness
4.	FGD-H	<p>HP2: “Who is he? (giggles)”</p> <p>HP2: “Empowering image...got a lot of diabetics are already very depressed, and newly diagnosed they are also depressed...and they are</p>	<p>Questioning if the person in the stimuli relevant to diabetes.</p>	EM010008	Celebrities or actors image			Relevance

also in a denial phase. Then you show them all this ..the more they don't want to come back..

At least something like empowerment...something that they can manage..you know ah...show someone who is like can live until 90 years old..that is encouraging right? Or actress who have diabetes...or something like that.”

5.	FGD-H	<p>HP4: “So the statements are all factual?”</p> <p>Researcher: “With regards to the statements..the statements are , from diabetes related studies...from magazines..or from other papers, other literature..”</p> <p>HP2: “There is one, which says some pill can prevent or cure...”</p> <p>Researcher: “The enthusiasm part is it? So, some of these are directly from magazines and a lot is from the journals itself. So</p>	<p>Questioning the credibility of the statements in the stimuli.</p> <p>Informing about local context.</p>	<p>EM020002, EM020014</p>	<p>Credibility</p>
				<p>Contextualising to local situation.</p>	<p>Relevance</p>

some journals also test for positive statements. So they would also include some of these things. Some of these, I personally feel ..”

HPI: “But the one which says can cure diabetes?”

Researcher: “This one was taken from a magazine.”

HP5: “So does your pictures and statements have to be factual because this is a ...”

Researcher: “We do not talk about whether it is factual or not...we are considering the emotions aspect of it but we felt that if it is exaggerated then probably it has to be taken out ..in the sense. Another issue is about the relevance. If we talk about the UK but not in Singapore.. if it might not have contextual relevance with them “

HPI: “Last year in Singapore, we have a lot of huge campaigns about

diabetes. The news is everywhere.”

HP6: “Ya...and last year we have the Touch Diabetes..”

HPI: “Last year November, you can get it from the newspaper. I think you can get it from there as well. You want the photo we can give you photo from everyone. Free one...But not me lah..”

6.	FGD-P	P3: “The pictures are not that scary”		Suggested to keep the fear-related images.	Appropriateness
7.	FGD-H (2 nd review)		Amended FR010008 (eye after glaucoma treatment)		
8.	FGD-H (2 nd review)		Amended FR010009 (an arm of dialysis patient)	Suggested to use the images of patients with dialysis.	
9.	FGD-H (2 nd review)		Amended FR010007, FR010010	Suggested not to use repetitive images.	

			(Neuropathy of fingers)		
10.	1-1 P5	<p>P5: “It doesn’t matter as long as the message can get through. The main thing is to make the patients understand. The images that you show should not scare them...but make them realise the results..that have happened.”</p> <p>Researcher: “So it is a reality.”</p> <p>P5: “So it is a reality and it can be seen. We can see it in our families. Where the toes have been amputated, and the fingers everything...”</p>	Suggesting the stimuli is appropriate.	Suggested that the pictures were appropriate to be used in the study.	Appropriateness
11.	1-1 P6	<p>P6: “These pictures will not make the patient forget...”</p> <p>Researcher: “Yes..we have to show the images...because education alone is not enough...”</p>		Proposed to keep the existing images for the study.	
12.	1-1 P7	<p>P7: “Because most of the people who have diabetes..they don’t take advice.”</p> <p>Researcher: “Ya lah ..”</p>		Justifies the use of fear-based images.	Appropriateness

P7: My brother also the same..he doesn't take care...he doesn't take his medicine.

Researcher: So in this case..to threatened is good right?

P7: so that they will start to take the medicine..

13.	1-1 P8	<p>Researcher: “.....So do you think it is appropriate or anything which should be changed or do this it is ok to test out?”</p> <p>P8: “For me it is ok”</p>	Suggesting the stimuli is appropriate.	Appropriateness
14.	FGD-H	<p>HP2: Are we allowed to follow the comments and what the photos are referenced to? To find out why is it related to diabetes.</p>	Determining if the stimuli is diabetes-related.	Relevance
15	1-1 P7	<p>P7: This (referring to the picture), refers to the whole world?</p>	Understanding if the stimuli relevant in local context.	Relevance

16	1-1 P8	Researcher: “.....So do you think it is appropriate or anything which should be changed or do this it is ok to test out?”	Suggesting the stimuli is appropriate.				Appropriateness
		P8: “For me it is ok”					

2. (Emotions) What kinds of emotions should we consider?

No.	Source	Meaning Unit	Condensed Meaning Unit	Stimulus reference (label)	Code	Subheadings	Category	Themes
1.	FGD-H	HP3: “Is there some research done on other emotions such as guilt? Because the main bulk of the photos is about fear. I don’t know if guilt can be used...where more guilt can be used for not controlling and the family suffers. So it is the emotion that we can play home.”	Try to use guilt-based stimulus	FR01 and FR02		Use of other emotions		Appropriateness

3. (Formats) Should we include other formats?

No.	Source	Meaning Unit	Condensed Meaning Unit	Stimulus reference (label)	Code	Subheadings	Category	Themes
-----	--------	--------------	------------------------	----------------------------	------	-------------	----------	--------

FGD –
Healthcare
FGD –
Patients
1-1 P5
1-1 P6
1-1 P7

Researcher: *”But do you feel do think that the things which was showed...would the text be better or the images..which give more effect.. Do you think the image is more effective or the writings is more effective?”*

P7: *“I think the image is more effective...”*

Researcher: *“Image is more powerful..?”*

P7: *“I think the image is more powerful lah...because because they can see..so its better. Because they can have some fear. Then they can take care of their diabetes.”*

Suggesting
image is a
better format

Format
type

Appropriateness

1-1 P8

4. (SAM-Measurement) Do you have any issues with SAM?

No.	Source	Meaning Unit	Condensed Meaning Unit	Stimulus reference (label)	Code	Subheadings	Category	Themes
	FGD – Healthcare FGD – Patients 1-1 A 1-1 B 1-1 C 1-1 D							

Healthcare Providers Full Transcription

Transcription for the Focus Group Discussion with Healthcare Providers at Tan Tock Seng Hospital (TTSH) on 19th April 2017.

Researcher: OK. Basically, if you see any image which is not appropriate, please flag it. These are basically to encourage enthusiasm among the patients. All are positive images.

HP1: What is this picture?

HP2 and Researcher: Cinnamon.

HP2: They believe that cinnamon is good for diabetes.

HP2: Who is he? (giggles)

Researcher: He is a random person. I will stop at this first. So far what you have seen are images which are used for positive feeling for the patients. I don't think from the positive part there is an issue. But if there is an issue, we can discuss it now or we can discuss it at the end of it.

Researcher: OK, this is the text. So, basically these texts are for positive emotions to the patients. So next. This is the one that we want to see with regards to the appropriateness....showing them these pictures. So far, these are all images to induce fear. These are the texts which are supposed to induce fear.

So, we are done with the fear images. Next, we will be viewing the neutral images and texts. These are the neutrals. So basically, that's all.

So each patient for the Rating Group, what they will do is that they will go through this set of 30 images, and then they will rate it. This is to know their level of arousal. They call this, we call this the SAM or Self-Assessment Manikin. It is being used in studies related to emotions or affective. So they will look at valence. Valence is basically happy or not happy, arousal basically is arousal or calm, these are the two spectrums. And then dominate and dominating. Dominated mean that your feel that you are not in control. And then dominating means that this is a small-thing.

The assessment group for the rating group is this. And when it comes to the third phase, there will be actual questions with regards to diabetes. For example, "How do you feel about your condition?" and all that. This is the typical diabetes-related questions which is being asked. However, the whole idea of this focus group discussion is that we need to get the consensus from the healthcare providers, as well as a small group of patients to see whether or not these pictures are appropriate.

And also apart from looking at enthusiasm and fear, should we be looking at other types of emotions. Should you think in your course of duty when you meet the patients, and all that. There are certain other emotions that we may need to look at.

You will see for smoking cessation that, fear was used quite a fair bit. There is quite a bit of history with smoking cessation. Lee Kuan Yew, or we were like the first government to push through, smoking cessation campaigns, and we faced lawsuits in the early 80s, early 90s, but it still continued and other countries follow suit.

The idea here is to borrow from the marketing campaign and the smoking cessation campaigns. Although there is a lot of negativity, particularly when using fear, there is a lot of grievances to incorporate fear. But we have seen in quite a number of cases, it have been

beneficial. So, we want to try it out for patients with diabetes particularly with Type 2. And when we consider Type 2, we understand that there is no staging of diabetes patients. There is no like, Stage 1 or Stage 2 or Stage 3 but based on discussion with a number of scholars, they propose that we only use this only for new patients or patients which only have only one or two tablets that they are consuming. The moment they get into the insulin, or amputation then there is no point. The fear element is already taken out of the equation. So this is the whole premise of our study. So if there is any feedback from your side or any discussion, I open it to everyone right now.

Any comments? Or if you feel strongly about some pictures, or may not be appropriate or give some patients some nightmares...

HP3: There are some photos pertaining to diabetes that may not be the correct photos. Where did you all get the photos?

Researcher: We got help from the librarians from some journals.

HP3: Journals that has diabetes...

Researcher: Ya, journal that has diabetes as a key word.

HP3: OK. Can you help us through theI don't know.. the skin condition may not be....

HP1: Ya, correct. I also feel that the skin condition pictures...

HP4: Yeah....this one is ok.

HP3: Maybe you scroll a bit, and we will tell you which ones....

HP1: I think both leg one...

HP3: Ya, this is a mollusca contagiosum

HP4: Ya, this is mollusca contagiosum

HP3: So it is not really relevant to diabetes.

HP2: Do you have the original data that you get from....

Researcher: Yes, yes, we do. If we take one of the pictures, we will also take the corresponding positive image as well.

HP3: How do you correspond between it?

Researcher: That's the thing. In terms of healthcare literature, there is no corresponding emotions. But, normally in studies, you borrow from other areas. So we borrow from political literature, so when you go for voting right, you will mix the two. For instance in political campaigns, the use of fear...if you vote for my opposition, this is what will happen to and using enthusiasm, ..if you choose me this is what you are going to get...this is what going to be beneficial for you..

So here, the basis is actually fear, but the thesis advisory panel felt that, Dr. Rinkoo as well, that there must be a positive emotion, which must be incorporated. So we had to look for the corresponding ...

HP3: So which is the corresponding image for this image?

Researcher: No ..its not one-for-one image.

HP3: OK, but this is not too appropriate ..

Researcher: OK, OK.

HP1: OK, this one, the skin...

HP3: This might be the wrong picture and we have to change.

Researcher: As with this discussion, we will be having a similar discussion with the patients. So, we would like not know also, what this group of patients will comment that wewe would also need to flag certain images..

HP4: I mean, certain things ..like the skin condition are not diabetes related. I mean the skin condition.

HP5: Ya.. the foot, for instance the skin changes might not very clinical to diabetes but the foot is something that can happen to a diabetic patient. So it is not entirely reflective.

Researcher: OK, so in that sense..it might be that you are causing fear but ,,

HP2: Ya...

Researcher: So there is an ethical issue as it is exaggerated ... so I will scroll down..

HP3: So what is this?

Researcher: If I can recall correctly, it is same kind skin condition, with regards to early stage condition for patient..

HP6: You cannot tell lah..

HP2: Are we allowed to follow the comments and what the photos are referenced to? To find out why is it related to diabetes.

Researcher: I will not do that for the patients group but I can.... I will see if I can show..

HP2; Glaucoma is also wrong image..

Researcher: OK, so we will take this out.. ..any other images ... 7 do you want to check...?

HP4: Yes please...

Researcher: So just now, you were mentioning as well as number 9...

HP2: Ya... this is not appropriate..

Researcher: So. you have seen 8?

HP4: I think it is just by the way, he has diabetes..

Researcher: OK, so 14...

HP (all): Not directly related...

Researcher: So basically, the issue is more on the fear images ah...

HP4: Can we see the second photo for the fear images?

Researcher: You this is it? You mean the source?

HP2 – HP5: Yes yes...

HP2: Your picture 1 and picture 3 is almost identical.

Researcher: It is the ulcer right?

HP2: Ya, ya..

HP2: Empowering image...got a lot of diabetics are already very depressed, and newly diagnosed they are also depressed...and they are also in a denial phase. Then you show them all this ..the more they don't want to come back..

At least something like empowerment...something that they can manage..you know ah...show someone who is like can live until 90 years old..that is encouraging right? Or actress who have diabetes...or something like that.

HP1: Ya..you see the sports guy ...the one with Type 1..

HP2: Ya... so that is empowering...there Is already a low of pessimism in the society. Optimism is something that we need to convey..I am not sure, but this is something that I feel.

Researcher: OK, I see. So I catch that ..celebrities with that particular condition will really help the patients...

HP2: I guess, they may have copyright..

Researcher: Ya I need to check. Because most of the pictures have been purchased by NTU ..or NTU is currently subscribing...so it is easier to get such images..

HP2: I am sure that photography of some people with Type 1 who write books...I sure you can get their pictures..

Researcher: OK. We can do that. Basically this is the whole set of curated images..so if you were to, change or to review it again...and if we want to use in our study, we have to submit to the DSRB...

But that is not an issue lah. If you see that there is too many images need to be taken out, we will have to re-submit

HP4: So the statements are all factual?

Researcher: With regards to the statements..the statements are , from diabetes related studies...from magazines..or from other papers, other literature..

HP2: There is one, which says some pill can prevent or cure...

Researcher: The enthusiasm part is it? So, some of these are directly from magazines and a lot is from the journals itself. So some journals also test for positive statements. So they would also include some of these things. Some of these, I personally feel ..

HP1: But the one which says can cure diabetes?

Researcher: This one was taken from a magazine.

HP5: So does your pictures and statements have to be factual because this is a ...

Researcher: We do not talk about whether it is factual or not...we are considering the emotions aspect of it but we felt that if it is exaggerated then probably it has to be taken out ..in the sense.

Another issue is about the relevance. If we talk about the UK but not in Singapore.. if it might not have contextual relevance with them

HP1: Last year in Singapore, we have a lot of huge campaigns about diabetes. The news is everywhere.

HP6: Ya...and last year we have the Touch Diabetes..

HP1: Last year November, you can get it from the newspaper. I think you can get it from there as well.

You want the photo we can give you photo from everyone. Free one...But not me lah..

HP3: Is there some research done on other emotions such as guilt? Because the main bulk of the photos is about fear. I don't know if guilt can be used...where more guilt can be used for not controlling and the family suffers. So it is the emotion that we can play home.

Researcher: We actually presented in the Public Health Conference on "guilt". So that was meant for healthy people who are consuming sugar. So we brought along this literature with regards to the slave trade in the past and even in the current context. For example, the cup of sugar in your kitchen and all that, what is the source of it so played it up a bit like PETA for animal rights?

There was an effect. But we have not done before. The issue was looking at a corresponding emotion from any literature even if you don't get it from the health literature. Guilt, alone...to conduct a study on guilt alone, I think that would also be effective lah. In the sense you are right..

HP1: The fear, the side of the picture, the one photo which shows the dialysis ...because the dialysis cost a lot of money..

Because for some patients ..they will be concern that this costs this...this one cost me how many thousands lah that..one costs me how much lah...

Researcher: OK. OK. That's the concept. When I work with the librarians, when we start to curate, because normally by then we look for key words, you know like certain things...it may not be contextual .. in the sense. So, but generally do you think that it will cause them like depression or like some exaggerated fear that can cause the patients ...they totally become ..scared ..even You know? Will you have extreme cases with some patients. It is difficult to say lah...like the mental state of the patients. So it depends on their situation outside. What's state they are in when they meet you. So that is the limitation for the study lah..

HP1: Only the last portion, that one that I can't really understand.. that what is the photo.

Researcher: These are neutral images. So that we know that we actually give them the neutral images, and then when we conduct the survey, and that particular image caused them fear, then we know we have to discount this particular participant.

HP3: So we throw lah?

Researcher: Yea. For the neutral it has already been used by another study so it has already been rated and verified. It is very widely used.

HP1: This is why I am wondering why the neutral ...so boring..

Researcher: Yea, it has no relevance. It serves two purpose. One is ...because we want to see if they just tick-tick-tick...and secondly is to like you have already seen a set of fear images, and these studies is not just pen-and-paper studies, but these studies include the psycho-physio analysis, like on the finger, on your skin

HP4: But I must say that if you include your neutral with the cinnamon fruits and the wholemeal, then that is not going to be ...

Researcher: So the final phase, for the third phase, we will separate them in the fear group, the enthusiasm group and the control group. Then they will be separated. But for the rating group, they will see every single thing. So for example, from there then they will like...tell whether they feel calm or excited or happy..you know?

HP3: So is your final outcome or should I say..is your final goal that you are going to use this images this statements to do help you to draw out diabetes...

Researcher: Yea...the ultimate goal is what we can contribute. In the sense to like those who actually work on campaigns those who work on ...like right now, we actually our research team have actually come out with diabetes app, and then it has these monsters shows gamification in the sense that if your sugar level is good, then the monster will look nicer, but if your blood glucose is bad, then the monster will look bad. Then they can choose the avatar..the monster will look differently.

And they know the monster are these messages that we give them. So before they start the app, we can also pump certain of these images.. or messages.

HP3: It should be these specific images?

Researcher: May not be. It might be similar.

HP3: I see. Similar..similar.

Researcher: But this is to give us an understanding of the whole... how do we conduct this „... and what kind of similar things...we can actually...so definitely know the proper..for instance after the curation...we definitely need to include the doctors, the nurses, the dietician ..because this is the propble.. the librarians ..the researchers might not really know what pictures actually based on the literature we get. It is also used in other studies a well. But it might not be the actually this..or it might be exaggerated...
Is there any other feedback before we close this because I know that you guys are very busy..?

So if not, I thank all of you for your participation ..
(Ends at 28:42)

Patients' FGD Full Transcription

Transcription for the Focus Group Discussion with Patients at Tan Tock Seng Hospital (TTSH) on 5th May 2017.

Researcher:

There are two emotions. One is happy and the other is not so good. Positive and negative emotions. For the positive emotion, we use enthusiasm, a thing which makes people excited and happy, that is enthusiasm. The other emotion we look at is fear, which makes people scared. These are the emotions that we are looking. So all of you will have 15 sets of images, which is to cause fear, and another 15 pictures to make people happy. After the images, there texts. The texts will be in English. This is a research decision on why we have the texts in English. So without further-ado, I will show you the pictures first.

If there is a problem, I will stop or you can stop me to discuss, if not, we will see all the messages first, then all of you tell me to go back to the picture which you think is not appropriate for a diabetes patient.

Every 10 seconds the picture will change.

The ones that you are looking at now are positive pictures, which is to show enthusiasm.

Researcher: Okay, now we are starting to see the pictures, which are negative. The pictures will be negative. The text will also be negative. These will all be negative (emotion). Earlier, it was all positive. After it was negative. Now, the pictures and the texts are neither positive nor negative. They are now as neutral messages which are the neutral pictures and neutral texts. There is only 10 of each (image and text). Every 5 seconds, the message will change. So the reason why we use these neutral messages is because when we show the patients the scary pictures and then the neutral pictures, but the results shows that the patients are scared all the time, we have to discount these kinds of patients, these kind of results.

All these neutral images, we have to add them. But when you see all the pictures from the neutral side,

Do you have any comments for the pictures? Does anybody have any comment regarding the earlier pictures, which shows the positive emotion be it pictures or texts?

Patient 1: Healthy foods.

Researcher: So that one, does it actually like encourage people to think positively, you think will make them consume better and make them get better. What other images do you think can make them think positively so and make them get better. Like some people who told us, in another group, who are the doctors who told us to get pictures of celebrities or stars who have diabetes. We should them.

So do you have any idea?

Generally we do not have problem with images which are positives, The problem that we have are the scary images. So do you think that it is still okay or not for me to conduct the experiment using the scary pictures or the sentences (text)? Or do you think that it will be too scary for the patients that once they come back to their homes, they do not want to work on their condition, don't take their medication and instead just give up. There are some who react to such extent. Or do you think that leg amputation has become norm that there is no effect.

Patient 2: No.

Researcher: That is why, our target patient are those who are recently diagnosed with diabetes. If we provide these messages to a person who already had amputation, then there won't be an effect. Those who have not undergone amputation, within 2 to 3 years as patients. Early stage patients. Those who are only on tablets or they have not started on insulin for type 2 diabetes. Patients who only take oral or 1 or 2 tablets. For Type 1 diabetes, they immediately have to inject insulin. For Type 1 diabetes, once you have it, you immediately have to take insulin.

But like for Type 2, only after more than 10 years, then the patients have to inject. So if you all feel that there is a problem with our pictures or texts, then let us know. Or do you think that we should consider other emotions in the study for example guilt or other pictures or emotions.

Do you have any idea?

Patient 3: The pictures are not that scary.

Patient 1: So, about the scary pictures...where you get..

Researcher: The idea behind these scary pictures I got from cigarette. The ads to scare people. Although some people say that they are immune to such ads, but studies shows that the ads have managed to bring down the number of people smoking. Actually it helps. So in the future if our study shows good results, and it is positive. Certain words can be added into food labels. We have certain food labels such as halal, kosher, we can add in food labels, "This food has high sugar content." So the kids know. The parents who goes to the supermarket know. So in future, you think about it, this is a preliminary study, maybe in 15 years' time, if you go the supermarket, you might see scary pictures on some sweets which are dangerous. Confirmed, food companies will argue with us. They even will file law suits onto the authorities. This also happened for smoking. Lee Kuan Yew was also sued by tobacco companies. When he was about to reach his 40s, we wanted to stop smoking, so he wanted the whole nation to stop smoking. So he persevered. But smoking data showed that smoking went down.

So likewise, we are doing this for diabetes. Maybe 10 years from now. First we need to do a small study. After we do a small study, we do a bigger study. Then we present it to the authorities. And then if we can get their support, we can go higher and higher and higher. Then once the government supports, they will push this to manufacturers. We should do this. Maybe you will find on your food labels. Maybe not these kinds or pictures. Maybe at least texts, or a logo. Because the sight would have an impact. This is what marketing or branding does.

That is why we use emotion of enthusiasm and emotion of fear. But there are several types of emotions, such as hope, anger, guilty, etc.

So if you guys think that there is no problem, we will carry on and proceed to test on 100 patients.

When we test with the 100 patients, they will look at the image on the screen to rate how happy or not happy they are. Then, the patient will rate how calm or aroused he or she (due to the message). Then dominant, Does the patient feel in control or the patient cannot do anything after looking at the image. So the 100 patients will be tested. Normally studies related to emotions will use such rating scale.

So if there are no issues or there is no other feedback, we can end the focus group discussion. That's all. If you have any input let us know.

One-to-one Interview with Patients Full Transcription

Transcription for Interview with Minah (P5)* at Tan Tock Seng Hospital (TTSH) on 21st July 2017.

***not her real name**

Researcher: These images are supposed to evoke emotions. These images are supposed to evoke positive images which to encourage patients towards healthy behaviours. Things which are healthy and food which are healthy. This is cinnamon, which reduces sugar. Lemon also reduces sugar. So these are things which if we want to infuse positive (emotions), we can put in the apps or we use in posters, so it depends... So do you think that it is appropriate for us to use these kind of messages for patients, your opinion, what do you think? Is it OK?

Minah: Ya, I think... to me it is OK.

Researcher: Like all these pictures to show... it shows that even these people have diabetes, but they are still acting... they are involved in all kinds of movies. So these images are happy images lah. Exercised, health food, wholemeal... these are all diabetes patients. Until old age you can still be active, not be worried. For example, this person, he is active. So the earlier you saw were all images, so these are images and these are texts. So we will show, we will push these kind messages to the patients to motivate them. So we tell them that something is happening overseas (with regards to diabetes) so this is to increase awareness, on short films and all that... so it is preventable. So these are things which are positive... (for example statements such as) reversing Type 2 diabetes, government declaring war on diabetes... what it means here that is that there will be more funds invested for diabetes patients.. And now, recipes for diabetes appears

Actually blood glucose can be controlled if you keep to a healthy meal. So at any time if you feel that the messages is not appropriate then just flag to me, and I can take down.

Now there are also cookbooks for Malays. The patientslikeme.com is a portal that you can register and connects you, and the patients that have the similar profile as you ... then you can connect into one group, say someone in UK or US, so it can connect to someone who is from overseas ... or some European countries. So these are all positives.

We want to show how people react to negative... usually, the non-clinical intervention usually takes in the form of advise... but after getting advise.. people still don't take advise. So we show pictures such as... the leg ulcers... the hand like this... these are all complication related to diabetes when we don't take care... even though we can manage but people don't do so.

So these pictures we will show to the patients... the eyes, people undergoing dialysis if they don't take care, ulcers... so these are all pictures which are negative ... and these is a picture of leg which have undergone amputation, eyes with glaucoma. So earlier were fear-based images with negative emotions... after that we see the texts with negative emotions. For example, "more diabetes-related deaths than breast cancer and AIDS combined. So it shows that there are a lot of people whose deaths are caused by diabetes. (Another example)

Diabetes can lead to stroke, blindness, and kidney problem... and there are other texts which requires patients to ponder and to instil fear in them. (Another example) Every seven seconds somebody dies due to diabetes.

There are some scholars who feel that we should not scare the patients, but some scholars feel that if the patients are not threatened, they will not be scared. So, there is a paradox. So say that this is right, other says that it is wrong. For instance, the leg amputation is preventable but there are many people who do not manage and in Singapore, one out four patients, one would undergo amputation. That is 25%.

Type 2 diabetes can also affect the mind if we keep leaving the hypo untreated. So, the heart condition. OK, this is for somebody who is already married.

OK, these are all neutral images. For our experiment, we put some images which are scary, some images which are happy and some images which are neutral. This is to find out their behaviour after that, so the images here are all neutral images. All of these are in database. These are also slogans which are neutral. So we will do the experiment and we will just see what is their reaction. They will answer in the forms lah.

So we are done. The way the patients will rate the images and texts is using SAM. So every time they see an image, they will rate whether they are happy or not. What I am doing with you is just an interview. It is just preliminary. After that is whether they feel calm or they feel aroused. This how they rate arousal. Usually these kinds of experiment would be used for marketing campaigns. So when they do sales or marketing, they will also employ a similar experiment. But now we want to use this experiment – borrow this idea for people with diabetes.

So do you think it is appropriate or anything which should be changed or do this it is ok to test out?

Minah: For me it is ok.

Researcher: So this all ...this is just to get feedback ...

Transcription for Interview with Maryam (P6)* at Tan Tock Seng Hospital (TTSH) on 21st July 2017.

***not her real name**

Researcher: Alright. Now we will see these pictures. These are all pictures to show the patients food which are healthy, things which make the patients happy..all positive images. If you have any opinion regarding these....do feedback to us.

The diabetes campaigns, when you see these images, what do you feel? Or the treatments...is it ok to show these images to diabetes patients? These are fruits...apple...these are things which bring down blood glucose. Green apples....cinnamon....

Maryam: Oh...cinnamon can reduce diabetes?

Researcher: Yes..

Maryam: Then what do you do? Soak?

Researcher: You can soak or you can add the powder form to foods....or lemon...these are the things which are good. Lemon reduce the sugar.....These are campaigns...so there is a lot of things that people do.

These are popular actors that were diagnosed with diabetes but they can still do a lot of things..so it doesn't mean that if you are sick, you cannot do anything. So they have the runs..

Maryam: Oh...

Researcher: These are all positives. Diabetes does not mean ..you sitting down...becoming unhealthy...but instead there is a lot of things that you can do. This is also the same. In India also they do running campaigns..and exercise. ...

This is a happy family, they exercise...these are people who have been diagnosed with exercise. This is a woman who is already an elderly who can still remain active ...so earlier were pictures..

These are in English. But I can explain...It says that broccoli can reduce Type 2 diabetes.

Maryam: Oh...

Researcher: It is known to be good for Type 2. Do you still eat the medicine?

Maryam: Yes...

Researcher: Then it means that you have Type 2 diabetes...?

These are action slogans..which tell us not sitting down...but we have to be active. In UK they are making huge campaigns...about diabetes..so when the patients see these campaigns...then they will be motivated to take care of their diabetes. This is to give them motivation.

OK. SO this is also the same. This is also slogan to motivate patients

And then pertaining about the leg amputation...80% of the patients can avoid the amputation. Actually if you check your feet regularly, every week check and you wash your leg if there is foot ulcer...if you see anything amiss...a lot of people can be saved.

So if you eat healthy food, the diabetes can be reduced.

Here we interviewed patients, and there was one who was already cured...he was cured twice...but after get getting cured, he just gobbled anything..then he was with diabetes again. Now at 60, he cannot be cured again...so the situation can change.

Our government also declared war on diabetes, the Minister of Health ...have also declared war on diabetes...all this is to give patients motivation and that they are not alone in fighting diabetes.

And now they have a lot of recipes so that people know how to cook for patients...so the family knows...diabetes recipes. Our MP, Fatimah Latiff...she also contributed to the recipe..for diabetes patients....she is also a doctor right...so...if you take care of your food...diabetes can be easily manageable..

Sometimes it is not that we cannot control diabetes...but we cannot control our desire to eat...we are lazy to do exercise...

And this, we encourage the patient and his/her friends to also give motivation...

The focus now is not only on the patients but the focus on the patients' family...and the patients' friends.

These are the slogans that we give to the patients. If you change your diet, your diabetes would also be under control.

Now there are a lot of apps for diabetes. If you download for your mother, you can apps which gives advice, some to key in blood glucose, ...you can buy your gluco-meter and you can monitor yourself.

So when you come to the clinic every three months, the doctor will see...after see the readings...the doctor can advise. Usually, the doctors would guess ...

Maryam: But I do take the readings myself...

Researcher: So here ..they are asking you to move...don't keep still...you need to move.. Now there is a Malay cookbook for people for have diabetes. Then, there is a website known as PatientsLikeMe.com, where if you want to connect with other patients, who also have diabetes...you want to know what they go through..and their advice...what they eat...so we learn from these patients..because we sometimes need to do trial-and-error..so it will be good if you can go to the site patientslikeme.com..

These are the things which causes fear...feets which have holes..there are the things that we will show to the patients

Maryam: So these are the things that we could go though..?

Researcher: What do you feel when you look at these pictures.

Maryam: For sure, it is scary. Because now, my own siblings most of them have diabetes..

Researcher: So, do you think if we implement such things...I mean showing them some of these pictures, do you think that ...by showing them these pictures could help...

I mean sometimes by telling them about diabetes might not be enough but we need to show them the pictures...

Maryam: Ya...need to show them the pictures..

Researcher: Ya..so these are the scary images that we show to the diabetes patients.

The doctors can be categorised into two groups. One group think that it is good to show them these pictures so that the patients would be scared about their condition. Another group says that it is not good to show the pictures to scare the patients..

Maryam: Ya....the patients can be too scared.

Researcher: Ya...they could be too scared that they give up about trying to manage their condition...

Maryam: Ya...true true..

Researcher: So what is your opinion? Would it be alright for us to show them the pictures for research sake?

Maryam: That would be good..

Researcher: So it is good that we threaten them a bit?

Maryam: Yes...its better. Because when they see... they can do something...

Researcher: Ya lah.. so for example..like this picture on dialysis..we don't want to end up like this right? Because..we say about diabetes...if we give it an inch...it will take a foot. This is an English proverb..

Maryam: Because most of the people who have diabetes..they don't take advise.

Researcher: Ya lah ..

Maryam: My brother also the same..he doesn't take care...he doesn't take his medicine.

Researcher: So in this case..to threatened is good right?

Maryam: so that they will start to take the medicine..

Researcher: But do you feel do think that the things which was showed...would the text be better or the images..which give more effect.. Do you think the image is more effective or the writings is more effective?

Maryam: I think the image is more effective...

Researcher: Image is more powerful..?

Maryam: I think the image is more powerful lah...because because they can see..so it's better. Because they can have some fear. Then they can take care of their diabetes.

Researcher: So I will read to you the text which is supposed to cause fear... Here it says that diabetes can give you stroke..can make you blind...can make you sick... These are all slogans which are supposed to threaten..example..don't let your diabetes leave you on your knees. However...all these are proverbs. ...(another example), if you diabetes, check your eyes properly..the slogans to me are not as scary as the images...(another example), someone dies every seven seconds because of diabetes.

Maryam: Is this true?

Researcher: Ya..for the whole world.

Maryam: Do you mean every day?

Researcher: Yes, every day. It is also the seventh killer in terms of cause of death. It is also known as the silent killer. If you don't control, it will control you. And although more people know about diabetes, more people are getting their legs amputated. Every 4 diabetes patient, 1 will have his or her leg amputated even though to take of it is easy but people don't know, and the leg is lost. So these kinds of texts, if people were to read...they could have fear as well right? But the image impact is still stronger right?

Maryam: The picture is still....

Researcher: It's the same..if you don't take of your medicine...then...more money is going to be spent...(another example)...diabetes can also affect our mind..our brain....can make us forgetful..

Maryam: Oh... can affect us lah...

Researcher: Can make us fall...and can affect our brain..

Maryam: Oh... that's why if our blood glucose goes down...our body can also experience tremors

Researcher: The body tremors...can also affect our brain. If it occurs frequently..

Maryam: Oh really?

Researcher: Yes...it can make us forgetful, so we need to make sure that it seldom happens..not often.

Maryam: This thing happen because we don't eat.

Researcher: It could be because of not eating...it is known as hypo...and it weakens our mind.

Maryam: Oh....

Researcher: And it (diabetes) can cause us diabetes. And for those who are married, it can reduce your sex drive, so not good for newly married...and these are neutral images which we showed, in our experiment. I will show you the pictures...which has no relevance to diabetes...I will tell your later why we used such pictures. So this is done. So when we let people see...We let people rate...we let them see the picture, we ask them if they feel ok or not ok. If he sees a picture...is he feeling scared or relaxed...he feels that he is secured or otherwise..using such rating...with such picture. Then we do the experiment...at this stage its only preliminary ... Do you think that we should change either one of the pictures...or everything is ok.

Maryam: It is ok. No problem.

Researcher: So that's all for the study,

Ends at 14:50

Transcription for Interview with Ayu (P7)* at Tan Tock Seng Hospital (TTSH) on 21st July 2017.

***not her real name**

Researcher: These are all positive pictures for patients. For example the carrot, all these are good for the blood glucose. We also show campaigns for diabetes, these are all positive images, so that the patients know what have been done for them. Then we also show patients images of green apples which are supposed to bring down blood glucose. Cinnamon...lemon, lime, all these brings down blood glucose. So these campaigns are done all over the world ... In our experiment, we show them (the diabetes patients), how they feel when they see the images. These images are advised by the doctors to be included...so that they would be enthusiastic about their managing their diabetes. Here are all positive images...

So in your opinion, do you think these images are appropriate for the diabetes patients. To motivate them, we can include these images into posters, through phone messaging...so these are the images. These are images to show people who are active even in their old age. The people in the images are people with diabetes lah..

So if earlier are images, these are text...these texts are slogans which are positive for diabetes patients...so this will motivate them to take care of themselves.

Ayu's Husband: Is Type 1 and Type 2 diabetes the same?

Researcher: They manifest as the same condition but it is caused by different factors. It appears as the same. Type 2 is preventable ...and Type 2 is reversible. I have interviewed a person...he got cured by taking traditional Chinese medicine, then he didn't take care....then he got the diabetes back again..it happened for the second time...he didn't take care and he got it again. Then on the third time....it is not cured. Now he in his 50s or 60s...

So the government declared war on diabetes, and you have read it right? So our minister declared war on diabetes as well, ...so more funds expected for diabetes research..

Ayu's Husband: There are now recipes for diabetes ...

Researcher: Ah..yes.. there are recipes for diabetes patients.

Meal planning and exercise is important...if you enter YouTube or you can Google, Type 2 diabetes exercise. And they will show you the exercise...so these are slogans which are positive...there are a lot of apps that you can go to Google Play..which teaches how to monitor your blood glucose

In NTU we have also developed an app, (for the recipe)...Fatimah is also involved because she is also a doctor...

These are pictures which can evoke fear.

Ayu: I have seen these pictures when I first came the hospital..

Researcher: We show to patients because we feel that education alone is not enough for the patient.

Ayu: These pictures will not make the patient forget...

Researcher: Yes..we have to show the images...because education alone is not enough... We need to give them some fear...some of the images are mild and some of it are serious. This is the eyes...here show how it can affect the leg...it actually doesn't affect the leg...but it affects the small arteries in the leg. The small veins are plenty in the eyes and in the leg. Seldom affects the finger. The small veins are also at the heart. At the eyes, the heart, the legs, the brain. That is why some people start to forget, Alzheimer, Parkinson these are all diseases..

These are the images..the eye with glaucoma, these are all the small veins, these is to make patients aware that if you don't take care then you will get dialysis. For some people, if they have already take care of themselves, but they still get it...then it is already beyond their control..

However, generally the idea here is to cause fear for the patients. You can get a lot of complications from diabetes..

These are texts which acts as slogans pertaining to diabetes.

Ayu: How many people are there in Singapore with diabetes?

Researcher: In Singapore, there are about 500,000 patients with diabetes, out of the 5.5 or 6 million population. But half million knows that they have diabetes but there is another half million who have diabetes but don't know that they have diabetes. So all in all, it is near one million.

Ayu: This (referring to the picture), refers to the whole world?

Researcher: The 7th leading cause of death, refers to the whole world. These are all texts.

Ayu: What is mellitus?

Researcher: They type 2 diabetes is known as Type 2 diabetes mellitus.

(This picture refers to) That if you don't it, then it will control you. Now, the amputation is 1 in 4 although 80% of these amputations can be saved but still 1 in 4 get it.

Initially we show the positive then the negative images, we will show these to the patients ... So this phase, I just show you the picture to get feedback, so this is just preliminary. So, in September or October, then we do the real experiment. Then these are normal (neutral) picture. These are just random text, so overall, if you don't think that there is any concern, the I won't change these images I would also need to decide with the other doctors.

We will rate these messages using something known as SAM. Most studies use ...when you see one picture, they will choose between happy and not happy, they will feel calm or aroused..feel that they are in control or they are controlled. This is their rating lah.

SAM (rating scheme) is actually used in marketing. However, we plan to use it in context of diabetes. That is the whole research. So that all.

Transcription for Interview with Ali (P8)* at Tan Tock Seng Hospital (TTSH) on 21st July 2017.

***not his real name**

Researcher: So these are positive images...which shows pictures of food. Here we have campaign. These are campaigns which are positive for patients. Such images can be distributed via hand phone apps, posters that we can include, so in the experiment...this is the experiment that we will do.

This is cinnamon, things which can reduce sugar, lemon, these are the campaigns, a global campaign, we that celebrities are also diagnosed with diabetes, so don't think that once you have diabetes, you should be depressed and cannot do anything.

This is a run campaign for diabetes. So there are many campaigns. These images are all positive images. It shows that people who are already elderly can also be active.

This are campaigns. Then we also have pictures of food good for diabetes. Then we have book launch of diabetes. These are short-films that kids made such as drama for diabetes. Here it tells that 80% of amputations can be avoid but people normally don't take care, so this is what happens. Here are positive slogans.

Here it says Type diabetes is reversible. It is reversible, if we take care of our food, we exercise, so all these messages is to encourage patients to have positive behaviours.

There are many (diabetes) friendly recipes now. There books published on it. So if you follow meal planning, and any other exercise programs, this thing is achievable such as your lower blood glucose.

So these kind of messages we can post to patients. The reason I ask you, brother about these messages, because I want to know..for instance if you have a hand phone, and each day you get a message or you receive a positive image, for instance like this message...there is cook book nowadays,

So there is also this website which is known as patientslikeme.com. So you fill up regarding your condition, and the site will match you to the patients who also have similar condition.

SO you can interact with another and ask for their opinion. So now there are various portals.

So here are the fear part. Usually we are concern about giving patients fear...but we do so because without it people sometimes don't remember. These are the results of the complication. Leg ulcers, skin conditions as such, skin on the leg becoming dry,

This is the initial ulcer. Here the finger is also affected.

Do you think these (messages) would cause too much fear or is it ok, for us to show it to them?

Ali: These are the results from diabetes.

Researcher: So is it ok? For research, experiment.

Ali: Ok lah. Because our family also go through the same situation. So, we know.

Researcher: Correct. So this is amputation.

Ali: So these things if not taken care...this is what will happen.

Researcher: Normally from the Europeans, they do not like to use fear. Since the 1990s, they have begun not to want to use fear anymore. Although the use of fear can be beneficial.

Ali: Yes, because the results is really important.

Researcher: This is to let them be aware.

Ali: Normally because of one toe, it can spread.

Researcher: Ah..yes. It can spread.

Ali: My family also have experienced this.

Researcher: So earlier it was the fear images...now are texts which some of these texts are in the form of satire. Here it says that diabetes is more deadly than breast cancer and aids combined. Here it says diabetes can lead to stroke, blindness. So these are fear texts that is supposed to cause fear in them.

Another text, indicates that every 7 seconds there is a death which is caused by diabetes.

Another text indicates that it is a silent killer.

The whole idea that we want to collect these messages, is so that we can use it to send to the patients either through apps or text. So they are considering it right now. So these are all like reminders. So sometimes we need to give them positives images or sometime we give them texts that evoke fear.

So in our experiment, we want to test if we were to give them images such as these,...and these are the neutral ones, ..

So in the experiment we will show them these images. So these are nothing.

So we need you feedback from the Malay patients as to whether when we show these images and texts, do you think that it is ok? Here is random text, it is not related.

So after we show them the pictures we will ask them to rate. Here is how they rate. So every picture that they see they will rate. Are they happy or not happy with the pictures? They need to say if they feel calm or aroused. For instance, how scared they are. We rate a picture in an experiment. We go for one race each time. From Malay, Chinese and Indian. So this is how. So to you this whole idea, do you think it is ok or not ok or do you have any other feedback? Do you think we should include celebrities who Malays or do you think that it doesn't matter?

Ali: It doesn't matter as long as the message can get through. The main thing is to make the patients understand. The images that you show should not scare them...but make them realise the results..that have happened.

Researcher: So it is a reality.

Ali: So it is a reality and it can be seen. We can see it in our families. Where the toes have been amputated, and the fingers everything...

Researcher: So that is real lah...

Ali: So we have friends who faced this..so this is real.

Researcher: Ya lah.

Ali: Then for us, we have to take care of our food, but sometimes these things can't be avoided. Sometimes the sugar can increase and decrease even though we eat the same thing.

Researcher: Ya.

Ali: Who wants to be sick? Where sometimes our leg can feel the pins-and-needles. Which is not comfortable.

So the main thing is to make the patients understand. To cause them to fear, not really lah.

Researcher: Reality...is to make them understand..

Ali: To make them understand more..certain things can also just cause the sugar to go immediately high.

Researcher: For example, chocolates and rice, the rice is more dangerous than the chocolates.

Ali: Sometimes we can eat rice also and it goes down. But to me the most important thing is exercise. That is the thing ..that I have no time to do exercise.

Researcher: You can go to YouTube and type Type 2 diabetes exercise and they will give all the exercises that you can do indoor. So currently in SGH, they asks patients to do this. So we do compare the SGH programs and the other programs..

But actually there are a lot of patients who are not aware if they are type 1 or type 2. For example in Tan Tock Seng, we they handle more of the elder patients, where they are already 70s ..so it is really a pitiful sight

Ali : Ya...so it is really a pitiful sight.

ANNEX E – STIMULI RATED SCORES

Fear-based Stimuli

Fear-Image				Fear-Text			
Stimuli	V	A	D	Stimuli	V	A	D
FR010013	4.96	1.17	1.19	FR020003	4.81	1.35	1.4
FR010014	4.87	1.2	1.24	FR020014	4.78	1.38	1.39
FR010011	4.86	1.2	1.15	FR020002	4.8	1.43	1.42
FR010010	4.92	1.21	1.28	FR020006	4.78	1.47	1.39
FR010012	4.9	1.22	1.23	FR020011	4.81	1.47	1.51
FR010007	4.91	1.29	1.27	FR020004	4.64	1.48	1.54
FR010001	4.89	1.3	1.35	FR020013	4.66	1.54	1.56
FR010009	4.88	1.31	1.21	FR020007	4.56	1.59	1.59
FR010002	4.79	1.33	1.39	FR020015	4.73	1.59	1.45
FR010004	4.86	1.34	1.34	FR020012	4.55	1.61	1.59
FR010015	4.89	1.36	1.29	FR020008	4.57	1.66	1.61
FR010008	4.83	1.36	1.33	FR020001	4.55	1.72	1.69
FR010006	4.8	1.36	1.35	FR020009	4.47	1.8	1.85
FR010003	4.78	1.46	1.52	FR020010	4.47	1.8	1.85
FR010005	4.43	1.72	1.7	FR020005	3.98	2.22	2.05

ANNEX F – RESEARCH APPLICATIONS & GRANTS

Wee Kim Wee School of Communication and Information

26 September 2016

Dear Mohamed Ariffin Bin Mohamed Kawaja Kamaludin:

The Wee Kim Wee School of Communication and Information - Research Office is pleased to inform you that your application for 3K Grant entitled, *Arousal-Based Messages For Diabetes Patients*, under the supervision of Prof Theng Yin Leng, has been approved in the amount of \$3,000. Please refer to the table below for the breakdown:

Item	Amount Requested (\$)	Amount Awarded (\$)
Manpower	400.00	400.00
Materials and Consumables	90.00	90.00
Other Costs	2,510.00	2,510.00
Travel Cost	0.0	0.0
Total	3,000.00	3,000.00

Please let us know your acceptance of this grant by appending your signature on the attached Letter of Acceptance. You will be duly notified as soon as the account has been activated. Please note that as per University guideline, the account will be created under your supervisor's name. We strongly advise NOT to incur any expenses until you receive a notification of the account activation; otherwise, you will not be reimbursed for your expenses.

Please print and sign the attached Letter of Acceptance and send to the WKWSCI Research Office within three days upon receipt of this email.

Sincerely,

A handwritten signature in black ink, appearing to read "B. Agulto".

Dr. Benedict P. Agulto
Research Manager
WKWSCI Research Office

On behalf of the Associate Chair (Research)

Ariffin Kawaja
<ariffin.kawaja@gmail.com>

Funding for Research on Malay Patients with Diabetes in Singapore

Siti Najihah Anuwar
<najihah@lbkm.org.sg>

Wed, Apr 4, 2018 at
9:34 AM

To: Ariffin Kawaja <ariffin.kawaja@gmail.com>

Salaam Mr Ariffin

We have decided to award you a grant of \$1000 for your thesis. Do send me a copy of your IC so we can issue the cheque to you as soon as possible.

(419975)

Regards,

Siti Najihah Anuwar

Lembaga Biasiswa Kenangan
Maulud

448 Changi Rd #04-01 Wisma Indah

Study Title

Emotion-Based Messages for Malay Diabetes Patients in Singapore

Supervisory Team:

1. PhD Student: Mr. Ariffin Kawaja, mohamed002@e.ntu.edu.sg, Telephone Number: 9026 9196 Wee Kim Wee, School of Communication and Information, Nanyang Technological University, 31 Nanyang Link, WKWSCI Building, Singapore 637718
2. NTU Supervisor: Prof. Theng Yin Leng, tyltheng@ntu.edu.sg, Telephone Number: 6790 5834 Wee Kim Wee School of Communication and Information College of Humanities, Arts, & Social Sciences, ADM03-03A / WKWSCI 05-08
3. Thesis Advisory Panel: Dr. Rinkoo Dalan, rinkoo_dalan@ttsh.com.sg, Telephone Number: 8126 3170, Tan Tock Seng Hospital, Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes (Endocrine and Diabetes (Clinic 4B), Endocrine and Diabetes (Clinic B2B), 11 Jln Tan Tock Seng, Singapore 308433

Purpose of this document

The study is a doctoral thesis project which is carried out by Ariffin Kawaja, a PhD student, from Wee Kim Wee, School of Communication and Information (WKWSCI). The project has already received \$3,000 partial grant from WKWSCI and \$1,000 from LBKM, a local Muslim charity organization in Singapore. However, the project is still short of \$1,600 because of the need to increase the number of subjects in Phase III. This amount is required for diabetes patients' recruitment. The funds raised would be used as patients' honorarium for Phase III of the study.

The proposed budget breakdown on diabetes patients' recruitment is as follows:

Study Phase	Study Type	Number of Patients	Recruitment Period	Amount Required	Funding Source	Status
Phase I	Focus Group Discussion (FGD)	4	Apr 2017 – Jul 2017	\$80	Self-fund	Completed
	One-to-one interview	4		\$80	Self-fund	Completed
Phase II	Rating Group	100	Sep 2017 – Mar 2018	\$2,000	WKWSCI 3K Grant	Completed
Phase III	Experiment	180	March 2018 – July 2018	\$3,600	Partial funding \$1,000 received from WKWSCI 3K Grant for 50 patients and	On-going

\$1,000 from
LBKM.

\$1,600 from
prospective
sponsor for 130
patients.

Study Abstract

In recent years, there has been more recognition regarding the need to incorporate non-clinical interventions to manage diabetes (Upadhyay et al., 2015). Studies indicated that emotion-based messages have an important role in changing patients' behaviour (Eborall et al., 2015). The use of emotions is prevalent in the corporate and political world. In the healthcare context, scary pictures of cancer on cigarette packs are examples of emotions being used to curb smoking (Cheng & Lee, 2012).

The International Affective Picture System (IAPS) is a database of emotion-based stimuli, and it is widely used in emotion-related studies (Peter J Lang, Bradley, & Cuthbert, 1997). Apart from IAPS, several other niched databases have been developed to understand emotions in certain context (Dan-Glauser & Scherer, 2011; Goodman et al., 2016; Lu, Hui, & Yu-Xia, 2005a). The current study is intended to investigate how emotion-based messages can affect Malay diabetes patients in Singapore to change their behaviour in managing their diabetes. The Malay ethnic group was considered because it has a higher risk of developing diabetes compared to the other ethnic groups in Singapore (Khalik, 2014). Furthermore, according to a research done by a team from Khoo Teck Puat Hospital's (KTPH), the risks of Malays having diabetes-related complication is two times higher, and Indians 1.7 times higher when compared to Chinese patients with Type 2 diabetes (KTPH, 2014).

Another objective of the study is to contribute towards the development of the Diabetes Affective Stimuli (DAS), a database of emotion-based stimuli, which is niched for diabetes. To achieve these objectives, the study is divided into three phases. The patient-participants for this study are all recruited from a local hospital in Singapore.

We summarise the work carried out in 3 phases:

- In *Phase I*, a set of eighty stimuli, relevant to diabetes were curated from clinical databases, and a major search engine. Focus group discussions (FGD) were carried-out with two groups of participants namely, the healthcare providers and the diabetes patients between April 2017 to July 2017. There were eight participants in the health providers' group and four in the patients' group. Another four patients were recruited for a one-to-one interview to validate the stimuli used in subsequent phases of the study. Both groups were supportive of the development of the database. The healthcare group proposed the use of celebrities with diabetes to evoke positive emotions. Based on the discussions with the healthcare group, seven out of the eighty stimuli were amended. The patients felt that negative emotions could help to provoke patients toward healthy behaviours.

- In *Phase II*, 100 patient-participants were recruited between September 2017 to March 2018. The patients were tasked to rate the 80 stimuli which were reviewed in Phase 1, using Self-Assessment Manikin (SAM) which was introduced by (P. Lang, 1980). SAM provides a quick, nonverbal method of quantifying emotional states based on the three dimensions (Bucks et al., 2005) namely; valence, arousal and dominance associated to the response towards an object or event (Margaret M Bradley & Lang, 1994).
- In *Phase III*, a 2 (image and text) x 3 (fear, enthusiasm, neutral) – factor design experiment will be carried to investigate the combinations which are effective in changing patients' behaviour towards managing their diabetes. Recruitment of 180 patients is expected to begin from March 2018 to July 2018. In this phase, patients' will have to look at specific type of stimuli and answer several questionnaires pertaining to behaviors related to diabetes.

The findings for this research would help health authorities in coming up with more effective campaigns and messages which could be delivered through pamphlets, posters and mobile devices.

Savings Account 501-2-335963 Filtered from 18 Jun 2018 to 18 Jun 2018

☒ By date range

From

18 Jun 2018

To

18 Jun 2018

☐ By recent days

Last 30 days ▼

Submit

Transaction date	Value date	Description	Withdrawals (SGD)	Deposits (SGD)
18/06/2018	18/06/2018	GIRO 110838224 MUIS OTHR	-	1,600.00

238

ANNEX G – PHASE III EXPERIMENT

Demographic Questions

1. Your Name / Nama Anda
2. Your Age / Umur Anda
3. Your Gender / Jantina Anda
4. Your Highest Education Level/ Tahap Pendidikan Tertinggi Anda

No School	Primary	Secondary	ITE/Vocational	Pre- U/College	Diploma	Degree	Post- Graduate
Tak Sekolah	Rendah	Menengah	ITE/Vokasional	Pra- U/Kolej	Diploma	Ijazah	Pos- Ijazah
o	o	o	o	o	o	o	o

Stimuli Exposure

Group 1 (high arousal images)

Please take a look at the following image:
Sila lihat gambar berikut:

Group 2 (low arousal images)

Please take a look at the following image:
Sila lihat gambar berikut:

Group 3 (High arousal-text)

Please take a look at the following text:
Sila lihat teks berikut:

**Don't let diabetes
cut you off at the
knees.**

**Jangan biarkan
diabetes menjadi
punca lutut anda
dipotong.**

Group 4 (Low-arousal text)

Please take a look at the following texts:
Sila lihat teks berikut:

**Record number of
people undergoing
amputations
because of diabetes.**

**Bilangan orang yang
menjalani amputasi
kerana diabetes
melonjak naik.**

Manipulation Check (Dillard et al., 1996; Meadows, 2020)

After every image or text, participants would reply using 5-point Likert scale as follows:

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Sangat Tidak Setuju	Tidak Setuju	Berkecuali	Setuju	Sangat Setuju
o	o	o	o	o

1. The image/text makes me feel fearful.
Gambar/teks ini membuat saya takut.
2. The image/text makes me feel afraid.
Gambar/teks ini membuat saya bimbang.
3. The image/text makes me feel scared.
Gambar/teks ini membuat saya gemetar.
4. The image/text makes me feel uncomfortable.
Gambar/teks ini membuat saya tidak selesa.
5. The image/text makes me feel nervous.
Gambar/teks ini membuat saya khuatir.

EPPM Questions

For every item, participants would reply using 5-point Likert scale as follows:

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Sangat Tidak Setuju	Tidak Setuju	Berkecuali	Setuju	Sangat Setuju
o	o	o	o	o

Perceived Severity (Popova, 2012; Witte, 1996b)

1. I believe that diabetic amputation is severe.
Saya percaya amputasi diabetes amat buruk akibatnya.
2. I believe that diabetic amputation is serious.
Saya percaya amputasi diabetes adalah serius.
3. I believe that diabetic amputation is significant.
Saya percaya amputasi diabetes adalah satu masalah besar.

Perceived Susceptibility (Popova, 2012; Witte, 1996b)

4. I am at risk for getting diabetic amputation.
Saya berisiko mendapat amputasi diabetes.
5. It is likely that I will be afflicted with diabetic amputation.
Kemungkinan saya akan mengalami amputasi diabetes.
6. It is possible that I will have diabetic amputation.
Ada kemungkinan saya akan mengalami amputasi diabetes.

Self-Efficacy (Popova, 2012; Witte, 1996b)

7. I am able to do self-screening of foot to prevent getting diabetic amputation.
Saya dapat memeriksa kaki saya sendiri untuk mengelakkan daripada mengalami amputasi diabetes.
8. Self-screening of foot is easy to do to prevent diabetic amputation.
Pemeriksaan kaki sendiri mudah dilakukan untuk mengelakkan amputasi diabetes.
9. Doing self-screening of foot to prevent diabetic amputation is convenient.
Melakukan pemeriksaan sendiri pada kaki untuk mengelakkan amputasi diabetes senang dilakukan.

Response Efficacy (Popova, 2012; Witte, 1996b)

10. Self-screening of foot helps in preventing diabetic amputation.
Pemeriksaan kaki secara sendiri membantu mencegah amputasi diabetes.
11. Self-screening of foot is effective in preventing diabetic amputation.
Pemeriksaan kaki secara sendiri berkesan dalam mencegah amputasi diabetes.
12. If I do self-screening of foot, I am less likely to get diabetic amputation.
Sekiranya saya melakukan pemeriksaan kaki secara sendiri, besar kemungkinan saya tidak akan mengalami amputasi diabetes.

Danger Control (McMahan et al., 1998; Popova, 2012)

13. Reducing the risks of diabetic amputation is good.
Mengurangkan risiko amputasi diabetes adalah baik.
14. I plan to do self-screening of my foot to reduce the risk of having diabetic amputation.
Saya bercadang untuk melakukan pemeriksaan secara sendiri pada kaki saya untuk mengurangkan risiko mengalami amputasi diabetes.
15. I currently practice self-screening of foot to reduce my risk of getting diabetic amputation.
Saya sekarang melakukan pemeriksaan kaki secara sendiri untuk mengurangkan risiko mendapat amputasi diabetes.

Fear Control (McMahan et al., 1998; Popova, 2012)

16. When I hear about diabetic amputation, I spend additional time thinking about it.
Apabila saya mendengar mengenai amputasi diabetes, saya meluangkan masa untuk memikirkannya.
17. The image/text about diabetic amputation are exaggerated.
Gambar / teks mengenai amputasi diabetes itu dibesar-besarkan.
18. The image/text about diabetic amputation was misleading.
Gambar / teks mengenai amputasi diabetes itu mengelirukan.

Fear of Diabetic Amputation (McMahan et al., 1998)

19. I feel frightened about diabetic amputation.
Saya berasa takut dengan amputasi diabetes.
20. I feel scared about diabetic amputation.
Saya berasa gerun dengan amputasi diabetes.
21. I feel anxious about diabetic amputation.
Saya berasa khuatir mengenai amputasi diabetes.

Personality Trait (Big Five Inventory or BFI- 44)

1. I see myself as someone who is depressed.
Saya melihat diri saya sebagai seorang yang tertekan.
2. I see myself as someone who is relaxed, handles stress well.
Saya melihat diri saya sebagai seorang yang santai, menangani tekanan dengan baik.
3. I see myself as someone who can be tense.
Saya melihat diri saya sebagai seorang yang boleh menjadi tegang.
4. I see myself as someone who worries a lot.
Saya melihat diri saya sebagai seorang yang banyak risau.
5. I see myself as someone who is emotionally stable, not easily upset.
Saya melihat diri saya sebagai seorang yang stabil emosi, tidak mudah marah.
6. I see myself as someone who can be moody.
Saya melihat diri saya sebagai seorang yang boleh menjadi murung.
7. I see myself as someone who remains calm in tense situation.
Saya melihat diri saya sebagai seorang yang tetap tenang dalam keadaan tegang.

8. I see myself as someone who gets nervous easily.
Saya melihat diri saya sebagai seorang yang mudah gugup.
9. I see myself as someone who does a thorough job.
Saya melihat diri saya sebagai seorang yang melakukan pekerjaan dengan teliti.
10. I see myself as someone who can be somewhat careless.
Saya melihat diri saya sebagai seorang yang agak cuai.
11. I see myself as someone who is a reliable worker.
Saya melihat diri saya sebagai seorang yang merupakan pekerja yang boleh dipercayai.
12. I see myself as someone who tends to be disorganised.
Saya melihat diri saya sebagai seorang yang agak tak teratur.
13. I see myself as someone who tends to be lazy.
Saya melihat diri saya sebagai seorang yang agak malas.
14. I see myself as someone who preserves until the task is finished.
Saya melihat diri saya sebagai seorang yang penyabar sehingga sesuatu tugas itu selesai.
15. I see myself as someone who does things efficiently.
Saya melihat diri saya sebagai seorang yang melakukan sesuatu dengan teliti.
16. I see myself as someone who makes plans and follows through with them.
Saya melihat diri saya sebagai seorang yang membuat rancangan dan menyusulinya.
17. I see myself as someone who is easily distracted.
Saya melihat diri saya sebagai seorang yang mudah terganggu.