

**Diabetes knowledge, health beliefs, and health behaviour among type
2 diabetes patients in rural area Indonesia**

- Qualitative and quantitative studies

(インドネシアの農村地域における2型糖尿病患者の糖尿病
知識、健康信念、および保健行動－定性的および定量的
研究)

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SUMMARY OF THE WHOLE DISSERTATION

Indonesia experiences an epidemiological transition with increasing cases of diabetes mellitus every year, especially in Java and Bali. In Indonesia, studies on diabetes have mostly been oriented on patients in urban areas. The study to explore the diabetes knowledge and health beliefs in rural areas is important to initiate. The Health Belief Model (HBM) is the model that has been specifically developed to explain health behaviour of patients. In this study HBM provides a conceptual framework to make it possible for the researcher to explore the health behaviour of the diabetes patients. According to the model, if the diabetes patients obtain correct knowledge about diabetes risk, then they will perceive diabetes as a serious disease and decide that it is important for them to take a preventive action. They will also try to adjust their behaviour to keep healthy by practicing diabetes prevention through perceived susceptibility, perceived severity, and perceived benefits and barriers. When they have self-efficacy within themselves that they can practice the diabetes prevention and overcome every problem, this will lead to a good self-management. Knowledge and demographic characteristics were also investigated in this diabetes study because they have implications as a foundation for a person's decision to manage the disease.

This study is divided into two stages, namely qualitative and quantitative studies. This study included a fieldwork to collect the data: i.e., study conducted in local community in rural Bali Province, Indonesia. The first study was qualitative study with aims to explore diabetes knowledge, health beliefs, and health behaviours among type 2 diabetes patients in rural Indonesia using the theoretical framework of the HBM. The first study used HBM in applied thematic analysis. The Focus Group Discussion (FGD) was used to collect data. The FGD guides were developed based on HBM aspects. The participants were selected through purposive sampling. The invitees were 32, of whom 20 signed the informed consent document and joined the study. This sample size was to ensure sufficient variety of experience needed for saturation. The participations were voluntary and confidential. The mean age of participants was 49.9 years old, range 33-58. Nine (45%) participants were graduates from elementary school, 9 (45%) were those from high school, 2 (10%) were those

from junior high school, and all of them were working (45% of them were sellers). Mean age when the participants got the diabetes diagnosis was 49.6 ± 6.5 years old. Mean of random blood glucose level in November 2016 was 184.3 ± 75.7 (mg/dL). About 60% of the participants did not have a family member suffering from diabetes and 75% participants had no history of non-communicable disease. The result of the first study showed the emergence of three themes, according to HBM. The first theme was poor diabetes knowledge due to traditional indigenous beliefs and low health literacy. The second theme was the perception of diabetes as a life burden related with physical and psychological conditions. The third theme was the existence of factors affecting self-efficacy in practicing healthy lifestyle including the perceived barriers and external influence. Further studies on health beliefs in diabetes should be explored. In the future, there are needs to understand the traditional indigenous beliefs, burdens, and lacking internal intention as the modifying factors of health beliefs. The development of integrated health promotion of diabetes should consider the HBM's modifying factors in rural areas.

The second study was quantitative study with aims to identify factors explaining the healthy lifestyle behaviours of type 2 diabetes patients in rural Indonesia. In this study, Extension Health Belief Model (EHBM) provides a conceptual framework to explore the healthy lifestyle behaviours in the diabetes patients. It additionally includes locus of control and social support as extension factors in EHBM. According to this extended model, if the diabetes patients obtain correct knowledge about diabetes risk, they will perceive diabetes as a serious disease and decide that it is important for them to take a preventive action. They will also try to adjust their behaviour to keep healthy by practicing diabetes prevention through perceived susceptibility and perceived severity. Furthermore, if the patients understand the usefulness of new healthy behaviour and its effect of decreasing the risks of developing the complication and the benefit of social support from the environment around them, they will believe there is a benefit in adopting these healthy lifestyle behaviours. When they have an internal locus of control within themselves that they can practice the diabetes management and overcome every problem, this will lead to a good self-management. The participants were selected voluntarily by convenience sampling for this study. There were 256 participants recruited, of whom 203 completed and returned the questionnaires. Informed consent was obtained from all individual participants included in the study. Each participant

took about 30 minutes to complete the questionnaire anonymously. Demographic characteristics, clinical and lifestyle factors, knowledge, EHBM, and healthy lifestyle behaviours as the measurements for this study were measured using a personal information sheet and standard self-report scales. Means, percentage, and standard deviations were calculated for descriptive statistics. Pearson's correlation coefficients were used to identify the correlations among variables. Predictors of healthy lifestyle behaviour were identified by hierarchical regression analysis. An alpha level of 0.05 was used to determine statistical significance in all statistical tests.

The mean age of the participants was 54.6 years old (standard deviation, SD 8.99). Notably, 36.9% were senior high school graduates; 61.1% took diabetic medicine; mean symptom duration was 33.8 months (SD 33.3), and 34.0% consumed alcohol. About 17.7% of the participants believed that diabetes was associated with black magic and shamanism. The mean score for diabetes knowledge was 5.41 (SD 1.51). The results of the hierarchical regression predicting healthy lifestyle behaviours from demographic characteristics, clinical and lifestyle factors, diabetes knowledge, and EHBM. All these factors accounted for 71.8% (0.718) of the variance in participants' healthy lifestyle behaviours. The strongest predictors for healthy behaviours were demographic characteristics (33.9%), the extended health belief model (24.3%), clinical and lifestyle factors (12.6%), and the last was diabetes knowledge (0.9%). The significant predictors of healthy lifestyle behaviours were age, educational level, employment status, traditional belief, symptom duration, diabetic medicine, alcohol use, perceived susceptibility, perceived severity, family support, bonding social capital, chance locus of control, and perceived barriers. The findings from this study indicate that demographic characteristics, clinical and lifestyle factors, diabetes knowledge, and the EHBM could predict healthy lifestyle behaviours in type 2 diabetes patients in the rural areas of Bali. Even though diabetes knowledge is a foundation, the extension factors of EHBM, i.e., social support (family support), bonding social capital, and chance locus of control are an adequate framework that could help to predict healthy lifestyles. Healthcare professionals need to consider EHBM for patient education and disease management in diabetes care.

Based on the results from qualitative and quantitative study, efforts to promote healthy behaviours of type 2 diabetes patients should not be limited to educating type 2 diabetes patients about diabetes. They should also include the consideration of their

health beliefs, support from the family and those in the environment around them for reducing the risk of diabetes complications. The following recommendations are offered for the development of an effective intervention program for patients in rural area.

- 1. At the individual patient level:** The EHBM theory can be used as a guide to include all suitable aspects in the intervention program. Diabetes education classes can include important information about the etiology of diabetes and the complications of diabetes. The class is more focused on improving diabetes knowledge, perceived susceptibility, reducing risk factors and the benefits of behavioural change. The class is a message to give the appropriate view of diabetes: i.e., diabetes is a chronic disease that can be controlled, and the risk of complications is significantly reduced by patient decisions and behavior. Classes are encouraged to share success stories among diabetic patients in the classroom to make behavioural change more successful. Classes are also expected to discuss perceived barriers to behavioural change, as one of the key aspects of HBM.
- 2. At the level of family, friends and small groups:** The study showed that social support from families could predict healthy lifestyle behaviours. The diabetes program can intentionally encourage class participants to bring family members and/or friends ("anyone who helps you manage diabetes") to class and facilitate the development of a family-like atmosphere in the classroom itself. Diabetes education classes can be designed with the aim of applying aspects of social support. The aim is to make participants feel supported, both interpersonally and in a real way, throughout the class. Classes can be introduced as "second families" and set cultural expectations for emotional support throughout each session. Participants in the class are also socially integrated with each other; they will communicate outside the classroom, calling each other as "buddy" and "family," and rely on each other during class sessions.
- 3. At the organizational, community and cultural level:** Health care organizations and providers in these organizations can provide infrastructure not only to improve patient care but also to support patients in making behavioral changes. For example, nurses as care managers can help to increase social support, to improve medication adherence, and to facilitate adoption of lifestyle

behaviors. A nurse practitioner at a community health center could function as a care manager for high-risk diabetes patients. He/she is also a companion teacher in the diabetes education class and able to provide a smooth transition among intensive education, support for behaviour modification, and providing care.