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Ubar Kampung: indigenous knowledge and practice of medicinal, aromatic and cosmetic (MAC) plants used for the treatment of diabetes mellitus in the Tatar Sunda Region of West Java, Indonesia

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Summary

Diabetes mellitus is a disease involving numerous factors, including behavioural, environmental, and genetic. Smoking, less exercise, a sedentary lifestyle, and poor dietary habits (low-fibre intake, high cholesterol, and high sodium intake) are identified as major risk factors for diabetes and its complications (*cf.* Alberti *et al.* 2007). In addition to mentioning direct factors, aspects of globalisation and urbanisation are also strongly related to the high incidence of obesity, diabetes and other NCDs (*cf.* WHO 2016). Diabetes mellitus is the fourth cause of most deaths in West Java in 2017, with a 49.1% increase compared to 2007 (*cf.* IHME 2017). However, the health care system in Indonesia is still under-prepared to adequately manage diabetes mellitus. Lans (2006) argues that most of the problem in the delivery of primary health care services, particularly in developing countries including in Indonesia, is the lack of knowledge and sensitivity toward local health care practices and related cultures.

In the past decades, there has been growing interest in the consumption of medicinal plants because of their natural origin, ease of use, and lower cost (*cf.* Modak *et al.* 2007; Skalli *et al.* 2019). Consequently, medicinal plants are being looked up to for the treatment of diabetes mellitus and its complications. Slikkerveer (2006) states that the amount of biomedicine derived from medicinal and poisonous plants has advanced recently. Numerous medicinal plants around the world have been evaluated for their anti-diabetic properties (*cf.* Kooti *et al.* 2016; Skalli *et al.* 2019). The prevalence of medicinal plants used among people living with diabetes ranges from 17% to 80% (*cf.* Ocvirk *et al.* 2013). Several studies on indigenous medicine for diabetes mellitus have been conducted worldwide, mostly in developing countries (*cf.* Matheka & Alkizim 2012; Kooti *et al.* 2016; Baharvand-Ahmadi *et al.* 2016; Bindu & Narendhirakanan 2019). While most of the studies on medicinal plants tend to examine the role of medicinal plants in one culture, only a few compare the use of medicinal plants in the setting of medical pluralism (*cf.* Slikkerveer 2006).

The Sundanese people, the largest ethnic group in West Java, have been using traditional medicine for a long time. Known as *ubar kampung*, Sundanese indigenous knowledge, beliefs and practices of traditional medicine are based on local people's knowledge and use of Medicinal, Aromatic, and Cosmetic (MAC) plants. MAC plants have continuously provided the Sundanese community with practical and readily available traditional medicine. Roosita *et al.* (2008) document that there are about 117 species of plants in West Java which have been used by the villagers in the Tatar Sunda region for the treatment of 96 cases of illness. Additionally, research conducted by Nisyapuri *et al.* (2018) regarding the use of traditional medicines in West Java reveals that various medicinal plants used among local people are in accordance with the scientific literature. Thus, local knowledge about the types and uses of medicinal plants can be integrated with scientific studies to support the development of disease treatments and improvement of public health in the future.

Despite the remarkable contribution of indigenous medical knowledge in society, the practical utilisation of indigenous resources at the community level have hardly ever been the focus of research. At the same time, the practice of Sundanese traditional medicine in West Java is also at risk of being lost. To address the lack of studies on indigenous knowledge and its role in patterns of health care utilisation, this study aims to document, describe, and analyse knowledge of, beliefs in, and practices with MAC plants among the Sundanese community members in the environment where biomedicine and traditional medicine are co-existing. While most studies on health care utilisation are currently limited by the use of one medical system - generally speaking, the modern medical system - the present study has a primary focus on utilisation across medical systems. The broad objective of this study is to explore the utilisation of the plural medical system with particular attention to the role of knowledge and practice of *ubar kampung* by the Sundanese community for the treatment of diabetes mellitus.

This study employs the 'Leiden Ethnosystems' Approach' methodology to document and analyse Indigenous Knowledge Systems at the community level which consists of three basic concepts including the *Participant's View* (PV), the *Field of Ethnological Study* (FES) and the *Historical Dimension* (HD). In the context of health care utilisation behaviour, this approach can also be extended to the concept of medical pluralism in which the traditional, transitional, and modern medical systems co-exist within the community. Comparison of the medical systems in the community provides a better understanding of the determinants of health care utilisation behaviour.

A household survey in this study aimed to collect and document local medical knowledge, practices and beliefs in relation to the utilisation of not only traditional but also transitional and modern medical systems in the research area comparatively. The study employs the adapted analytical model developed by Slikkerveer (1990) to analyse the health care utilisation behaviour in the research area from the *emic* perspective. This model provides a means to determine the relationship between various factors generating possible determinants in transcultural health care utilisation. The factors consist of sets of predisposing factors, enabling factors, perceived morbidity factors, institutional factors, environmental factors, and intervening factors.

Documentation of the local knowledge on medicinal plants substantiates the focus of the present study on ethnomedicine for the treatment of diabetes mellitus. Ethnobotany and ethnomedical studies are recognized as the most effective methods in the discovery of new medicines (*cf.* Mahwasane *et al.* 2013). Data on MAC plants were collected through in-depth interviews with elders, traditional healers, and community leaders in a traditional community in the Sunda region. In total, 115 MAC plants for the promotion of general health and several ailments were reported by key informants and community members in the research area. The majority of plant species used for the treatment of diabetes mellitus belong to the families of *Asteraceae* (2 species), *Lauraceae* (2 species), and *Liliaceae* (2 species). Most of the medicinal plants reported in the research area are already publicly acknowledged for their medicinal properties, indicating that their pharmacological activities have been studied in different areas. Medicinal plants such *Syzygium polyanthum*, *Moringa oleifera*, *Swietenia mahagoni*, *Allium sativum*, and *Cinnamomum burmanni* have been widely used in several regions by various ethnic groups.

Health care utilisation in Kabupaten Bandung, as part of Sunda Region in West Java, are composed of three different co-existing and interacting medical systems, namely the traditional, transitional, and modern medical system; therefore, it adopts the patterns of transcultural health care utilisation. Modern health care services are provided by the public and private sector; The transitional health sector is represented by self-medication practices and health services administered by *mantri*, midwives, and pharmaceutical technical staff; Traditional medicine in the research community includes the private home practice of traditional healers and the use of MAC plants for self-medication and other traditional home remedies.

In view of multiple health care system utilisation, among 360 patients, 2 patients abstained from using any medical system available in the research area, including self-medication, and were thus categorised as 'non-action patients'. 358 patients reportedly took action to treat reported diseases, identified as the 'action patients'. Among 358 patients, 154 (43.02%) took one step to seek treatment, 155 (43.30%) took two steps, whereas 49 patients (13.68%) took three steps to seek treatment. In the first step of the illness behaviour, transitional medicine presents a dominant medical system, accounting for 54.5% (n=195) of utilisation. Out of 358 patients, 204 patients followed through with the second step, of which the majority of patients chose the modern medical system (53.4%, n=109). Furthermore, out of 204 patients who took second steps, 49 followed through with the third step, which is the final step; here, the majority

of the patients (71.4%, n=35) used traditional medicine. The pattern of utilisation of the plural medical system by 358 patients amounted to a total of 611 utilisation rates.

With regards to the total utilisation rates by patients, the modern medical system presents as the dominant medical system in the research area, accounting for 39.4% of total utilisation, followed by the transitional medical system (35.0%, n=214), and the traditional medical system (25.5%, n=156). Patients generally contact modern medical services in severe/emergency conditions. In the research area, transitional medicine was mostly practised in the form of self-medication. In relation to the reported diseases, self-medication and/or the utilisation of 'over-the-counter' medicines are common for acute conditions such as common cold, diarrhoea, cough, and moderate pain. Traditional medicine is generally used as a follow-up to the utilisation of modern and transitional medicine in the second and third steps. Evidence shows that traditional and modern medical systems are often used in conjunction.

As for diabetes mellitus, 212 diabetes patients generated 388 utilisation rates; out of 388 utilisation rates, traditional medicine accounted for 27.1%, transitional 29.5% and modern 43.8% utilisation by diabetes patients. Although patients' utilisation of modern health care services as the first choice of treatment is almost equally as high as transitional medicine (41.2%, n=88), only less than 5.7% utilise transitional medicine. The study of Millar (2001). indicates that modern health facilities often represent a point of departure or initial treatment before patient follow-through with other health providers. However, at the follow-through step, the modern medical system presents as the predominantly utilised medical system accounting for 52.9% of the total utilisation. At the final step, the majority of the patients seek care from the traditional medical system (77.8%, n=28). The results indicate that modern health facilities were often represented as a point of departure or initial treatment before the patient followed through with other health providers, and most of the study participants regarded traditional medicine as a complementary treatment to modern medicine.

Diabetes mellitus is often regarded as the silent disease because of no particular symptoms at an early stage and is often mistaken with other diseases. This study finds that the majority of diabetes patients in the research area have a low to average level of knowledge on diabetes symptoms, risk factors, and treatment. The experience of symptoms was expressed in relation to the recognition of diabetes status and in assessing illness severity. Common symptoms such as inability to do routine work, increased thirst, frequent urination, and spasm sensation led most patients to seek health care. The vast majority (including those who had close family members with diabetes) did not relate the symptoms to diabetes mellitus. The patients tend to delay or ignore the symptoms until the symptoms become evident.

In the research area, for the treatment of chronic diseases, people tend to prefer modern medicine from *puskesmas* to traditional medicine. One of the reasons is the Indonesian government program 'Kartu Sehat' which allows poor people to get free services and medication at public health care facilities. BPJS is another reason people decide to go to public health care facilities. This program offers a relatively low premium cost for the poor.

Furthermore, while earlier it was stated that traditional medicine was cheaper than modern medicine, in some cases it can be more expensive. In most countries (except China, India, Japan, and South Korea), traditional medicines are provided by the private health providers (*cf. Ros et al 2018*). For example, the cost of traditional medicine in Kenya was higher than the Kenyan standard of living since such medications are not covered by health insurance (*cf. Chege et al. 2015*). A similar phenomenon is also observed in the research area, consequently resulting in less utilisation of the traditional medical system.

The final dataset for transcultural health care utilisation consists of 611 utilisation rates from 358 action patients. The results of the bivariate analysis indicate that out of 52 identified variables within the multivariate model, 32 show a significant correlation with the health care

utilisation variable. Following the bivariate analysis, the determinants which generate a certain degree of significance are summarized as follows :

Set of Independent and Intervening Variables

8. The pre-disposing socio-demographic factors consist of the variables :
 - Village
 - Age
 - Place of birth
 - Level of Education, and
 - Occupation
9. The pre-disposing psycho-social factors consist of the variables :
 - Knowledge of traditional medical system
 - Source of knowledge of traditional medical system
 - Belief in the traditional medical system
 - Opinion on the traditional medical system
 - Knowledge of transitional medical system
 - Opinion on the transitional medical system
 - Source of knowledge of modern medical system
 - Belief in the modern medical system
 - Knowledge of Diabetes Mellitus
10. The enabling factors consist of the variables: Expenses of health care services
11. The perceived morbidity factors consist of the variables :
 - Reported disease
 - Duration of disease
 - Complication of disease
12. The institutional factors consist of the variables :
 - Accessibility traditional medical system
 - Accessibility transitional medical system
 - Accessibility modern medical system
 - Cost to access the transitional medical system
 - Cost to access the modern medical system
13. The environmental factors consist of the variables:
 - Rural / urban residence
 - Residential status
 - Geographical characteristics
14. The intervening factors consist of the variables:
 - Impact of the policy on the traditional medical system
 - Impact of the policy on the transitional medical system
 - Impact of the policy on the modern medical system
 - Impact of BPJS
 - Impact of the promotion on the traditional medical system
 - Impact of the promotion on the transitional medical system
 - Impact of the promotion on the modern medical system

Furthermore, this study is expected to make an important potential contribution of traditional medical knowledge for ethnopharmacological research.

Firstly, the study of traditional medical knowledge provides a better understanding of plants' efficacy in their cultural context. Secondly, research on traditional medical knowledge highlights how knowledge of medicinal plants is distributed in a community. Thirdly, the study of indigenous medical knowledge enables the sustainability of cultural characteristics and the medical knowledge system of a community.

Moreover, this study seeks to provide practical contributions to the treatment of diabetes mellitus not only in the Sunda Region, but also nationwide. The data of the study will be useful in planning and developing effective public health intervention for the treatment of diabetes mellitus, resulting in decreased physical and social burden for the target population. In the present study, determinants which influence health care utilisation will help in identifying barriers to the successful implementation of public health intervention in the target population.

The community-based approach in the transcultural health care utilisation of the present study elucidates the *emic* perspective of health care needs and their limitations. The results are more generalisable across regional populations. With this regard, the analysis of the results of this study has a predictive value for future health care planning. Furthermore, this study presents each medical system which co-exists in the research area within the socio-cultural context, therefore generating a practical community-oriented perspective on medical pluralism.

Finally, the present study also promotes the integration of the traditional medical system with the modern medical system, since traditional medicine not only holds a significant position among the local community but also gives a more patient-oriented approach in the treatment of chronic diseases. This study links up with the WHO's recent Traditional Medicine Strategy 2014-2023 which aims to: *'promote the safe and effective use of traditional medicine by regulating, researching, and integrating TM [traditional medicine] products, practitioners, and practices into health systems, where appropriate.'* Additionally, current implementation of the National Health care Coverage which poses a significant factor in the utilisation of both traditional and modern medical systems has further emphasised the need to integrate traditional medicine into the national health care delivery system in Indonesia.

