SPIRITUAL PERSUASION AND SELF-MANAGEMENT BEHAVIOR AMONG ADULTS WITH TYPE 2 DIABETES IN WEST INDONESIA

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ABSTRACT
Background: Compliance among diabetes patients in Indonesia was found to be poor. Too many diabetes patients receive inadequate support to enable them to achieve optimal control of their illness. Majority of diabetes education intervention in Indonesia have been focusing on the physician’s consultation with medical explanations on complications as approach. The SAKINAH education intervention is concerned with combining Islam’s health principles and diabetes education to persuade many Indonesian Muslims with type 2 diabetes to sustain control over their illness-related conditions and complications aside from gaining knowledge, awareness and skills on self-management. Purpose: The overall purpose of this study is to determine the effects of the spiritual component of SAKINAH on the self-management behavior of adults with type 2 diabetes. Methods: This study employs the quasi experiment pretest and posttest control group design to determine the effects of SAKINAH on the practice of self-management behaviors among the study group. Change on the criteria of the self-management behaviors and on health status changes. The Summary of Diabetes Self-care Activities measure (SDSCA); Physiological measures (fasting blood glucose, body weight, and blood pressure) are used to measure changes in behaviors and physical measures. Data were collected from 91 participants 50.6% from the study group and 48.3% from the control group. Results: There is no significant difference in the beginning of the SAKINAH intervention in the practice of diabetes self-management of diet, exercise, medication, foot care and smoking in the social support scores and in the values of fasting blood sugar, blood pressures and body weight. Environmental factors have no significant effect on the distribution of practiced behaviors and physical measures at pretest. The study result support that there is significant difference between groups at posttest in the practice of self-management and physiological measures. There is significant difference between pretest and posttest in study group in the practice of diet, exercise, glucose testing, and foot care; and in the measures of FBS, and systole blood pressure with p< 0.05 Conclusion: The result of this study suggests that social structural health determinant need to be considered in structuring the objectives and strategizing approach of the diabetes education intervention.

Key words: spiritual persuasion, self-management, type 2 diabetes

INTRODUCTION
Diabetes self-management has been considered an important part of clinical management through evolutionary process of knowledge, awareness and behaviours development by learning to survive with the complex nature of diabetes in a day to day context. The goal of diabetes self-management is to enable a person with diabetes to become a most active participant in his or her diabetes care. Active participation in self-care will enable the person to optimize metabolic control, prevent acute and chronic complications, and optimize quality of life (Norris, Engelgau, Narayan, 2001).
A number of diabetes self-management education recommendations and campaigns on increasing participation in diabetes self-management have been developed. Beside specific guidelines developed by institutions, there are many other guidelines that are globally recognized like the ones developed by American Association of Diabetes Educators (AADE) and American Diabetes Association (ADA) in 2006. These campaigns have been used to establish appropriate diabetes management knowledge and skills for adults of various ages and racial or ethnic backgrounds. However, despite the developments of diabetes self-management education (DSME) in the past decade, systematic studies suggest that compliance among patients were found to be poor and learned behaviour change overtime (Laksmi, 2007; Cramer, 2004; Norris, Lau, Smith, Schmid, Engelgau, 2002). Moreover, a multinational evaluation study (Peyrot et al., 2012) shows that too many diabetes patients receive inadequate support to enable them to achieve optimal control of their glucose levels and well-being. Despite the developments of diabetes self-management education (DSME) in the past decade, systematic studies suggest that compliance among patients were found to be poor and learned behaviour change overtime (Laksmi, 2007; Cramer, 2004; Norris, Lau, Smith, Schmid, Engelgau, 2002). Moreover, a multinational evaluation study (Peyrot et al., 2012) shows that too many diabetes patients receive inadequate support to enable them to achieve optimal control of their glucose levels and well-being.

Diabetes data of Indonesia shows that an estimated seven million Indonesians had diabetes in 2010 with the figure expected to hit 21.3 million in 2030, but people are not really aware that this can be prevented by changing their lifestyles (Faizal 2011, Ririh, 2012). A cross-sectional with longitudinal follow up study in 2006 in Indonesia done as part of the International Diabetes Management Practices Study (IDMPS), shows that majority of patients seen to by general practitioners, internists, and endocrinologists, did not attain the recommended glycemic target. The average HbA1c was 8.27% and only 37.4% reached the target value of HbA1c that is less than 7%. This indicates the gap between recommendations of the most recent guidelines and the actual practices. It further confirmed the lack of knowledge on health (health illiteracy) among the general public.

According to Osman (2010) and Al Tera (2011) the unawareness of the relationships between lifestyle and the onset of diabetes among young Indonesians is overburdened by the government’s lack of will and resources to include education as part of health care for diabetes patients. This leads many people with diabetes in Indonesia to be reluctant in seeking for treatment from health care professionals (Pos Kota, September 2013). There are still many people with diabetes who merely rely on information passed by word-of-mouth and survive by turning to traditional medicine that often promised healing (Yulia, 2012). Diabetes education at this point, as part of a nursing approach to the problems of its management, offers perhaps the most hope.

There have been various types of diabetes education intervention which aimed to change behavior and promote self-management. Padgett, Mumford, Hynes, and Carter (1988), in their meta-analysis study, revealed eight types of diabetes education intervention, namely: (1) didactic, (2) enhanced, (3) diet instruction, (4) exercise instruction, (5) self-monitoring instruction, (6) social learning/behavior modification, (7) counselling, and (8) relaxation training. Of all these various types of diabetes education intervention, the investigator pays more attention to social learning or behavior modification: partly because it has been shown to offer more effective outcomes (Yee A.S.W., Chan M.F., Leung E.L.Y., and Christine M., 2006; Gary,
Genkinger, Guallar, Peyrot, Brancati, 2003; Whittemore, 2003; Olivarius, Nielsen, Andreasen, Hørder, Pedersen, 2001; Padgett, Mumford, Hynes, and Carter, 1988). Partly, because it acknowledges different agents of social factors, including individual beliefs and the culture the individual grew up in (Bandura, 2000, 2001).

Behavioral models in diabetes self-management education with cultural approach have been developed and tested to determine the effects of a community-based, culturally tailored diabetes lifestyle intervention on risk factors for diabetes complications (Feathers, Kieffer, Palmisano, Anderson, Sinco, et al., 2005). However, those studies were done in non-Muslim immigrant communities and focusing more on language translation (Klein, Jackson, Street, Whitacre, and Klein, 2013). The proposed SAKINAH education intervention is concerned with combining Islam’s health principles and diabetes education to persuade Indonesian Muslims with type 2 diabetes to sustain control over their illness-related conditions and complications aside from gaining knowledge, awareness and skills on self-care management. The SAKINAH is particularly interested in changes of behaviours brought about by Islamic health principles from the Al-Quran and Hadiths as the central religious philosophy of Islam and as a major source of law and moral guidance.

Spiritual approach diabetes education is chosen since this study believes people tend to behave in ways that they feel they are expected to behave. Believing that health is a state of complete physical, mental and social well-being as defined by WHO, Islam deems this to be necessary component of faith and of Islamic law. Islam takes a holistic approach to health, just as religious life is inseparable from secular life, physical, emotional and spiritual health cannot be separated; they are parts that make a complete healthy person. These principles have been implemented during Islam golden age and historically provided evidence supporting its applicability. Spiritual approach as social persuasion is a way of strengthening people's beliefs that they have what it takes to succeed. Islam’s philosophy and ideology have had a profound influence on the physical, mental, and social well-being of the Indonesian. By partnering them with diabetes education intervention in SAKINAH education intervention, there is a very good chance that diabetics will follow the program much longer (if not permanently) because it is commensurate with their beliefs, value systems, and customs.

This study is guided by the social cognitive model as a theoretical framework to examine the effectiveness of SAKINAH in persuading adults with Type 2 diabetes to adopt, practice and sustain self-management behavior. SAKINAH as treatment factor cognitive factors consist of seven Islamic health principles namely: balance,” halal” food, and “tayyib”; being active, right medication, right information ‘Iqra’, self-care and self-awareness conscious, cope with stress, avoid risks of harmful substance—cigarettes smoking. The proposed cognitive variables will be used as predictors to the physiological measures and the practice of seven diabetes self-management behaviours namely: diet, exercise, blood sugar testing, foot care, medications, and smoking avoidance. The environmental or individual variables are education, family structure, support system, and duration with diabetes are thought to also play roles in determining the behaviours. The results of the study are expected to offer a viable nursing care strategy for patients with type 2 diabetes, a strategy which can deal with cultural barriers on the practice of self-care behaviour within a limited resource community. The overall purpose of this study is to determine the effects of diabetes self-management education with spiritual persuasion SAKINAH on the practices of self-management behaviors.

This study aimed to generate empirical data on cultural congruent nursing approach to diabetes self-management education intervention through spiritual persuasion SAKINAH. This
study benefited participants by transferring knowledge of diabetes self-management, diabetes prevention, and rehabilitation for related complications. It also promoted determination through the essential moral guidance which came from the spiritual persuasion of SAKINAH. It helped determine the applicability and acceptability of combining spiritual persuasion in a diabetes education program like SAKINAH for use as a nursing strategy among people with specific Islamic cultural background. The result of the study also offered a viable strategy for a community care program for type 2 diabetes clients, which could be an alternative way of dealing with barriers on self-care behaviours in a limited resource community.

This study allowed the diabetes educator to assess behavior change and inform the person with diabetes about improvements in self-management and health status which can be achieved over time as a result of practicing the spiritual persuasion (Islamic health principles) of SAKINAH. It also created a demand on adding a spiritual component in diabetes self-management guidelines. Finally, this study established a unique contribution in the overall context of diabetes care, allow for comparison of performance with established benchmarks, and inform investigators of the effectiveness of a program like SAKINAH.

This study focused on adults Muslims aged 45-80 years old who are diagnosed with type 2 diabetes (T2DM). Participants are active members of the Diabetes clubs which affiliated with Dustira Army Hospital, Pringsewu District General Hospital and Bandar Lampung Adventist Hospital of West Indonesia. SAKINAH is a structured education program that consists of four meetings, with at least one meeting to be held each week for four consecutive meetings. Each meeting teaches two topics about Islam’s health principles coupled with two responsive-related topics of diabetes self-management behaviors. The spiritual component of SAKINAH are developed based on the Al-Quran and hadiths, elaborated with the Amman Declaration, the Islam health education material as part of the health-related writings and national radio speeches delivered by religious leaders like H.L. Istana Taufiq, Yahya Amarmad Salim Sungkar, Ilhamulloh Sumarkan, Abu Zuhril, Ahmad Toha, and Agus Sofyan.

Behaviours change in diabetes self-management are limited to immediate to intermediate level of changes as indicated by pre-contemplative to active-type of self-management behaviors voluntarily committed by each patient. The diabetes self-management behaviours are limited to physiological changes and the seven core self-management behaviors namely diet, exercise, blood sugar testing, foot care, medications, smoking, and self-care recommendation.

Method of Research

This study employed a quasi-experimental pretest and posttest control group design to determine the effects of SAKINAH education intervention on the practice of self-management behaviours among treatment group and control group. The practice of self-management behaviours as dependent variables are assessed in terms of its score and physical measures. The differences between groups in the measures before- and the difference between measures before- and -after the intervention are examined for any change. The Pretest-posttest designs are widely used in behavioural research, primarily for the purpose of comparing groups/measuring changes resulting from experimental treatments.

Four selected environmental factors or client factors like family structure, support system, education, and the duration of diabetes are examined in terms of their relationships to the change in diabetes self-management practice. These four are chosen because they are evidently related to self-management behaviours (Noris, Lau, Smith, Schimid, Angelgau, 2002; Coulter, Ellins, 2006). These environmental factors are reported in as mean scores. SAKINAH, as
independent variable, will serve as a nursing intervention and, at the same time, as a method of
treatment trials to compare with the present practice of self-management behaviours.

A qualitative method was also employed to explore the experience of joining SAKINAH
education intervention and to confirm and support the measures converging on the areas of
expected change on the criteria of the self-management behaviours and on health status changes.
Creswell (1999) noted that qualitative part helps answer questions that cannot be answered by
quantitative approaches alone. This model employed encourages investigator to collaborate
across quantitative and qualitative data.

Population in this study, refers to adults from ages 45-80 years old who are diagnosed
with diabetes (WHO, 2000 in Wild, Roglic, Green, Sicree, King, 2004), and who have joined and
registered as members of the Persadia/diabetes clubs organized by Rumah Sakit Dustira
(Indonesia Army Hospital Dustira), Rumah Sakit Umum Pringsewu (Distric General Hospital of
Pringsewu), and Rumah Sakit Advent Bandar lampung (Advent Hospital Bandar Lampung) in
West Indonesia. Diabetes club or Persadia (Persadia: Persatuan Diabetes Indonesia/Indonesian
diabetes association) is an organization for people who care about the disease diabetes mellitus.
Persadia members consist of physicians, professionals (nurses, nutritionists), patients with
diabetes, and patients’ families who are interested in joining. The board of Persadia is currently
in Jakarta, Indonesia, and has had members in 10 regions with 91 branches and 169 Persadia
clubs throughout Indonesia.

The criteria for study participants were: male and female adults (45-64 years old) with
medical diagnosis of type 2 diabetes mellitus and fit to join education intervention as confirmed
by medical doctor; has Islam as a religious affiliation; no physical disability like severe vision
and hearing loss; no mental disability; able to speak, read, and understand Bahasa Indonesia;
and, willing to participate in the study. The exclusion criteria are: male and female adult clients
with medical problems and who are non-Muslim. The was no subjects excluded from the study
due to development of severe complications, such as joint problems and become unable to
perform diabetes self-management activities at home as confirmed by family and the medical
doctor, or were hospitalized during the study period.

To determine the study group and control group simple random sampling by coin toss. The
coin’s head represented control group and the tail represented the study group. To determine
the participants of the two groups, invitations were announced in an introductory meeting at the
respective Persadia. Convenient sampling technique was employed in the recruitment of
participants in each group. The sample size of this study was determined by the Statistical Power
Analysis. Effect sizes from previous studies were taken into account. The calculation in this
study this study is suggested to recruit 130 participants for two groups which divided into the
treatment and control groups.

To ensure the ethical integrity of the research process, the following aspects had been
undertaken. First, approval from the Ethical Review Board of University of the Philippines
Manila (UPERB) was secured. After the approval from UPERB, then letters of request was
submitted to the Persadia management of the Rumah Sakit Dustira, Rumah Sakit Umum
Pringsewu, and Rumah Sakit Advent Bandar Lampung. After the requests to conduct study at the
chosen Persadias have been approved, then the SAKINAH education intervention phases were
done in each respective hospital.

Prior to the education intervention, the chairman of each Persadia introduced the
principal investigator (PI) to all members in one of their regular weekly meetings and express the
approval of Persadia’s management that the SAKINAH education intervention will be done in
the place of their regular weekly meeting in the same venue. After introduction to the Persadia’s members had been established, invitation to join the study was verbally done by the PI. Complete information regarding the process of the study, inclusion and exclusion criteria, the benefits, and potential risks were explained. Questions and clarifications from all members were encouraged.

Considering the marginalized and vulnerable individuals who might be present among the members, this study ascertained their needs well in advance. This study was not involving any collection of blood specimen. Rather, it asked for permission to have access to the result of the regular measures done by Persadia management. All personalized data of the participants obtained during the study was kept confidential and can only be accessed by the investigator and diabetes club’s personnel.

There are three instruments used to derive answers for the research objectives. The first instrument is The Summary of Diabetes Self-care Activities measure (SDSCA) that was used to assess the behavioural factor of the participants. The second instrument is the Persadia members’ personal health records. This study utilized the participants’ personal health data consisting of fasting blood glucose, blood pressure, and body weight measures. These measures are regularly taken by Persadias’ nurses and medical doctors in every meeting and record it in each member’s personal health record book. All output data of this study was analyzed using SPSS 20 registered under University of the Philippines, College of Public Health, Department of Biostatistics and Epidemiology. This study has set the level of significance at 0.05 level of significant.

Result

Demographic Characteristics

The total of one hundred twenty seven (127) adults who had been diagnosed with type 2 diabetes (T2DM) had voluntarily consented in joining the study from three different diabetes clubs or Persadia (Persatuan Diabetes Indonesia/Indonesian diabetes association). After evaluating their attendance and validity of data, there were 91 participants (71.6 %) being included for the analysis. From the total of 91 data analyzed, there are 46 data (50.6%) from the treatment group and 44 data (48.3%) from the control group. There is no significant difference in the beginning of the SAKINAH education intervention in the practice of diabetes self-management of diet, exercise, medication and foot care; in the social support scores and in the values of fasting blood sugar, systole and diastole blood pressures and body weight. The characteristics of adult diabetes participants including age, sex, educational attainment time of diagnosis, family structure, most frequent helps and number of closest friends are described by the following table 4.1 to table 4.7 below.

<table>
<thead>
<tr>
<th>Age</th>
<th>Control Count</th>
<th>Control %</th>
<th>Study Count</th>
<th>Study %</th>
<th>Total Count</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>56-60</td>
<td>15</td>
<td>34.09</td>
<td>9</td>
<td>19.57</td>
<td>24</td>
<td>26.67</td>
</tr>
<tr>
<td>61-65</td>
<td>14</td>
<td>31.82</td>
<td>19</td>
<td>41.30</td>
<td>33</td>
<td>36.67</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>100</td>
<td>46</td>
<td>100</td>
<td>90</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 1

Groups’ Age and Sex Characteristic
Sex | Control | Study | Total
--- | --- | --- | ---
Men | 6 | 12 | 18 | 20
Women | 38 | 34 | 72 | 80
Total | 44 | 46 | 90 | 100

There is 34.09% of the respondents in the control group are in the range of 56-60 years old and 41.3% in the study group are in the range of 61-65 years old. The average age of the respondents on the control group is 59.02 years old and on study groups is 61.7 years old. This study age characteristics are supported by a study done by DECODA (Diabetes Epidemiology Collaborative Analysis of Diagnostic criteria in Asia) in 2003 in 11 Asian cohort. The findings showed prevalence of diabetes increased with age and reached the peak at 60-89 years of age.

Both groups are dominated by women participants, 86.36% in the control group and 80% in the study group are women participants. This study sex characteristics are supported by a thesis of Doctor of Phylosophy of Agrimon (2014), in exploring the feasibility of implementing self-management and patient empowerment through a structured diabetes education program in Yogyakarta city of Indonesia where women participants 69.9% had out-numbered the men.

Table 4.2 shows that almost half of the respondents (47.73%) in the study group and (47.83%) of the control group finished secondary education. Data on education and literacy in Indonesia support this finding where lower and upper secondary education is the most percentage of education participation figures (Republic of Indonesia Ministry of National Education, 1999).

Table 2
Groups’ Educational Attainment Characteristic

<table>
<thead>
<tr>
<th>Educational Attainment</th>
<th>Control</th>
<th>Study</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>%</td>
<td>Count</td>
<td>%</td>
</tr>
<tr>
<td>Primary</td>
<td>15</td>
<td>34.09</td>
<td>12</td>
</tr>
<tr>
<td>Secondary</td>
<td>21</td>
<td>47.73</td>
<td>22</td>
</tr>
<tr>
<td>College</td>
<td>6</td>
<td>13.64</td>
<td>8</td>
</tr>
<tr>
<td>Graduate</td>
<td>2</td>
<td>4.55</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>100</td>
<td>46</td>
</tr>
</tbody>
</table>

Pertaining duration with diabetes, Table 4.3 shows that 34.09% of the control group participants have been living with diabetes for 6-10 years, while 34.78% of the study group have been living with diabetes in for 1-5 years. There is no hard and fast answer to the question of ‘how long can I expect to live’ as a number of factors influence one’s life expectancy in people living with diabetes. How soon diabetes was diagnosed, the progress of diabetic complications and whether one has other existing conditions will all contribute to one’s life expectancy - regardless of whether the person in question has type 1 or type 2 diabetes.

Table 3
Groups’ Duration with Diabetes Characteristic
Environmental Factors

Table 4 shows the environmental factors of most frequent help. For both groups, the most frequent help are coming from the family, where in control group is 50% and in the study group is 28.26%.

Table 4
Groups’ Most Frequent Help Characteristic

<table>
<thead>
<tr>
<th>Most Frequent Help</th>
<th>Control</th>
<th>Study</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>%</td>
<td>Count</td>
</tr>
<tr>
<td>Spouse</td>
<td>16</td>
<td>36.36</td>
<td>12</td>
</tr>
<tr>
<td>Family Member</td>
<td>22</td>
<td>50.00</td>
<td>13</td>
</tr>
<tr>
<td>Neighbor</td>
<td>1</td>
<td>2.27</td>
<td>6</td>
</tr>
<tr>
<td>Friend at Work</td>
<td>0</td>
<td>0.00</td>
<td>2</td>
</tr>
<tr>
<td>Religious leader</td>
<td>0</td>
<td>0.00</td>
<td>4</td>
</tr>
<tr>
<td>Health Worker</td>
<td>3</td>
<td>6.82</td>
<td>2</td>
</tr>
<tr>
<td>House Helper</td>
<td>2</td>
<td>4.55</td>
<td>3</td>
</tr>
<tr>
<td>Most of them</td>
<td>0</td>
<td>0.00</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>100</td>
<td>46</td>
</tr>
</tbody>
</table>

The second most sources of help is from their spouses, this is found in both groups. The study of social support, self-efficacy and psychological stress responses among outpatients with diabetes in Yogyakarta Indonesia by Kanbara, Taniguchi, Sakaue, Hong Wang, Takaki, Yajima, Naruse, Kojima, Sauriasari, Ogino (2008) shows similar characteristics where most frequent help are coming from family and spouse. These characteristics of most frequent help are also corresponded with the family structure and age characteristics described in Table 5 and Table 8 where most of the respondents are staying with their nuclear family, leaving with their spouses and their age are ranging from 56 to 65 years old.

Table 5 shows that there are 66% of the control group and 63% of the study group who have in average 1-5 number of closest friends. There are 28.26% in study group and 27.27% in control group who have 5-10 closest friends. In relation with the most frequent help distribution
shows by Table 8, the result shows that despite both groups having an average of 1-5 friends yet the most helps are given by their family members including their spouses.

Table 5
Groups’ Number of Closest Friends Characteristic

<table>
<thead>
<tr>
<th>Number of Closest Friends</th>
<th>Control</th>
<th>Study</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>%</td>
<td>Count</td>
</tr>
<tr>
<td>1-5</td>
<td>29</td>
<td>65.91</td>
<td>29</td>
</tr>
<tr>
<td>6-10</td>
<td>12</td>
<td>27.27</td>
<td>13</td>
</tr>
<tr>
<td>11-15</td>
<td>2</td>
<td>4.55</td>
<td>2</td>
</tr>
<tr>
<td>16-20</td>
<td>1</td>
<td>2.27</td>
<td>1</td>
</tr>
<tr>
<td>above 21</td>
<td>0</td>
<td>0.00</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>100</td>
<td>46</td>
</tr>
</tbody>
</table>

A study from 13 focus groups by Gallant, Spitze, and Prohaska (2007) tried to identify the positive and negative influences of family and friends on self-management of older adults with chronic illnesses. It was conducted in upstate New York with 84 African American and White men and women, 65 years old or older, with arthritis, diabetes, and or heart disease. The study found that many more positive influences than negative social network influences. Another study, a meta-analysis study by Gallant (2003) shows evidence for a modest positive relationship between social support and chronic illness self-management, especially for diabetes. Dietary behavior appears to be particularly susceptible to social influences. In addition, social network members have potentially important negative influences on self-management.

Table 6 shows that both groups scored “greater social support” with above 57 points. Control group total mean score is 78.64 (SD=20.15) and study group total mean score is 71.48 (SD=20.15). Informational or emotional support scored the highest among the other 3 subscales of social support with average of 31.21 (SD=8.94) in control group 26.95 (SD=6.92) in study group with p=0.04.

Table 6
Environmental Factors—Social Support Distribution

<table>
<thead>
<tr>
<th>Social support</th>
<th>Control</th>
<th></th>
<th>Study</th>
<th></th>
<th>pvalue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Mean</td>
<td>Standard Deviation</td>
<td></td>
</tr>
<tr>
<td>Informational</td>
<td>31.21</td>
<td>8.94</td>
<td>26.95</td>
<td>6.92</td>
<td>0.040</td>
</tr>
<tr>
<td>Interaction</td>
<td>13.82</td>
<td>2.91</td>
<td>12.85</td>
<td>3.74</td>
<td>0.054</td>
</tr>
<tr>
<td>Affective</td>
<td>10.06</td>
<td>1.97</td>
<td>9.48</td>
<td>2.76</td>
<td>0.910</td>
</tr>
<tr>
<td>Instrumental</td>
<td>17.61</td>
<td>8.63</td>
<td>16.28</td>
<td>8.78</td>
<td>0.164</td>
</tr>
<tr>
<td>TOTAL</td>
<td>78.64</td>
<td>20.15</td>
<td>71.48</td>
<td>20.15</td>
<td>0.097</td>
</tr>
</tbody>
</table>

The second highest social support subscales is the interaction where control group mean score is 13.83 (SD=2.91) and study group mean score is 12.85 (SD=3.74) with p=0.054.
Affective and instrumental social support subscales are found to be similar in scores across the groups. According to Salinero-Fort et al. (2011) the Medical Outcome Study Social Support Survey (MOS) yields 4 subscale scores (Tangible Support, Emotional or Informational Support, Affectionate Support, and Positive Social Interaction), as well as a total score. Each of these scores ranges from 0-100, with higher scores indicating greater perceived support and lack of social support was defined by less than 57 points.

A study in Indonesia on DSME with family based done by Susanti (2012) shows that diabetes self-management significantly improve the family and patient ability to manage diabetes medication as well as self-glucose monitoring. The family involvement in reminding the family with diabetes to take and manage diabetes medication and self-glucose monitoring played important role in improving the level of self-care compare to conventional or hospital based diabetes self-management education which focus to patients independently. Meanwhile, nutrition and physical activity were the habits which were not easy to be changed and influenced by culture in nature.

Social support is found to be predictive of several adherence behaviors but not glycemic control as measured by HbA1c (Barbera, 2008). Indeed, studies have found that family conflict interferes with diabetes self-care, and that family support predicts better adaptation to the demands of diabetes.

**Behavioural Factors—Diabetes Self-management**

As the important aspect of diabetes regiment, this part describes the picture of health professionals who actively involved in disseminating diabetes care information and the regiments given as living with diabetes is concerned. Table 7 shows medical professional that involved most in disseminating information about diet for diabetes to the treatment group and control groups are the physicians (65-67%) as compare to the nutritionist and nurse. Moreover, the most given topics on diabetes diet regiments are: to limit sugar intakes followed by to have meal plan and to consume more fruits.

This study result provides a glance reflection of the grand picture of national dietary status in Indonesia studied by Usfar and Fahmida (2011). Their study attempted to review the Indonesian Dietary Guidelines consisting of 13 messages that were publicized by the Ministry of Health in 1995 in relation to nutritional status and health outcome of the population. The reviews covered 29 out of 33 provinces, representing studies from sub-district or higher levels (district, provincial, national). Their study findings in the last 10 years showed that out of 13 messages, there are some have been better implemented than others; information for some messages was not available for which to conclude of its implementation. Energy intake was still inadequate in 41% of the population, obesity was found in all age groups, with an increase trend between 2007 and 2010. Fats and oils contributed to more than a quarter of total energy intake in urban areas (28%), with the highest in Jakarta, capital of the country (30%). Intakes of micronutrients from the diet for some to most parts of the population were not adequate. Usfar and Fahmida further reported that habit of eating breakfast was not practiced by more than half of the adolescents. Reading food labels was not common practice. When practiced, consumers mainly referred to brand, expiry date, and “halal” sign and less to the nutrient facts in the label.

Data from the latest 2010 national basic health research showed that the prevalence of overweight was highest amongst adults, especially women, where central obesity was 8% in men and 29% in women. With 94% of the people above the age of 10 years eating vegetable and/or fruit less than the minimum 5 portion per day in a 7-day period.
Table 7

Groups’ Diet Information Characteristic

<table>
<thead>
<tr>
<th>Facilitator</th>
<th>Study</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>%</td>
</tr>
<tr>
<td>None</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Physician</td>
<td>37</td>
<td>64.6</td>
</tr>
<tr>
<td>Dietitian</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>Nurse</td>
<td>3</td>
<td>6.5</td>
</tr>
<tr>
<td>Some of them</td>
<td>5</td>
<td>10.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Information</th>
<th>Study</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>%</td>
</tr>
<tr>
<td>Never</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>Follow a low fat eating plan</td>
<td>8</td>
<td>17.3</td>
</tr>
<tr>
<td>Follow a complex carbohydrate diet</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Reduce the number of calories you eat to lose weight</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>Eat lots of food high in dietary fiber</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>Eat lots (at least 5 servings per day) of fruits and vegetables</td>
<td>5</td>
<td>10.8</td>
</tr>
<tr>
<td>Eat very few sweets (for example: desserts, non-diet sodas, candy bars)</td>
<td>8</td>
<td>17.3</td>
</tr>
<tr>
<td>Other topics</td>
<td>3</td>
<td>6.5</td>
</tr>
<tr>
<td>Some of the topics</td>
<td>19</td>
<td>41.3</td>
</tr>
</tbody>
</table>

Table 8 shows that the physicians are again the most involved medical professional in disseminating information about exercise (85-86%) as compared to other medical professionals. Nutritionist involvement in treatment group was 2.1%, and nurses’ involvement is only 8.6%. The most disseminated topic to the treatment group and to control group are the assorted topics of exercise and followed by topic of to practice light exercise and to practice continuous exercise. The assorted topics includes: (1) to get low level exercise (such as walking) on a daily basis, (2) to exercise continuously for a least 20 minutes at least 3 times a week, (3) fit exercise into your daily routine (for example, take stairs instead of elevators, park a block away and walk, etc.), and (4) to engage in a specific amount, type, duration and level of exercise.

National dietary status study in Indonesia by Usfar and Fahmida (2011) is also giving a bigger picture of this study result. Their study reveals that the lowest physical activity was reported amongst adolescent and adults. About half of the people aged 10 years or older not exercising enough, which is less than 10 minutes per activity and less than 150 minutes for 5 days within a week.

Opposite to the finding of this study, WHO in its “Five Key to appropriate physical activity” suggest people to: (1) start regular physical activity and reduce sedentary activities, (2) be physically active every day in optimum level, (3) to do at least 30 minutes of moderate-intensity physical activity on 5 or more days each week, (4) to enjoy some regular vigorous-intensity physical activity for extra health and fitness benefits (e.g. football, badminton, basketball, aerobics, running, swimming); and (5) for school-aged young people to engage in at least 60 minutes of moderate to vigorous intensity physical activity each day.
Groups’ Exercise Information Characteristic

<table>
<thead>
<tr>
<th>Facilitator</th>
<th>Study</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>%</td>
</tr>
<tr>
<td>None</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Physician</td>
<td>39</td>
<td>84.7</td>
</tr>
<tr>
<td>Dietitian</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>Nurse</td>
<td>4</td>
<td>8.6</td>
</tr>
<tr>
<td>Some of them</td>
<td>2</td>
<td>2.3</td>
</tr>
</tbody>
</table>

Information

<table>
<thead>
<tr>
<th>Study</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>%</td>
</tr>
<tr>
<td>Never</td>
<td>0</td>
</tr>
<tr>
<td>Get low level exercise (such as walking) on a daily basis</td>
<td>11</td>
</tr>
<tr>
<td>Exercise continuously for a least 20 minutes at least 3 times a week</td>
<td>9</td>
</tr>
<tr>
<td>Fit exercise into your daily routine</td>
<td>1</td>
</tr>
<tr>
<td>Engage in a specific amount, type, duration and level of exercise</td>
<td>2</td>
</tr>
<tr>
<td>Other topics</td>
<td>3</td>
</tr>
<tr>
<td>Some of it</td>
<td>20</td>
</tr>
</tbody>
</table>

For glucose monitoring regimen, Table 9 shows that there are many among respondents of both groups who have never received any information about glucose monitoring. Nevertheless, the most given topic on glucose monitoring is about the digital glucose monitoring which are given mostly by the physicians. There are 26% of the study group who have received information regarding the way to use the digital glucose monitoring device. While in study group, there are 25% who have received assorted information.

Table 9
Groups’ Glucose Monitoring Information Characteristic

<table>
<thead>
<tr>
<th>Facilitator</th>
<th>Study</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>%</td>
</tr>
<tr>
<td>None</td>
<td>15</td>
<td>32.6</td>
</tr>
<tr>
<td>Physician</td>
<td>27</td>
<td>58.6</td>
</tr>
<tr>
<td>Dietitian</td>
<td>2</td>
<td>4.3</td>
</tr>
<tr>
<td>Nurse</td>
<td>2</td>
<td>4.3</td>
</tr>
<tr>
<td>Some of them</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Information

<table>
<thead>
<tr>
<th>Study</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>%</td>
</tr>
<tr>
<td>Never</td>
<td>15</td>
</tr>
<tr>
<td>Test blood sugar using a drop of blood from your finger and a color chart</td>
<td>5</td>
</tr>
<tr>
<td>Test blood sugar using a machine to read the results</td>
<td>12</td>
</tr>
<tr>
<td>Test your urine for sugar</td>
<td>5</td>
</tr>
<tr>
<td>Other topics</td>
<td>2</td>
</tr>
<tr>
<td>Some of it</td>
<td>7</td>
</tr>
</tbody>
</table>
Physicians are again the most involved in giving information about glucose monitoring with 59% in the study group and 34% in the control group. However, there are 64% of control group and 32.60% of the study group who have never been receiving any information regarding glucose monitoring regimen. This study result on diabetes self-management behaviours distributions show in general that physicians are the most involved medical professionals in disseminating topics on self-management. This study gives the brief pictures of diabetes management service in Indonesia. As confirmed by Widyahening and Soewondo (2013) that currently diabetes-centered care in Indonesia is still in the hospital; this fact is mainly due to the capacity of physicians and primary care level infrastructure is still inadequate.

This result shows the gap between what is being practiced in Indonesia and what is proven to be effective in DSME studies globally. In a meta-analysis study by Klein, Jackson, Street, Whitacre, and Klein (2013) suggest that interventions delivered by nurses were more successful than those delivered by non-nursing personnel. The reason why does this happens is not listed in the intention of present study know but this will send a strong message for further studies.

Table 10 shows that majority of the respondents in study group (84.78%) and in control group (88.63%) are receiving oral DM medication as their treatment. There is only 2% in both groups who receives insulin injections. There are 11% of the study group and 9% of the control group who receive mix medications which mean oral and insulin injection.

This study result is relevant with a cluster-randomized controlled trial done in Asia Pacific by Reutens et al. (2012) on the efficacy of education of doctors about type 2 diabetes mellitus management guidelines in primary care practice, where the result identified that patient reluctance to use insulin as a management of their condition.

Table 10

<table>
<thead>
<tr>
<th>TYPE OF MEDICATION</th>
<th>Study</th>
<th></th>
<th>Control</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>%</td>
<td>Count</td>
<td>%</td>
</tr>
<tr>
<td>None</td>
<td>1</td>
<td>2.1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>An insulin shot 1 or 2 times a day</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2.2</td>
</tr>
<tr>
<td>An insulin shot 3 or more times a day</td>
<td>1</td>
<td>2.1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Diabetes pills to control my blood sugar level</td>
<td>39</td>
<td>84.7</td>
<td>39</td>
<td>88.6</td>
</tr>
<tr>
<td>Mix Medication</td>
<td>5</td>
<td>10.8</td>
<td>4</td>
<td>9.1</td>
</tr>
</tbody>
</table>

As Niazi and Kalra (2012) study noted that communities of South Asian Muslim patients are more comfortable with assuming a more passive role in their own health care management. They should not be given a choice regarding their own management. Instead the best choice for the patient’s health should be made by the physician on behalf of the patient. They believe that if given a choice in their own management, people with diabetes will not be able to make the best, informed choice and therefore for their own good the choices for their health should be made by the physicians themselves.
Comparing Study Group and Control Group

Determining the difference between study group and control group on the practice of diabetes self-management behaviors variables are performed by following the research questions and the hypotheses. The descriptions of the details are presented below.

Before Intervention (Pretest) and After Intervention (Posttest)

Table 11 shows that at posttest there is increment on the average of practice of diet, exercise, glucose monitor and foot care by treatment group. The posttest average practices are higher than the pretest average practice which p<0.05. Study group’s pretest mean of practicing diet is 4.34 (SD=1.25) and the posttest mean is 5.70 (SD=0.68).

Table 11
Comparison of Study Group’s Pretest and Posttest Practice of Self-management

<table>
<thead>
<tr>
<th>Study Group Practice of Self-management</th>
<th>Pretest</th>
<th>Posttest</th>
<th>pvalue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Mean</td>
</tr>
<tr>
<td>Diet</td>
<td>4.34</td>
<td>1.25</td>
<td>5.70</td>
</tr>
<tr>
<td>Exercise</td>
<td>3.56</td>
<td>1.43</td>
<td>4.68</td>
</tr>
<tr>
<td>Medication</td>
<td>5.22</td>
<td>2.38</td>
<td>4.02</td>
</tr>
<tr>
<td>Glucose monitor</td>
<td>2.97</td>
<td>1.39</td>
<td>3.52</td>
</tr>
<tr>
<td>Foot care</td>
<td>4.92</td>
<td>0.94</td>
<td>6.44</td>
</tr>
</tbody>
</table>

The pretest mean of practicing exercise is 3.56 (SD=1.43) and the posttest mean is 4.68 (SD=1.21) with p< 0.05. This means that study group practiced diet in average of four (4) days in a week before the SAKINAH and it became in average of five (5) days in a week after the education intervention.

Study group’s pretest mean value of the practice of exercise is 3.56 (SD=1.43) while the posttest mean is 4.68 (SD=1.21) with p>0.05. This means that study group was practicing exercise behaviour in average of four (4) days in a week before the SAKINAH intervention, then became five (5) days in a week after the intervention. Pretest mean of glucose monitoring behaviours is 2.97 (SD=1.39) while the mean for the posttest is 3.52 (SD=1.19) with p < 0.001. This means that study group was practicing glucose monitoring behaviour in average of three (3) days in a week before intervention, and it became four (4) days in a week after the SAKINAH education intervention. For practicing foot care behavior, the pretest mean is 4.92 (SD= 0.94) and the posttest mean is 6.44 (SD= 0.63). It means that study group practices foot care including washing foot, drying foot, soaking foot, applying lotion on foot and checking foot wear in average of five (5) days in a week at the pretest while at the posttest it became in average of 6 days in a week.

In the practice of medication behavior, pretest mean of the study group is 5.22 (SD=2.38) while the posttest mean is 4.02 (SD= 0.74) with P value > 0.05. This means that study group was practicing medication behaviour in average of three (3) days in a week and still continuously practicing it for three (3) days in a week despite the SAKINAH education intervention. It is so
with the practice of avoiding risk behavior of cigarettes smoking that are similar at the pretest and posttest.

Therefore, this study findings show that there is not enough evidence to reject the research hypothesis that the practice of diet, exercise, glucose testing and foot care in study group is not similar before and after the SAKINAH diabetes self-management education intervention. However, the practice of medication and avoid risk behavior of smoking in study group are found to be no significant difference at before and after the SAKINAH diabetes self-management education intervention.

Table 12 shows that the average level of Fasting Blood Sugar (FBS) of study group at the pretest is 180.08mg/dL or 10mmol/L (SD=64.90), while posttest mean is 150.58mg/dL or 8.3mmol/L (SD=46.31) with p< 0.05. There is decrement on the average measures of FBS from the pretest as compare to the posttest that approaching the target level of FBS which is 6.7mmol/L.

### Table 12

**Comparison Group’s Posttest Physical Variables**

<table>
<thead>
<tr>
<th>Posttest Physical Variables</th>
<th>Control Mean</th>
<th>Control Standard Deviation</th>
<th>Study Mean</th>
<th>Study Standard Deviation</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting Blood Sugar</td>
<td>193.75</td>
<td>71.45</td>
<td>150.58</td>
<td>46.316</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>BP Systole</td>
<td>128.86</td>
<td>14.81</td>
<td>125.00</td>
<td>12.24</td>
<td>0.020</td>
</tr>
<tr>
<td>BP Diastole</td>
<td>83.40</td>
<td>7.75</td>
<td>80.43</td>
<td>5.94</td>
<td>0.323</td>
</tr>
<tr>
<td>Body Weight</td>
<td>59.13</td>
<td>8.20</td>
<td>59.10</td>
<td>9.12</td>
<td>0.056</td>
</tr>
</tbody>
</table>

The distribution of study group systole blood pressure mean is 127.39mmHg (SD=11.24) while the posttest measures is 125.0mmHg (SD=12.24). There is decrement on the average measures of systole blood pressures where the posttest measure is lower than the pretest which has a significant difference with p=0.02. The study group pretest measure of diastole mean is 80.00mmHg (SD=6.32) while posttest measures is 80.43mmHg (SD=5.94). Pretest measure of body weight is 59.75Kgs (SD=10.06) while the posttest mean is 59.10Kgs (SD=9.12) with p> 0.05.

As summary of the findings of SAKINAH study show that majority of the participants are women in their middle to late adulthood with secondary basic education background. They have been diagnosed with T2DM within 1 to 10 years with oral diabetes medication as the most treatment. Family members and their spouses are their source of most frequent helps in managing their illness. They have greater than 57 score of social support with informational/emotional support and interactional support scored the highest among other subscores. Despite the evidence of DSME done by nurses are showing more effective impact, Indonesian nurse involvement in DSME found to be extremely in limited contribution with numbers of people are still found to have never exposed to diabetes self-management information. The tests of difference shows that integrating Islam health principles to persuade the practice of self-management behaviours is supported to have significant effect particularly in the practice of diabetes diet, exercise, foot care and glucose monitoring behaviours. It also shows
that through the practice of the behaviours help lowering the FBS somehow. As supplementary to the above given quantitative data the experience of the participants in SAKINAH diabetes self-management education intervention is presented in the following qualitative section.

Conclusion

The result of this study supports the social cognitive perspective that knowledge creates the precondition for change. After four weeks of intervention there was significant difference in the practice of self-management behaviours on the study group specifically on diet, exercise, glucose monitoring, foot care. Level of fasting blood sugar is also significantly lower in study group after the SAKINAH education intervention. SAKINAH as additional self-influences have significant role to overcome the impediments to adopting self-management behaviours and maintaining them. This approach addresses the sociostructural determinants of health as well as the personal determinants. Spiritual persuasion of SAKINAH plays its role in facilitating maintenance, negotiating and restructuring favorable behaviours.

Recommendations

Most of the respondents are in their late adult stage of life with decrementing fitness and health problems. SAKINAH education approach requires participants to expose to reading activities that somehow challenging for this stage characteristics. Another more “late adulthood friendly” approach in the future might have more impact on duplicating this education intervention.

The result of this study shows that professional nurse has yet a very limited involvement in term of disseminating self-management regiments for people with diabetes decision purposes. SAKINAH education intervention has shown the new perspectives and broader edge for professional nurse professionals to contribute to the negotiation and restructuring health services for healthier community.

Based on this study observation, people who are involved have their own definition of closeness to one another which might have impact on the interest and involvement to the education intervention activities. Careful observation, personal involvement and working close with the each other among and across health professionals would anticipate and retrogress significant barriers.

Although the effect of the changes is not measured by this study, SAKINAH education intervention shows how the accommodation of beliefs as part of culture can make the difference in promoting health behaviours. How much more if spiritual persuasion SAKINAH intervention be a part of a well concerted intervention with another successful approach in diabetes self-management educations like visitation, continuous follow-up, information medias and multidiscipline approach that caters for a specific background of people. It is a reality that in many instances diabetes self-management education is given by thinking it will fits all. But the reality also loudly speaks that people are significantly unique from person to culture to social to religion and nation. Back to basic, a careful assessment and planning is essential to every different scales of diabetes education intervention.

History tells that implementation and its sustainability is the most challenging part of any health program. The result of this study suggests that socialstructural health determinant need to be considered in structuring the objectives and strategizing approach of the diabetes education intervention. Qualitative result of this study confirmed that people loves to do what is close to their way of life. Consider the truth of how do we all love to wear a birthday-gift dress that fit
our size, our favorite color, need and trend compared to the items which we could not treasure nor esteem.

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