

# The Effect of A Self-Management Support Program on The Achievement of Goals in Diabetic Foot Care Behaviors in Indonesian Diabetic Patients

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**Introduction:** Diabetic foot care behaviors (DFCB) are a fundamental component of the prevention of diabetic foot complications. This quasi-experimental study aimed to examine the effect of a self-management support program on the achievement of DFCB goals in Indonesian diabetic patients.

**Method:** Thirty-five subjects were recruited from the diabetic unit of a district hospital in West Java, Indonesia. The subjects received a five-week diabetic foot care self-management (SM) support program. This program consisted of three sequential phases based on the self-management method proposed by Kanfer and Gaelick-Buys (1991): self-monitoring, self-evaluation, and self-reinforcement. The strategies used in this program consisted of individual foot care education, goal setting and action planning, and brief weekly counseling and follow-ups. The goals achieved from the second to the fourth weeks were evaluated weekly by phone call follow-ups with a face-to-face interview evaluation in the fifth week. The level of goal achievement was determined by counting the number of successfully implemented actions based on the subject's action plans. The actual goal achievement was then classified into three levels: goal completely achieved, goal partially achieved and no behavioral change (no action) at all.

**Results** Most of the subjects (94.3%) were able to completely achieve their first week goals whereas only approximately two-thirds of the subjects were able to completely achieve their goals in the second to the fourth weeks. Throughout the program, less than half of the subjects (42.9%) completely achieved all four weekly goals although only one subject (2.9%) was unable to achieve any of the weekly goals. The most improved DFCB component in each of the first to fourth weeks was foot hygiene, footwear, toenail care and a combination of foot hygiene and footwear, respectively.

**Conclusion:** This SM support program effectively improved the Indonesian diabetic patients' foot care behaviors. Therefore, nurses can apply this program in practice in enhancing DFCB in order to prevent diabetic foot ulceration.

**Keywords:** Diabetic foot care behaviors, self-management, diabetic patients

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Diabetic foot ulcers (DFU) are one of the most devastating complications of diabetes mellitus (DM) affecting 15% to 25% of diabetic patients (Singh, Amstrong, & Lipsky, 2005). The adverse effects of DFU include the high financial burden caused by the disease, foot amputation, physical disability, low quality of life, and a high mortality rate (Abdelgadir, Shebeika, Eltom, Berne, & Wikblad, 2008; Edmonds, 2006; Stockl, Vanderplas, Tafesse, & Chang, 2004). Since effective, long term treatment of DFUs is difficult and ulcers often reoccur even after healing (Ghanassia et al., 2008), the prevention of DFU is very important.

Diabetic foot ulcers can be prevented in several ways. Performing daily foot care, for instance, enables patients to detect foot abnormalities and injuries early and as a result to reduce or even prevent the incidence of foot ulceration effectively (Calle-Pascual et al., 2001). Unfortunately, many diabetic patients do not perform appropriate daily foot care by, for instance, failing to conduct regular foot self-inspection, wearing improper footwear or walking barefoot, improperly trimming their toenails, or using unsafe water for washing their feet (Gulliford & Mahabir, 2002; Khamseh, Vatankhah, Reza, & Baradaran, 2007).

Patients living with chronic diseases, such as diabetes, have to learn to self-monitor, to make appropriate decisions, to improve relevant skills, and to change aspects of their lifestyle on a day-to-day basis in order to control and manage their symptoms and complications (Bourbeau, 2008). Self-management support (SM) programs are a crucial strategy that can effectively assist patients with chronic diseases, including those with DM, to improve their health-related behaviors (Bodenheimer & Handley, 2009; Bodenheimer, Lorig, Holman, & Grumbach, 2002; Dewalt et al., 2009; Fan & Sidani, 2009; Handley et al., 2006). SM programs involve collaboration between patients and health care providers to ensure that patients' adopt specific behaviors to prevent the adverse effects of chronic illness (Bourbeau).

However, there have been no reports of the successful implementation of the SM method aimed at the improvement of diabetic foot care behaviors in patients suffering from DM. Indeed, one systematic review reported that the possibility of generalizing from most of the studies conducted in this area was limited (Norris, Engelgau, & Narayan, 2001).

In Indonesia, Makmurini and colleagues (2010) reported that Indonesian diabetic patients lacked both knowledge and practical ability regarding foot care. The current day-

to-day practice in the care of patients with diabetes mellitus and the information given in educational programs is mostly focused on diet, exercise, and medication. However, general information on diabetic foot care is rarely provided by physicians unless patients show symptoms of diabetic neuropathy or nurses/physicians find evidence of foot abnormalities. Additionally, Bodenheimer and colleagues (2002) found that using only educational programs limited the extent to which diabetic patients engaged in behavioral change and Ellis et al., (2004) recommended integrating self-management with educational programs as a means of successfully increasing patients' participation in managing their own chronic illness. It is therefore crucial to develop SM support programs to encourage Indonesian diabetic patients to improve their diabetic foot care behaviors.

### **Purpose of the Study**

This study aimed to examine the effect of a self management (SM) support program on the achievement of diabetic foot care behaviors (DFCB) goals in Indonesian diabetic patients.

### **Conceptual Framework**

In this study, the SM support program employed was developed based on the self-management method proposed by Kanfer and Gaelick-Buys (1991) and the diabetic foot care standards promoted by the Indian Health Diabetes Best Practice Foot Care (2009) program and the Registered Nurses' Association of Ontario [RNAO] (2007). The SM support program was modified to be a five-week intervention aimed at encouraging diabetic patients to achieve the desired diabetic foot care behaviors effectively. The five-week SM program consisted of a sequence of three stages: self-monitoring, self-evaluation, and self-reinforcement.

The self-monitoring stage involved the patients themselves reflecting on their current DFCB. The self-evaluation stage included giving individual foot care education sessions, conducting discussions to evaluate the subjects' current DFCB, and identifying DFCB component(s) that needed to be improved. The self-reinforcement stage consisted of giving feedback regarding the subjects' current DFCB, assisting the subjects to develop their own self-reinforcement, assisting the subjects in making decisions about the maintenance, modification, or improvement of their current DFCB, and assisting each

subject to set a goal and an action plan according to the decision made. After that, potential barriers and the subject's self-confidence level about implementing the action plan were evaluated and the subjects were given brief counseling sessions during which they were encouraged to discuss alternative solutions. These activities were integrated and repeated in follow up sessions during the second to fifth week of the five-week program.

## **Methods**

### *Setting and Subjects*

Thirty-five subjects were recruited from a diabetic unit of a district general hospital in West Java, Indonesia. The inclusion criteria included: age from 18 to 65 years old, able to read and speak the Indonesian language, no severe vision or hearing problems, no disabilities, and able to be contacted by telephone. The subjects were excluded from the study if they developed severe complications, such as severe diabetic retinopathy, joint problems, or were hospitalized during the study period or otherwise became unable to perform foot care independently.

### *Instruments*

The research instruments used in this study consisted of a prior foot care knowledge questionnaire, a teaching guideline and diabetic foot care booklet, and a self-confidence scale which were used in the SM support program, and a goal achievement form was used to measure the outcome of the study.

*Prior Foot Care Knowledge Questionnaire.* This questionnaire consisted of 10 items of the true or false type, aimed at assessing the subject's prior knowledge about DFCB. The results were used to guide the principal investigator (PI) in discussing and providing information about DFCB during the educational sessions. The content validity was approved by three DM experts. The internal consistency was measured based on the KR 20 reliability coefficient and was found to be 0.63.

*Teaching Guideline and Diabetic Foot Care Booklet.* This instrument was developed based on the foot care standards promoted by the Indian Health Diabetes Best Practice Foot Care (2009) program and the RNAO (2007). The contents were focused on DFCB. The DFCB information was given to subjects by the PI through a brief verbal explanation, in subsequent discussions, and via a booklet and a video.

*Self-Confidence Scale.* This instrument was used to estimate the subjects' level of confidence that they could successfully perform the action plans which were developed. It was based on a 0 to 10 numeric rating scale in which 0 indicated that the subject had no confidence at all and 10 indicated that they had total confidence. The subjects were given support and encouragement to help them maintain high levels of confidence, the aim being for them to maintain a level at least of 7 which has been found in another study to indicate that the subject has a better chance of successfully achieving their goals (Bodenheimer, Davis, & Holman, 2007).

*Goal achievement level.* The level of goal achievement was evaluated weekly by the PI. Phone call follow-ups were used to evaluate whether the subjects had achieved their goals during the second to the fourth week and a face-to-face interview was conducted in the fifth week. The level of goal achievement was determined by counting the number of actions successfully implemented according to the subject's action plan. Then, the goal achievement was classified into three levels: goals completely achieved, goals partially achieved and no behavioral change (no action) at all.

### *Ethics*

Before initiating the study, ethical approval and permission for the collection of data were obtained from the Faculty of Nursing, Prince of Songkla University, Thailand and from the district general hospital in West Java, Indonesia where the study was conducted. Informed consent was also obtained from the subjects prior to starting collecting data from them.

### *Program Development*

The five-week SM support program was developed based on the three stages of the self-management method outlined by Kanfer & Gaelick-Buys (1991). In the first week, the researcher assessed the subjects' prior knowledge and level of self-confidence in performing DFCB. Then, the (PI) collaborated with the subjects in evaluating their existing level of DFCB by comparing their actual DFCB with the ideal DFCB and also identified the DFCB components which needed to be improved. The PI also provided individual educational sessions to the subjects and gave them a booklet outlining suitable DFCB.

Then, the subjects were encouraged to set their weekly action plans and the goals they sought to attain during their participation in this study.

During the second through the fourth weeks, the PI contacted each subject once a week by a phone call to follow up their progress in achieving their goals and briefly counseled them in respect of any actions that they had found difficult to complete. The subjects were asked to attempt self-reinforcement in respect of goals implemented that week which had been either completely or incompletely achieved. At the end of the phone call, the subjects were encouraged to develop DFCEB improvement goals and action plans for the forthcoming week. In the fifth week, the PI conducted a face-to-face interview with the subjects to follow-up their progress on the day of their regular hospital check-up at the diabetic unit. Then, the numbers of goals achieved were assessed, and categorized as completely or partially attained, or not attained at all.

#### *Data Analysis*

Descriptive statistics were employed to analyze the subjects' demographic data and their levels of goal achievement.

### **Results**

#### *Demographic Data and Clinical information*

The mean age of the subjects was 53.54 years (SD = 7.33), the mean duration of having been diagnosed with DM was 6.70 years (SD = 5.28). All of the subjects were Muslim, more than half of them were female (57.10%), and more than half had been to university (51.43%). The majority of the subjects (80%) had never previously received information relating to DFCEB and less than half of the subjects (42.86%) had existing neuropathy problems (see Table1).

Table 1

*Means (M), Standard deviations (SD), Frequencies, and Percentages of Demographic Data and Clinical Information (N = 35)*

<b>Variable</b>	<b>M (SD)</b>
Age (years)	53.54 ± 7.33
DM duration (years)	6.70 ± 5.28

Table 1 (continued)

Variable		n (%)
Gender	Male	15 (42.9)
	Female	20 (57.1)
Religion	Muslim	35 (100)
Educational background	Primary school	6 (17.14)
	Senior high school	11 (31.43)
	University	18 (51.43)
Foot conditions	No history of foot problems	10 (28.57)
	A History of neuropathy symptoms	15 (42.86)
	A history of other foot problems	10 (28.57)
DFC information	Ever received DFC information	28 (80.00)
	Never received DFC information	7 (20.00)

*Prior Knowledge on Diabetic Foot Care*

The mean score for prior knowledge of DFCB based on the number of correct answers given was 7.0 (out of a possible 10; SD = 1.0). The highest level of prior knowledge was in respect of checking daily inside shoes (100% of subjects answered the item correctly). The items which attracted the second highest percentage of correct answers were: ‘performing daily foot self-inspections’ (88.6%) and ‘gently scrubbing the skin of the feet’ (88.6%), whereas, the two lowest percentages of correct answers were in respect of ‘not walking barefoot inside the house’ (25.7%) and ‘not wearing ‘flip-flop’ sandals’ (40%) (see Figure 1 below).

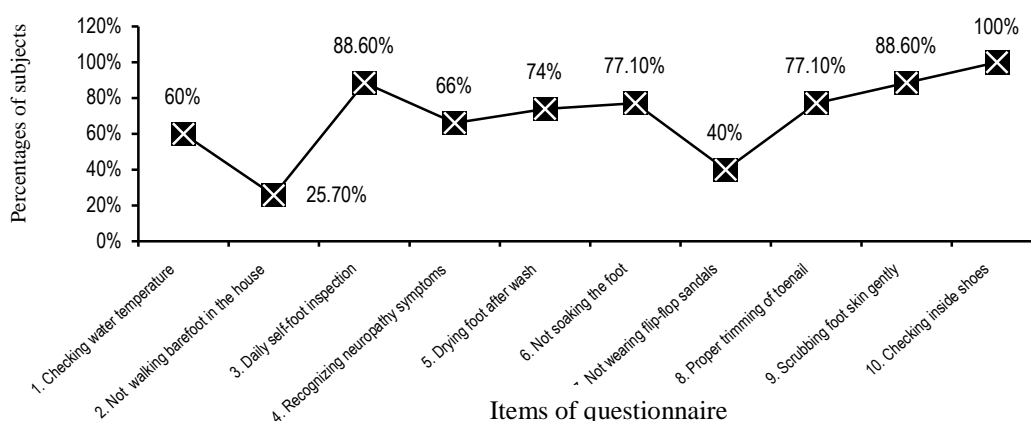


Figure 1. The percentages of the subjects who correctly answered the items in the Diabetic Foot Care Prior Knowledge Questionnaire (N = 35)

*Level of Goal Achievement*

Almost all the subjects (n = 33 or 94.36%) completely achieved their goals in the first week. However, this percentage was found to have decreased to between 60% and 70% during follow up interviews in the second, third, and the fourth weeks, the differences between the first week and each of the second, third and fourth weeks being found to be significant in Mc Nemar tests (see Figure 2 below).

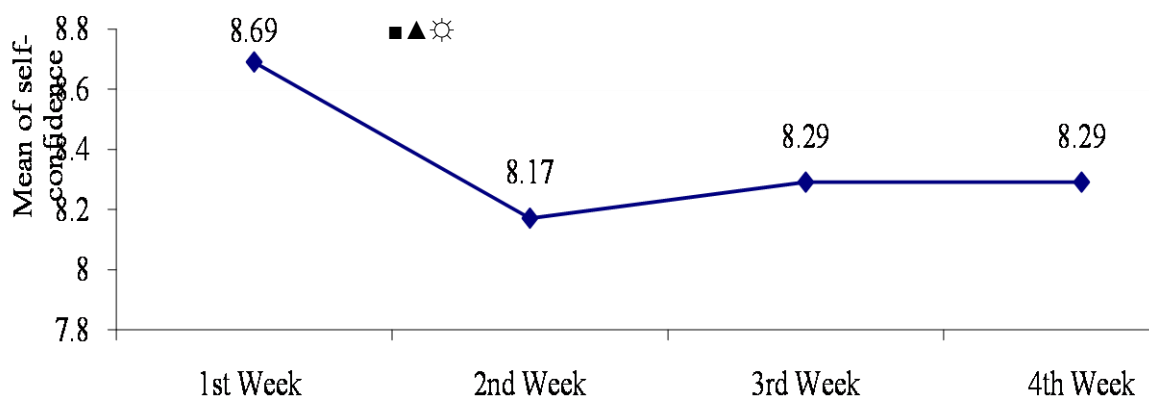


Figure 2. The percentages of subjects who completely achieved their weekly goals (N = 35). Note: Mc Nemar test showed; ■ = the first follow up week > the second follow up week ( $p < .001$ ), ▲ = the first follow up week > the third follow up week ( $p < .001$ ), ☼ = the first follow up week > the fourth follow up week ( $p < .001$ ).

*Total Goal Achievement Throughout the Entire Program*

Less than half of the subjects (n=15 or 42.86%) always completely achieved their goals throughout the entire four week period whereas only one subject (2.86%) never completely achieved his weekly goal (see Table 2 below).

Table 2

*The Frequency and Percentage of Subjects who Completely Achieved All their Weekly Goals (N =35)*

Goal achievement level	n (%)
Always completely achieved the four weekly goals	15 (42.86)
Completely achieved three out of four weekly goals	8 (22.86)
Completely achieved two out of four weekly goals	5 (14.28)
Completely achieved one out of four weekly goals	6 (17.14)
Never completely achieved the four weekly goals	1 (2.86)



*Diabetic Foot Care Behaviors (DFCB) Components set as Weekly Goals and Their Achievement*

For their weekly goal, each subject selected, on average only one DFCB component. From the first through to the fourth week of the study, the most popular weekly goal selected each week from the DFCB components were respectively, foot hygiene (n=16 or 45.7%), footwear (n = 22 or 62.9%), toenail care (n = 12 or 34.3%), and foot hygiene and footwear (n = 13 or 37.1%). Among those components, foot hygiene was the most selected component that was completely achieved by most of the subjects (n =14 out of 16 who selected it as a goal, or 87.50%). On the other hand, footwear was the most selected DFCB component which the lowest percentage of the subjects completely achieved (n=10 out of 22 who selected it as a goal, or 45.45%, Table 3).

Table 3

*Frequency and Percentage of Subjects Who Planned and Completely Achieved the Most Selected DFCB Component in Each Week.*

Week of Intervention	Top DFCB Components Set as weekly goal	(n)	Completely achieved goal n (%)
First	Foot hygiene	16	14 (87.50)
Second	Footwear	22	10 (45.45)
Third	Toenail care	12	8 (66.67)
Fourth	Foot hygiene & footwear	13	10 (76.92)

*Self-Confidence Level*

The highest mean level of self confidence (8.69) was found in the first week, as compared to the second (8.17), third (8.29), and fourth (8.29) weeks. A repeated measure of analysis of variance (ANOVA) demonstrated that there was a significant difference of self-confidence levels across the four weeks of intervention ( $F = 3.35, p = .02$ ). However, the pairwise comparisons (Benferroni) only showed a significant difference in the mean levels of self-confidence in the first and the second weeks of intervention ( $p = .04$ ) (see Figure 4 below).

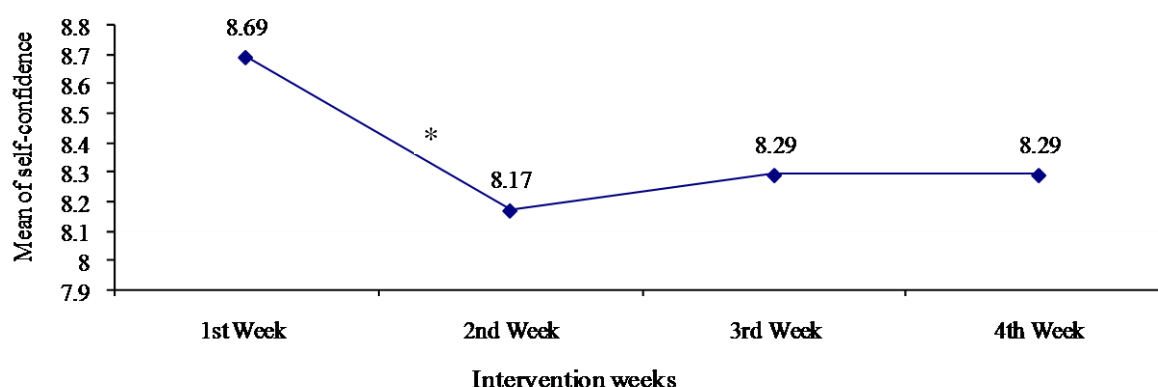


Figure 4. Mean Level of Self-confidence in each week of the study (\* = self-confidence level in the 1<sup>st</sup> week > 2<sup>nd</sup> week;  $F = 3.35, p = .04$ ).

## Discussion

As can be seen, almost all of the subjects (97.14%) were able to completely achieve at least one of their weekly goals. It can be concluded from this that the use of the SM support program served as a successful strategy in enabling this group of diabetic subjects to set DFBC goals and to develop action plans, and as a result to effectively improve their DFBC. In this study, the SM support program incorporating different foot care strategies as well as the monitoring and enhancement of the level of the subjects' self-confidence, operating within the prevailing religious and cultural background, played an important role in encouraging the diabetic patients to achieve ideal DFBC.

The SM program applied in this study was able to support the effective achievement of goals in several ways. First, the use of self-reflection as a tool to encourage the subjects to consciously monitor their DFBC increased their awareness of their actual behaviors. Next, in the self-evaluation stage, the subjects were assisted and encouraged to assess whether their current DFBC met the desired DFBC criteria or not, and to identify the DFBC components which needed to be improved. Additionally, through self-reinforcement activities, the subjects were assisted to decide whether or not they wanted to maintain, modify, or improve their DFBC. Thus, the subjects were made to realize and understand what activities needed to be done to improve their DFBC. Furthermore, the SM program places value on the subjects as experts who know what is best for their own lives. As a result, they were able to make their own decisions about the selection of their goals and the action plans to achieve them. In common with previous studies (DeWalt et al.,

2009; Handley et al., 2006), it was found that when the subjects were actively involved in the SM support program, they proved to be competent to change their behaviors and there was a high probability that they would do so successfully (Bodenheimer et al., 2002; Kanfer & Gaelick-Buys, 1991). The success of using SM to encourage chronically ill patients to change their behaviors in order to manage the adverse effects of chronic diseases is well supported and evidenced by these studies.

The partnership between subjects and the principal investigator also provided a positive environment for goal achievement. In this study, the PI acted as a facilitator who regularly evaluated and provided feedback on their actual DFCB and encouraged the subjects to improve their DFCB and to reflect on the improvement or progress of their behaviors. This relationship assisted the subjects and the PI to build effective communication and trust which effectively improved the subjects' adherence to the performance of the required actions, as has been noted in other studies (Fox et al., 2009; Martin, Williams, Haskard, & DiMatteo, 2005; O'Malley, Sheppard, Schwartz, & Mandelblatt, 2004) and the feedback and encouragement was able to facilitate improvements in the subjects' behaviors (Bodenheimer et al., 2007; Bodenheimer & Handley, 2009). The cultural background of the Indonesian subjects also enhanced the successful building of trust in the relationship between the PI and the subjects. Culturally, Asian patients highly respect healthcare providers. This basic virtue can potentially improve the subjects' motivation to perform the required actions and to achieve their goals.

The combined educational strategies applied in this study also supported goal achievement. The individual educational sessions allowed the diabetic subjects to gain knowledge and also allowed the individual subjects to intensively discuss any particular additional information they needed. In addition, the booklet given to the subjects guided the subjects in performing their daily DFCB. Vatankhah et al., (2009) similarly reported that individual educational sessions combined with an explanatory booklet can effectively improved patients' diabetic foot care knowledge and behaviors within a period of 6 months. Furthermore, discussion of the subjects' difficulties in performing DFCB were able to strengthen the subjects' problem solving skills which are fundamental for behavioral change.

Another strategy that contributed to the positive outcome of the study was the setting of individual goals, and action plans to achieve them. The goal setting and action planning session encouraged each subject to consciously engage in the process of changing their behaviors by adopting their own goals and action plans as also noted by Bodenheimer and Handley (2009). The goals and action plans also provided clear guidance for the subjects regarding what activities should be undertaken and how to achieve the desired goals. Additionally, the manner in which the goals were set allowed the subjects to set the most achievable goal and once a goal is achieved this serves to strengthen the subject's self-confidence which in turn provides encouragement for the subjects to successfully achieve further goals (Bodenheimer & Handley; Wallace et al., 2009). Additionally, the evaluation of the subjects' self-confidence allowed them to set appropriate goals and action plans based on their level of self-confidence resulting in a greater probability of the subjects achieving their goals (Bodenheimer et al., 2002; Kanfer & Gaelick-Buys, 1991).

The weekly follow up and counseling also provided regular encouragement to the subjects, facilitating the continuous improvement of their knowledge, responsibility, skill, and motivation to achieve their goals. Bodenheimer and Handley (2009) also noted that the combination of the setting of behavioral change goals and follow-up intervention resulted in more behavioral changes than did the setting of goals without follow-up intervention.

The level of self-confidence also contributed to the achievement of the subjects' goals. As can be seen from Figures 2 and 3, the highest self-confidence level was congruent with the highest goal achievement. This finding supports previous similar findings suggesting that higher self-confidence provided better chance for goal achievement (Bodenheimer et al., 2007; Bodenheimer & Handley, 2009; Kanfer & Gaelick-Buys, 1991; Perrin et al., 2009). However, it is interesting to note that in the last two follow up weeks (weeks 4 and 5 of the study) although, the mean self-confidence levels were similar, the goal achievement level in the last follow-up week was higher than that in the third follow up week. The reason for this finding is that in the last week of the study, the goals set were a repetition of those set in the first and the second weeks of the study. Therefore, the subjects had experience of performing the behaviors selected and consequently a better chance of achieving their goals.

Culture is another issue that affects goal achievement. In this study, although each subject was given information regarding the wearing of appropriate footwear, the behavior

recommended was not common practice among Indonesian people. For Indonesian people, the wearing of shoes inside a house is generally viewed as both unusual and impolite. Indonesian people also commonly wear 'flip-flop' sandals as their normal footwear. As a result, if subjects adopt the wearing of footwear when inside houses, and cease wearing 'flip flops' as they are recommended to do, not only do they face cultural challenges, but they will also be faced with the need to buy suitable shoes or sandals. Therefore, these two components were found to be less achievable as compared to other diabetic foot care components.

With regard to the religious background, since all of the subjects in this study were Muslim, they were already familiar with basic foot care and hygiene activities since they are a part of their religious practices. Being Muslim, they must wash their feet at least five times a day before praying. During the goal setting and action planning process, each subject was encouraged to start with the simplest DFCB components and to work up to the more complicated ones. Generally, foot hygiene was perceived as being the simplest component. Therefore, compared with improving other components, improving foot hygiene was easier and more achievable for Indonesian diabetic patients.

### **Conclusion and Recommendation**

The five-week SM program employed in this study effectively assisted Indonesian diabetic patients to achieve the goal of improving their DFCB. In this study, the goals set were based on four components of DFCB namely: foot hygiene, foot wear, toenail care, and a combination of foot hygiene and footwear. A recommendation is, therefore, made to nurses and/or other healthcare providers, particularly those working in an Asian context, to put this SM support program into practice. It is also recommended that further research should be conducted by replicating this study in multiple settings and using bigger samples, and over a longer duration in order to further investigate the efficacy and sustainability of the SM method, to strengthen the evidence in its favor and thereby to, and maximize the generalizability of the findings of this study.

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