

Diabetes Support Groups Improve Patient's Compliance and Control Blood Glucose Levels

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Abstract

Providing information is not enough to improve diabetic patient's compliance and achieve goals of therapy. Patient's good awareness as well as emotional and social supports from family and community may play an important role to improve their compliance and clinical outcomes. Therefore, diabetes support groups were developed and each support group consisted of two pharmacists, two nurses, diabetic patients and their family members. A total of 70 type 2 diabetic patient's were enrolled and randomized into support group 1 and support group 2. Patients in the group 1 received information leaflets only, while patients in the group 2 received pharmacist counselling and information leaflets at each meeting. Patient's awareness of diabetes and compliance with medications were assessed by a short questionnaire at baseline and final follow-up. Blood glucose and cholesterol levels were also evaluated in both groups. At the end of study, the overall patient's awareness and compliance improved by 61.5%. The random and fasting blood glucose levels decreased over than 30% in the group 2 and around 14% in the group 1. This study reveals that collaboration between health care professionals and community in the diabetes support group might help diabetic patients to increase their knowledge and compliance with the diabetes therapy as well as glycaemic control.

Key words: Diabetes, group awareness program, pharmacist, patient counselling

Kelompok Dukungan terhadap Diabetes Meningkatkan Kepatuhan dan Kontrol Kadar Glukosa Darah Pasien

Abstrak

Menyediakan informasi tidak cukup untuk meningkatkan kepatuhan pasien diabetes dan mencapai tujuan terapi. Kesadaran pasien serta dukungan emosional dan sosial dari keluarga dan masyarakat dapat memainkan peran penting untuk meningkatkan kepatuhan dan hasil klinis. Oleh karena itu, kelompok pendukung diabetes dikembangkan dan masing-masing kelompok pendukung terdiri atas dua apoteker, dua perawat, pasien diabetes dan anggota keluarga mereka. Sebanyak 70 pasien diabetes tipe 2 yang terdaftar dan acak ke dalam kelompok dukungan 1 dan kelompok dukungan 2. Pasien dalam kelompok 1 menerima selebaran informasi saja, sedangkan pasien di kelompok 2 menerima konseling dari apoteker dan informasi diabetes pada setiap pertemuan. Kesadaran Pasien diabetes dan kepatuhan dengan obat dinilai oleh kuesioner singkat pada awal dan akhir. Kadar glukosa darah dan koleste-rol juga dievaluasi pada kedua kelompok. Pada akhir penelitian, kesadaran dan kepatuhan pasien secara keseluruhan meningkat 61,5%. Kadar glukosa darah acak dan puasa menunjukkan penurunan 30% pada kelompok 2 dan sekitar 14 % pada kelompok 1. Penelitian ini mengungkapkan bahwa kolaborasi antara profesional perawatan kesehatan dan masyarakat dalam kelompok pendukung diabetes dapat membantu pasien diabetes untuk meningkatkan pengetahuan dan kepatuhan mereka dengan terapi diabetes serta kontrol glikemik.

Kata kunci: Diabetes, program penyadaran kelompok, apoteker, konseling pasien

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Introduction

The prevalence of diabetes mellitus (DM) is higher among other degenerative diseases in Indonesia. Head of Department for Health in the East Java says about 69 thousand of the 37 million people are living with diabetes in the East Java.¹ Surabaya becomes the region with the highest number of diabetic patients around 14,377 patients per year. An increasing number of diabetic patients with uncontrolled blood sugar in Surabaya can be attributed to the lack of understanding regarding the disease and its therapy.

A preliminary study was conducted in adult diabetic patients in the district of Kedung Tarukan Surabaya for the purposes of describing their diabetes-related knowledge and evaluating their current blood glucose levels (unpublished). The study revealed that most of them still have lack of understanding on diabetes and its therapy. This finding was then correlated to the high blood glucose levels among them. Therefore, a comprehensive care either from health care professionals or community was needed to improve glycaemic control.

Patient involvement is beneficial to the diabetes management program for a better disease control. A research conducted by McPherson et al.² revealed that patients who have a high level of knowledge and understanding in anti-diabetic drugs are positively correlated to controlled blood sugar and improved treatment adherence. Self-management education improved glycaemic control, particularly immediately following the intervention, and that continued contact with the educator extended this beneficial effect. Furthermore, social, financial and emotional supports from the family member and the community were very influential on the success of therapy particularly for diabetic outpatients.³ It is clearly stated that providing information is not enough to improve diabetic patient's compliance and achieve goals of therapy. Patient's good aware-

ness as well as emotional and social supports from family and community may play an important role to improve their compliance and clinical outcomes. Therefore, diabetes support groups can be developed and implemented in the community to provide a comprehensive care for people living with diabetes. They can meet and share their experiences with others and health care professionals can provide education programs which can be tailored to the needs of those diabetic outpatients.

Methods

The study was conducted in the district of Kedung Tarukan Surabaya, Indonesia over a period of 3 months. The study period was set up in accordance with the institutional guidelines on the community service programs (3–6 months) and was sufficient to capture the continuum of immediate and intermediate outcomes of the support groups, including knowledge, behaviour change and clinical improvement. Diabetes support groups were developed and each support groups consisted of two pharmacists, two nurses, diabetic outpatients and their family member. Pharmacists were responsible to provide educational interventions, patient counselling, and information leaflets as well as to record any patient information related to medications and lifestyle (dietary and activity), nurses were responsible to check blood pressure, fasting/random blood glucose, and total cholesterol levels, and patient's family members were responsible to help patients in taking any medications at home and to manage dietary and lifestyle habits.

At the beginning of study, all adult diabetic outpatients who agreed to participate in the study were interviewed by pharmacists to record their demographic details and current clinical condition in a designed patient profile form. Paediatrics and pregnant women with diabetes were excluded from the study. These patients were considered as a vulner-

able group due to their specific issues. They needed a family support specialist and a paediatric diabetes medical specialist which were not provided by the support groups. Therefore, they were referred to the community hospital for an intensive monitoring.

Patients were randomized into support group 1 and support group 2. At each meeting (once a month) patients in the group 1 received information leaflets only, while patients in the group 2 received pharmacist counselling and information leaflets. The support groups offered a meeting once a month where patients could share their experience living with diabetes, so they could get support and understanding from different perspectives. Other activities included counselling session and checking patient's blood pressure, blood glucose and cholesterol levels. The counselling session was carried out by the pharmacists in the local language (Javanese) for 15–20 min each patient. The pharmacist explained issues relevant to diabetes including causes and pathophysiology, short-term and long-term complications, goal of therapy, insulin and oral antidiabetic agents, side effects and their management, recommendations for appropriate lifestyle changes (e.g. meal, exercise, lose weight, etc.), and foot care. Patient information leaflets in Bahasa were also provided by the pharmacist and distributed to both groups. The leaflets contained information on diabetes, medications, potential side effects and their management, and desirable dietary and lifestyle changes. Moreover, blood glucose and total cholesterol levels were evaluated in both groups at baseline and final follow-up.

A short questionnaire was developed to assess patient's knowledge and awareness regarding to the disease and its management. Questions were constructed on the basis of diabetes self-care behaviour measures in "Standards for Outcomes Measurement of Diabetes Self-Management Education" developed by the American Association of Diabetes Educa-

tors.⁴ and the diabetes medication knowledge questionnaire developed by McPherson et al.² We modified and constructed the questionnaire to have these same five patient knowledge and behaviour areas, including diabetes, complications, goal of therapy, medicine use, and important side effects. There were 12 questions, 2 questions related to knowledge about diabetes, 2 questions to address complications, 3 questions related to aim of therapy, 3 questions to assess how and when to take specific medicines, and 2 questions to assess patient's action towards the side effect. For scoring 1 point was awarded for each correct answer and none for an incorrect or blank answer, so the maximum possible score was 12. Patients were asked to answer the questions at the beginning (baseline) and at final follow-up (after 3 months).

Outcome variables of this study were patient's knowledge, blood glucose and cholesterol levels. Data were analysed by using simple descriptive statistics (frequency in numbers and percentages).

Results

A total of 70 type 2 diabetic patients were enrolled into the study and randomized into support group 1 and support group 2. Patient characteristics are presented in Table 1. Fourteen patients were male and 56 female. The median age was 50 years and the range was 25 to 89 years. There were 21% of patients who had either random or fasting blood glucose levels more than 140 mg/dL.

The diabetes knowledge and awareness levels were assessed by using a short questionnaire at the beginning and the end of study period despite of interventions applied (Table 2). None of the patients were able to answer all questions correctly. Patient's scores ranged between 0 and 11, out of a maximum score of 12 (mean baseline score=4.6±2.2, mean final score=8.2±1.7). Interestingly, number of

Table 1 Patient characteristics

Parameters	Support group 1 (n = 35) Number (%)	Support group 2 (n = 35) Number (%)
Gender		
Male	6 (17.1)	8 (22.9)
Female	19 (54.2)	17 (48.6)
Age (years)		
<39	0 (0.00)	3 (8.60)
40–49	4 (11.4)	3 (8.60)
50–59	16 (45.7)	21 (60.0)
60–69	13 (37.1)	3 (8.60)
>70	2 (5.70)	5 (14.3)
Blood pressure (mmHg)		
Systolic		
≤120	9 (25.7)	13 (37.1)
>120	22 (62.9)	15 (42.9)
Diastolic		
≤80	19 (54.2)	16 (45.7)
>80	12 (34.3)	12 (34.3)
Fasting plasma glucose (mg/dL)		
≤126	0 (0)	2 (5.70)
>126	0 (0)	2 (5.70)
Random plasma glucose (mg/dL)		
≤140	25 (71.4)	22 (62.9)
>140	10 (28.6)	9 (25.7)
Total cholesterol (mg/dL)		
≤ 200	21 (60.0)	17 (48.6)
> 200	6 (17.1)	9 (25.7)
Diabetes treatment		
Oral diabetes medications + diet	27 (77.1)	30 (85.7)
Insulin + diet	3 (8.6)	2 (5.70)
Insulin + oral diabetes medications + diet	5 (14.3)	3 (8.60)

patients with correct answers in both groups increased by 61.5% at final follow up. On analyzing the response, more patients in the support group 2 answered correctly at the final (after 3 months) compared to the baseline. Another crucial finding was that less than half patients (40%) exhibited a basic understanding of their disease and therapy. Around 30%

patients knew the treatment and its importance to control blood glucose prior to initiation of diabetes support group.

Impact of support group activities on blood glucose and total cholesterol levels was described in Table 3. Decreased level of fasting blood glucose could only be assessed in the support group 2 in which data were available.

Table 2 Comparison of patient knowledge scores at baseline and after 3 months

Questions (in Bahasa Indonesia)	Number of patients giving correct answer (%)	
	Baseline	Final
1. Penyakit Diabetes Melitus merupakan penyakit yang berkaitan dengan gangguan	11 (1.40)	36 (51.4)
2. Gejala penyakit Diabetes Melitus adalah	60 (85.7)	66 (94.3)
3. Tujuan pengobatan Diabetes Melitus adalah	24 (34.3)	42 (60.0)
4. Target capaian gula darah sesaat pada pengobatan Diabetes Melitus adalah kurang dari	22 (31.4)	43 (61.4)
5. Target HbA1c pada pengobatan Diabetes Melitus yaitu	28 (40.0)	32 (45.7)
6. Komplikasi jangka panjang Diabetes Melitus antara lain	28 (40.0)	44 (62.9)
7. Aktivitas yang dianjurkan untuk mencegah Diabetes Melitus adalah	18 (25.7)	42 (60.0)
8. Glibenclamide, salah satu obat Diabetes Melitus, hendaknya tidak digunakan pada	47 (67.1)	47 (67.1)
9. Obat Diabetes Melitus Acarbose sebaiknya digunakan	10 (14.3)	35 (50.0)
10. Cara menghindari efek samping obat Metformin dengan menggunakan	26 (37.1)	46 (65.7)
11. Salah satu efek samping obat Diabetes Melitus adalah hipoglikemia (kadar gula darah di bawah normal) yang ditandai dengan gejala	26 (37.1)	46 (65.7)
12. Cara cepat mengatasi hipoglikemia bila posisi di rumah adalah	34 (48.6)	44 (62.9)
Mean ± SD	27.0 ± 15.4	43.6 ± 8.5

Table 3 Impact of diabetes support groups on plasma glucose levels and total cholesterol

Parameters		Support group 1 Mean ± SD	Support group 2 Mean ± SD
Fasting plasma glucose	Baseline	0	127 ± 57.1
	Final	0	123 ± 2.08
	% decrease	0	3.3
	% achieving target (≤ 110 mg/dL)	0	0
Random plasma glucose	Baseline	166 ± 81.4	206 ± 133
	Final	143 ± 69.9	142 ± 89.6
	% decrease	13.9	31.1
	% achieving target (≤ 110 mg/dL)	37.1	60.0

Table 3 Impact of diabetes support groups on plasma glucose levels and total cholesterol

Parameters		Support group 1 Mean \pm SD	Support group 2 Mean \pm SD
Total cholesterol	Baseline	0 188 \pm 20.8	192 \pm 43.3
	Final	156 \pm 28.8	158 \pm 34.9
	% decrease	17.0	17.7
	% achieving target	60.0	48.6
	(\leq 110 mg/dL)		

The percentage reduction of random blood glucose level in the group 2 was higher (31.1%) than the other group (13.9%). Moreover, 60% patients in the group 2 had the glucose levels within the range of target levels. The percentage decrease of total cholesterol did not differ much; however, 60% patients in the group 1 achieved the target as compared to the group 2 (48.6%).

Discussion

The study demonstrates that a majority of patients have lack of understanding to the disease and therapy which might correlate to their high blood glucose levels prior to initiation of diabetes support groups. These diabetic patients may develop complications due to low level of awareness of diabetes and inadequate blood glucose control. Therefore, patient education constitutes a cornerstone in the management of diabetes. Previous research has shown that patient education adds value to the diabetes management and that specific interventions aimed at improving patient's knowledge can improve diabetes control.⁵ Education on self-management is essential to provide the diabetic patients with the knowledge and skills which are needed to perform self-care, manage therapy, and make lifestyle changes.^{6,7}

Diabetes support groups applied two interventions, pharmacist counselling and conducting group awareness programs to improve patient's knowledge and self-care management.⁶

The groups consisted of pharmacists, nurses, diabetic patient's and their family member which provided social, educational and emotional supports to the patients. There was an exchange of information on diabetes, its complications and therapy at each meeting among patients and other group members. Provision of relevant information provided to the diabetic patients and families of patients have been reported to have a relationship with increased treatment adherence.^{8,9} Of importance, social, financial and emotional supports from the family member and the community were very influential on the success of therapy.³ Improved knowledge and blood glucose control might occur immediately following the educational intervention; however, continued contact with the health care professionals (pharmacists and nurses) and other support group members could prolong this beneficial influence. Therefore, the study was conducted over a period of 3 months to observe any different response to blood glucose control from the educational interventions, information leaflets only and a combination of patient counselling and information leaflets. Evaluation intervals of 3 to 6 months are appropriate in most practice settings, recognizing that behaviour change needs to be practiced for at least 2 weeks before reevaluation.⁴ The first month interval evaluation over a 3 months period was chosen in this study to capture immediate and intermediate outcomes, including knowledge, behaviour change and clinical improvement.

The questionnaire used in this study was developed to assess the knowledge of the patients about diabetes and its management and to assess the change after continued contact with the diabetes support groups. Thus, the study did not evaluate the effect of specific intervention applied in each support group on diabetes awareness level. The overall scores of patients in both support groups increased at final follow-up despite of its specific interventions; however, more patients receiving pharmacist counselling at each meeting answered questions correctly at the final follow-up compared to the baseline. This finding might be a reflection of continued exposure to pharmacist who had educated patients about their disease, medications, and desirable lifestyle changes. Pharmacists motivated patients to manage their dietary and lifestyle habits which might contribute to a better glycaemic control. Previous studies have reported the positive effect of counselling by pharmacists on glycaemic control and quality of life in the diabetic population.¹⁰ Moreover, counselling and monitoring activities delivered by the support group helped to improve glycaemic control by more than 30% and to achieve target of therapy compared to information leaflets only.

The overall findings suggest that diabetes support groups may help to improve patient's awareness of disease, compliance to medications, diet and lifestyle changes and thereby on glycaemic control. Furthermore, any behaviour change may also demonstrate the effectiveness of the support group program at participant level. However, there were potential confounders of this study, including age, gender, co-morbidities, medications, and lifestyle. These factors may bias the findings. Although it was difficult to strictly control the confounders, pharmacists always recorded and monitor patient's data at each meeting, for instance pharmacists always interviewed patients and their family member regarding daily lifestyle and recommended appropri-

ate changes in their dietary and lifestyle habits during counselling session. Nevertheless, confounding factors can be adjusted and controlled by using a linear regression analysis with multivariate models to examine the association of educational interventions applied by the support groups with patient's glycaemic control. Expansion to a larger-sample study can therefore be considered to assess the effect of diabetes support group on glycaemic control and other laboratory findings such as blood pressure and lipid profile.

Nonetheless, this study has several limitations. First, the support group did not limit patients to gain any information either from trusted or not trusted sources, thus allowing more confounders to bias the final positive results. For this reason, the support groups offered a meeting once a month where patients could exchange information and share experience in dealing with diabetes and its medications to the other group members. Moreover, during counselling session pharmacists could provide unbiased information on diabetes and direction to choose which sources are reliable, so these might impact on heightened awareness of diabetes, increased compliance to diabetes therapy and behaviour change. Second, number of male and female was not equal between the two groups and patients were from one local area, so the findings may not be generalizable to other patient populations. Third, this study did not assess patients' HbA1c (glycated haemoglobin) level although HbA1c measurement is the internationally accepted test as a longitudinal reflection of glycaemic control and can be assessed every 3 to 6 months. Fasting and random blood glucose levels were used instead because these parameters are still recommended as the tool for monitoring glycaemic control in the regional practice settings.

An encouraging part of this study is that many patients were willing to attend all monitoring and counselling sessions over a three-

month period. This reflects the increased awareness of diabetic patients to their disease and therapy and also the lack of such programs in Surabaya. Establishing a trusting and professional relationship among pharmacists, nurses and patients as well as involving general practitioners, specialists, community health centres, and specific patient population (paediatric, pregnant women, and geriatric) should be done in a further study to motivate more patients to participate in such education programmes. Furthermore, this study did not evaluate the effect of medication-specific education on glycaemic control. Therefore, in a future study it would be reasonable to assess the effect of specific diabetes medication education on glucose control.

Conclusions

Lack of patient's understanding to their disease and therapy might correlate to low level of compliance and high blood glucose levels. Diabetes support groups will therefore be beneficial to expand pharmacist's and nurse's role in the diabetes management program. These groups may further help in improving patient's compliance to diabetes therapy and control blood glucose levels.

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