Quality improvement of diabetes care using flow sheets in family health practice

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ABSTRACT

الأهداف: أظهرت بعض الدراسات الحديثة أن أطباء الرعاية الصحية الأولية قد لا يتجاوبون بشكل جيد مع تطبيق المعايير المعتمدة لرعاية مرضى السكري، وتعتبر استمارة المتابعة إحدى التدخلات التي يمكن أن تساعد أطباء الأسرة على تحسين جودة الرعاية الصحية المقدمة لمرضى السكري.

الطريقة: تم تطبيق هذه الدراسة في عيادات طب الأسرة (عددها ٧) التابعة لمستشفيات القوات المسلحة بمنطقة الطائف بالمملكة العربية السعودية، خلال الفترة من مارس ٢٠٠٦م وحتى يونية ٢٠٠٧م، حيث تم تصميم استمارة متابعة لمريض السكر ي من صفحة واحدة بناءا على المعايير الإكلينيكية الكندية (١٩٩٨م) لعلاج النوع الثاني من مرض السكري وقد تم اختيار عدد٥٠٠ ملف لمرضى السكري بطريقة عشوائية من بين المترددين على عيادات طب الأسرة، تم تدقيقها قبل وبعد استخدام استمارة المتابعة.

النتائج: وجد تحسن ملحوظ في تسجيل جميع مؤشرات جودة رعاية مرضى السكري، إلا أن التحسن كان ذا دلالة إحصائية في مؤشرات كتلة الجسم وقياس نسبة الدهون بالدم و $HbA1_c$ وفحص الأعصاب الطرفية وفحص القدم.

خاتمة: توصي الدراسة باستخدام استمارة المتابعة ليس فقط في تحسين جودة الرعاية الصحية لمرضى السكري وإنما أيضا للحالات المزمنة الأخرى.

Objectives: To show that the use of a flow sheet would improve performance of family physicians in diabetes care.

Methods: This is a one-year intervention study conducted in 7 family practice clinics in Taif Armed Forces Hospitals, Taif, Saudi Arabia from March 2006 to June 2007. Diabetic flow sheet was developed based on the clinical practice guidelines of Canada for the management of type 2 diabetes. Patients' records were selected by systematic random sampling technique.

Results: Four hundred and fourteen medical records of patients with type 2 diabetes were included in the study. Compliance with the quality indicators was audited using 9 quality improvement indicators. Significant improvement was detected in the indicators of body mass index, glycosylated hemoglobin, microalbuminuria, lipid profile, retinoscopy, foot examination, and peripheral neuropathy examination.

Conclusion: Flow sheet can be effective in improving quality of care not only for diabetes but also for other chronic conditions.

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Diabetes is a devastating chronic disease that affects more than 180 million people worldwide and the number is likely to more than double by 2030.[1] In Saudi Arabia, although the tremendous surge in socio-economic growth has considerably influenced the lifestyle of the people especially in the past 2-3 decades, epidemiological studies on the prevalence of diabetes mellitus are variant and relatively few.[2] However, there is a trend of increase in the prevalence compared to previous years. Studies by Warsey and El-Hazmi,[3] Al-Khader[2] and Al-Nozha et al[4] estimated the prevalence of diabetes among Saudi people as 9.7%, 13% and 23.7%. Although the actual cost of diabetes care in Saudi Arabia remains unknown, the cost of caring for patients with diabetes is 2-4 times the amount spent for non-diabetics.[5] The major component of direct costs (estimated to be >80%) was found to be the cost of hospitalization, mainly resulting from chronic preventable complications.[4] These high costs show that

early interventions are cost-effective and emphasize the importance of appropriate management of diabetes.[6-8] Standards of care and clinical practice guidelines have been published by professional organizations such as the Canadian Diabetes Association (CDA),[9] the American Diabetes Association (ADA)[10] and the World Health Organization (WHO).[11] These standards generally call for primary care practitioners to provide a number of preventive care services and to ensure that the guidelines are incorporated into daily practice.[12] Unfortunately recent studies have shown that primary care physicians comply poorly with some diabetic care recommendations.[13] There are shortcomings and variations in adherence to diabetes care in office-based primary care practice.[14-16] Interventions designed to improve the delivery of preventive diabetic care have been directed to physicians, health care delivery system, and patients.[17] A flow sheet is a simple intervention tool. Its primary goal is to help physicians to improve documentation and provision of diabetes care.[18] The diabetic flow sheet provides a central location in the patient's chart for recording and tracking the performance of diabetic preventive care services.[12] This study was carried out in the context of a quality improvement project of the Armed Forces Hospitals, Taif region (Western Saudi Arabia). The aim was to show that using flow sheet containing 9 practice guidelines for the management of patients with type-2 diabetes would improve performance of family physicians' care for patients with diabetes.

Methods. This is a one-year intervention study from March 2006 to June 2007. It was conducted in 7 family practice clinics in Taif Armed Forces Hospitals. The clinics serve the military personnel and their families free of charge including laboratory investigations and specialty consultations. The family practice clinics work in 2 shifts from 8:00 am - 12:00 pm and from 1:00 pm - 5:00 pm 5 days a week. There are on average 100 patients seen per shift, accumulates over 48,000 office visits a year. There are 7 full-time family physicians and the Department of Family Medicine (DFM) was accredited by the Saudi Council of Medical Specialties (SCMS) to train 8 residents for the 4 postgraduate years. Both residents and family physicians participated in the study. Approval of the Research Ethics Committee (REC) of Al-Hada Armed Forces Hospitals was obtained to conduct the study. Five hundred type-2 diabetic patient records were selected by systematic random sampling technique (every third file). Of these files, 86 were excluded as the patient did not complete 4 visits in the previous year or may lose to follow-up (such as patients who had sensory or cognitive impairment sufficient to interfere with completion of the study).

Baseline data. Medical records of each patient were reviewed (2005-2006) to ensure the provision and documentation of adequate care and to determine if the patient received interventions recommended in the clinical practice guidelines of Canada for the management of type-2 diabetes.[9] These interventions included either: one quarterly performed procedures or tests such as body mass index, blood pressure, glycosylated hemoglobin, fasting and post-prandial blood glucose levels or 2 annually performed procedures or tests such as retinoscopy, referral to ophthalmologist, foot examination, microalbuminuria, serum creatinine, creatinine clearance, lipid profile, and peripheral neuropathy examination. Additional guideline indicators were assessed if the record contained evidence of regular home blood glucose monitoring, patient education for diabetes, and referral to dietician. All medical staffs (namely family physicians and nurses) were completely blinded to the records.

Flow sheet intervention. Following collection and analysis of the baseline data, the investigators developed and implemented a flow sheet to be used in the medical records of all diabetic patients beginning May 2006. Prior to the study's inception, all family physicians and nurses were instructed in the purpose and use of flow sheets. Randomly, the investigators reviewed selected sample of the medical records quarterly. The investigators reminded the physicians to fill out the flow sheets.

Post-intervention data. After May 2007, the same patients' records that have been previously identified in the baseline analysis were reviewed. Compliance using 9 quality improvement indicators (blood pressure, glycosylated hemoglobin, fasting blood glucose level, microalbuminuria, lipid profile, retinoscopy, foot examination, and peripheral neuropathy examination) was audited. Additional 43 records were excluded, as the number of visits was <4. Post-intervention data had 371 patient records.

Statistical analysis. Baseline and post-intervention data was compared using SPSS statistical package version 13. Two-tailed Pearson chi-square tests were used. Level of significance was set as ≤0.05.

Results. Four hundred and fourteen medical records of patients with type-2 diabetes were included in the baseline analysis. The mean age was 55 years old with a standard deviation of ±5.8, 46% were male, and the mean duration of diabetes was 5 years. There was a significant improvement in compliance with 7/9 quality indicators after flow sheet use for body mass index, lipid profile, glycosylated hemoglobin, examination for peripheral neuropathy and foot, retinoscopy and microalbumin testing (differences were 40%, 36.1%,

Table 1 - Comparison between baseline and post-intervention data.

Frequency	Procedure/test	Baseline (May 2005-2006) (n= 414)	Post-intervention (May 2006-2007) (n= 371)	*P*-value
Quarterly (%)	1. Body mass index	20	60	0.001
	2. Blood pressure	100	100	-
	3. Glycosylated hemoglobin	52	81.5	0.001
	4. fasting blood glucose	80	87.5	0.12
Annually (%)	5. Retinoscopy	35	52.8	0.01
	6. Foot examination	41	64.3	0.01
	7. Microalbuminuria	45	58.6	0.05
	8. Lipid profile	43	79.1	0.001
	9. Peripheral neuropathy examination	38	62.5	0.001

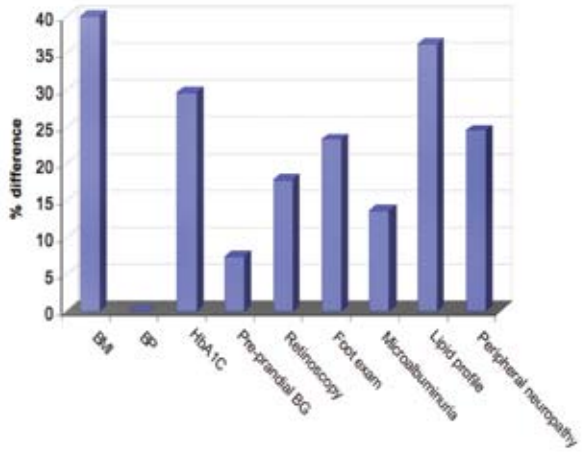

Figure 1 - Percentage differences before and after application of diabetic flow sheet. BMI - body mass index BP - blood pressure HbA1c - glycosylated hemoglobin

29.5%, 24.5%, 23.3%, 17.8%, 13.6%) (**Table 1**) (**Figure 1**). There was no significant improvement in fasting blood glucose level and blood pressure (p>0.05). After flow sheet use, the patient education for diabetes given by the physicians has increased from 50-90% (p=0.001) and the referral rate of diabetic patients to dietician was from 30-55% (p=0.001).

Discussion. The use of flow sheet was associated with an increase in the documentation of quality indicators. Flow sheets serve as both documentation and reminder system.[18] In the current study, there was an improvement in all the studied indicators, even those that could easily be assessed regardless of chart documentation (for example HbA1C results are available from the laboratory). However, significant improvement has been reported in 7 out of 9 indicators. This suggests that the higher rate of performance recorded in the charts was related to the improved quality of care not only on the documentation of care. The preventive care for diabetic patients in this study was not perfect but consistent with other studies.[12-15,19,20] Except for better documentation in cholesterol and triglycerides levels stated by Akel and Hamadeh,[19] our results of the other indicators were better than those of similar studies.[12-15,19,20] Indicators that showed poor compliance in the previous studies (retinoscopy 44%[13] and 48%;[12] foot examination 41%;[20] microalbuminuria 21-37%;[14] and HbA1c 44%[15]) improved to >50% after implementation of the flow sheet in the current study. On the other hand, quality indicators with good compliance in the previous studies (blood pressure 85.8%,[19] HbA1c 79%,[20] 78%;[12] and lipid profile 55%[13]) improved in this study. The improved adherence to guidelines in our study may be due to continuous education and regular audits. Modifying behavior is as important as utilization of flow sheets.[12] The physicians did not adhere equally to different elements of diabetes care recommended by different guidelines.[21] They performed some physical examinations and laboratory tests more regularly than others. For example, in the current study, documentation of blood pressure and blood glucose level was the highest as compared to other parameters even after implementation of the flow sheet. However, marked improvement has been detected in the parameters of BMI, lipid profile and HbA1c. This emphasizes the importance of flow sheets for consistent documentation of quality of care parameters. Perhaps the most difficult aspect of any flow-sheet system is getting people to use it consistently.[18,19] Some researchers[21] thought that it may help to get someone other than the doctor to fill out the flow sheets. But delegating this duty to other health care personnel may not be the solution. Instead, flow sheets seem to work best when shared by physician, nurse and laboratory personnel.[19] While flow sheets can be easy and effective tools[18] even in their simplest form (paper), they become infinitely more valuable when they are computerized. Computerized programs offer automatic reminders when patients need certain services and provide an easy way to track patient data

over time.[12,21] This study showed that practices could identify methods to improve care and develop a means to implement these methods. Based on the current data, using flow sheets result in significant improvement in the physicians' adherence and quality of care for patients with type-2 diabetes attending family health practices, especially in a busy practice, where physician may have difficulty in following numerous and detailed standards of care set by major authorities.[9-11] The improvement in compliance with practice guidelines suggests that tools such as flow sheets can be effective in improving quality of care not only for diabetic patients but also for other chronic conditions.

Limitations of the study. As our study was conducted in family practice clinics in the Military Services it may not be generalized. Our results do not permit us to ascribe improvement in physician performance to the flow sheets. Rather it is possible that they increased physician's awareness of issues related to diabetes management due to educational activities prior to implementation of flow sheets. On the other hand, it is possible that increased awareness may have led physicians to improve both the delivery and the documentation of recommended services. This study may also be limited by being a retrospective chart review.

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