Audit of Diabetes in Perak Outpatient Departments

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Summary

Adequacy of diabetic management in 5 Perak outpatient departments was studied in April 1996. Two hundred diabetic patients' records were analysed. All doctors and 100 patients answered questionnaires on diabetes. Fifty five percent of doctors had adequate knowledge. Patients' knowledge varied between centres (13% to 80% adequacy). Most records had insufficient data to determine adequacy of early detection. Centres with screeners had adequate weight and blood pressure measurement. Overall control and monitoring of diabetes were inadequate. Referral of complications were delayed in 2 centres. Refresher courses for doctors, patient health education, protocols, screeners and physician visits are recommended.

Key Words: Adequacy, Management, Control, Diabetes Mellitus, Outpatient departments

Introduction

Diabetes mellitus (DM) is a common disease in Malaysia with an estimated prevalence between 6.3%[1] to 14.6%[2]. The National Cardiovascular Risk Factor Prevalence Study, 1995 showed a prevalence of 7.7%[3] whilst the Asian - Pacific Non Insulin Dependent Diabetes Mellitus (NIDDM) Policy Group (October 1995) reported a 10% prevalence[4]. A survey of attendances in an outpatient department (OPD) which is a walk-in primary care clinic in a Malaysian general hospital showed 6.7% were diabetics[5]. Majority of diabetics managed in OPD are NIDDM.

With no known cure, emphasis is on morbidity reduction and prevention of complications. Uncontrolled diabetes is a major problem in day to day clinical practice leading to complications and increased incidence of admission, morbidity and mortality. Uncontrolled diabetes can be due to patient non-compliance from inadequate knowledge and health education. Another contributing factor is lack of competency among doctors in early diagnosis, treatment and identifying complications early for specialist referral. It is therefore imperative that practitioners looking after diabetics are knowledgeable and apply correct management principles. Common goals and standards of good diabetic care have been formulated in the Malaysian Consensus Report February 1992[6] and both the European[7] and Asian - Pacific NIDDM Policy Groups Consensus Reports.

In 1990 an audit was done in the outpatient departments (OPDs) and medical specialist clinics of 5 Malaysian hospitals[8]. The results showed very poor control and monitoring of diabetes mellitus especially in OPDs. An audit of diabetes in general practice in United Kingdom also showed defined standards were not met for several criteria including diabetic control (17% versus 90% standard)[9].

This study aimed to assess adequacy of diabetic management in OPDs in Perak and identify contributing factors and remedial measures.

Materials And Methods

Five OPDs in Perak were selected by level of physician coverage:- centre 1 (OPD in a general hospital), II (OPD in a large district hospital with resident specialists), III (OPD in a small district hospital with a visiting physician), IV (OPD in a small district hospital with no visiting physician & far from a referral centre) and V (a health centre run by one medical officer with no visiting physician). The diabetic clinic set-up in the 5 centres (including workload, screeners, health education program and special problems encountered) at time of audit are listed in Appendix I. In April 1996, 200 diabetic patients' records from the 5 centres (60 consecutive diabetic patients each in centres I & II, 30 each in III & IV, 20 from V) were analysed for adequacy of diabetic management (see footnote[1]). Diabetic patients on follow-up less than 1 year in OPD were excluded. The medical officers in charge of centres I, II & V and the hospital directors in centres 111 & IV were responsible for conducting the study and data collection using the format in Appendix II.

All doctors in the 5 centres answered a questionnaire prepared by a physician to test knowledge of diabetes mellitus. One hundred patients selected by random sampling (30 from each centres I & II, 15 each from III & IV and 10 from V) were assessed by a standard questionnaire taken from the Ministry of Health guidelines on diabetic health education[10]. The questionnaires were pretested on 6 medical officers (with only basic medical degree) from 5 public polyclinics in Ipoh and 6 medical officers (with MRCP Part I) from the medical department Ipoh General Hospital and on 5 diabetic patients in centre I. Original passing mark was fixed at 70% for both questionnaires. After pretesting, minor adjustments to the doctors' and patients' questionnaires were made. The passing mark for doctors was lowered to 50% when all doctors from the polyclinics failed but doctors from the medical department scored more than 82%. All completed formats and questionnaires were sent to centre I where compilation and analysis were done by a group consisting of the medical officer in charge of centre 1, a physician, a doctor and 2 nurses from centre I.

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1. Adequate diabetic management[4,6,7,8] includes the following:
   a) prompt (early) detection of diabetes mellitus within 2 weeks of patient presentation to OPD with symptoms as follows: polyuria, polydipsia, weight loss, non healing ulcers, skin infections, moniliasis.
   b) good or acceptable diabetic control as defined by: good control (last 2 years 70% or more of fasting blood sugar (FBS) < 6 mmol/l & 70% or more of postprandial blood sugar (PPBS) / random blood sugar (RBS) < 8 mmol/l; acceptable control (last 2 years 70% or more of FBS between 6 mmol/l to < 8 mmol/l & 70% or more of PPBS / RBS between 8 mmol/l to < 10 mmol/l)
   c) adequate monitoring / assessment according to the following protocol:
      i) every visit check blood pressure, body mass index (height record once, weight every visit), blood sugar, examine feet
      ii) every year check urine albumin, serum creatinine or blood urea, do fundoscopy, ECG
      iii) refer complications within 3 months of detection. Complications include: urine albumin trace after urinary tract infection excluded, 2 serum creatinine above normal, suspected angina or ischaemic heart disease (to physician clinic); exudates / haemorrhages, fundoscopy after 10 years of diabetes (to eye clinic); intermittent claudication, non healing or deteriorating ulcers (to orthopaedic / surgical clinic)
      iv) patient follow-up within 1 month after appointment date
2. Late detection of DM is defined as detection after 2 weeks of presentation to OPD with symptoms as in l(a).
3. Poor diabetic control is defined as more than 30% of FBS = or > 8 mmol/l & more than 30% of PPBS / RBS = or > 10 mmol/l in last 2 years. Patients monitored solely by urine sugar with no blood sugar done were automatically classified as poor diabetic control in this study
4. Overall assessment / monitoring considered adequate if fulfils 70% of criteria listed in format in Appendix II which must include adequate blood sugar monitoring, adequate feet and fundosopy examination and either adequate urine albumin or adequate blood urea / serum creatinine monitoring

Findings

Table I shows the adequacy of diabetic management in the 5 centres. Majority of patient records had insufficient data to determine the adequacy of early detection. This was largely due to poor documentation in the "diabetic books" which replaced the old OPD cards. Some patients were asymptomatic but found to be diabetic on blood tests. Patients referred for follow-up of diabetes in OPD did not have sufficient information in their referral letters to assess adequacy of early detection. Centres II and IV had a small percentage of late detection. These were patients with recurrent skin infection (boils) in whom DM was not suspected until after a few visits.

Overall control of DM was poor (see Table I). Twenty out of the sixty patients in centre I had acceptable FBS (< 8 mmol/l) but elevated PPBS (= or > 10

Table I
Adequacy of diabetic management (early detection, control, assessment / monitoring)

Criteria	Centre				
	I	II	III	IV	V
Early detection of DM					
% early detection	12	20	17	7	5
% late detection	0	5	0	3	0
% unknown	88	75	83	90	95
Control of DM					
% good control	7	8	0	0	5
% acceptable control	3	5	0	0	5
% poor control	90	87	100	100	90
% Adequacy in Assessment/Monitoring of:					
Height	100	0	0	0	100
Weight	100	0	100	100	0
Blood Pressure	100	23	100	100	80
Blood Sugar	82	0	0	3	30
Examination of feet	2	0	0	0	0
Fundoscopy	17	7	3	0	0
ECG	42	8	10	27	5
Blood Urea/Creatinine	60	22	83	17	30
Urine Albumin	47	93	50	7	0
Referral within 3 months of complications	86	86	100	13	17
Adequate follow up within 1 month	98	98	97	93	90
% overall adequacy assessment/monitoring	0	0	0	0	0

Table II
Adequacy of knowledge of doctos and diabetic patients based on questionnaires

Score	Centre									
	I		II		III		IV		V	
	n	%	n	%	n	%	n	%	n	%
Doctors = & > 50%	9	75	2	25	4	67	1	25	1	100
<50%	3	25	6	75	2	33	3	75	0	0
Total	12	100	8	100	6	100	6	100	1	100
Patients = & > 70%	24	80	17	57	8	53	2	13	7	70
< 70%	6	20	13	43	7	47	13	87	3	30
Total	30	100	30	100	15	100	15	100	10	100

mmol/l). Doctors did not increase oral hypoglycaemic treatment for fear of fasting hypoglycaemia. Similarly for elderly patients with mildly elevated blood sugars (between 10 to 12 mmol/l), doctors were reluctant to increase medication for fear of hypoglycaemia. A group of patients uncontrolled on maximum dose of oral hypoglycaemics but refused to switch to insulin contributed to poor control. Patients monitored solely by urine sugar (common in centres II & IV) were automatically classified under poor diabetic control.

Monitoring of weight and blood pressure were adequate (100 %) in centres with screeners (paramedics). Centres III & IV monitored weight but height was not taken because it was not in the screeners protocol. Centre V had height taken but could not cope with weight measurements every visit because of heavy workload and staff shortage. Without screeners centre II fared badly in height, weight and blood pressure monitoring.

Blood sugar monitoring was adequate only in centre I. Centres II & IV were monitoring diabetic control with urine sugar. Blood sugar was ordered only when urine sugar was present. Centre III had blood sugar done but did not meet the required standard i.e. blood sugar must be done in 70% or more of the follow-up visits in the past 2 years. Centre V started blood sugar monitoring only in January 1996.

Feet examination and fundoscopy were very poor in all centres. Doctors either did not examine patient's feet routinely or failed to record normal findings because of heavy workload. OPD doctors admitted they did not do fundoscopy because of the short consultation time (see Appendix I). They also found the doctor's room not conducive for proper fundoscopy. All centres had poor ECG monitoring. ECG was ordered only when patient complained of chest pain. In smaller centres (III, IV, V) the staff could not cope with doing ECGs for inpatients and outpatients. Doctors in centre III monitored blood urea / serum creatinine adequately but not in other centres. Centre II had 93 % adequacy in monitoring urine albumin as diabetic patients had routine urine testing every visit.

Centre IV & V had delayed referrals of complications. Reasons cited were no specialist visit, transportation problem in centre IV as distance to the nearest specialist clinic is 154 kilometres. Centre V had patients who refused to be referred to specialist clinic because of long waiting time for appointments. They were also not keen to be seen only by medical officers in the specialist clinic after the long waiting time. Records showed majority of patients had adequate follow up within one month of appointment dates (90 % to 97%). However because of poor feet and fundoscopy examination, overall adequacy in assessment / monitoring was 0% in all centres (see Table I & Appendix II).

Overall passing rate of doctors answering the questionnaire was 55% (17 out of 31). Forty one percent were bare passes (50 - 60 marks) accounting for the low mean of 50.6 marks and a median of 52 marks only. Analysis of each question showed that doctors fared badly in questions pertaining to the diagnosis of DM, insulin dependent DM and diabetic eye disease. Centre III doctors surprisingly did better than centre II which is in one of the largest district hospitals in the country.

Table II shows the adequacy of knowledge of patients based on questionnaire. Patients in centres I & V had adequate knowledge. Compared to centre II (57% adequate), centre IV which started health education classes for diabetic patients around the same time fared poorly (13% adequate).

Table III
Comparison of findings in diabetic audit of OPD Hospital Ipoh in 1990 & 1996

	1990 n=25	1996 n=60
Early Detection of DM		
% Adequate	32	12
% Late detection	12	0
% Unknown	56	88
Control of DM		
% Adequate	0	10
% Inadequate	100	90
		(criteria stricter)
% Adequacy in Assessment/Monitoring of:		
BP	52	100
Weight	12	100
Fundus	28	17
CNS Examination	4	
Urine Albumin	20	42
Blood Sugar	0	82
Knowledge of Doctors		
% passes in questionnaires (Different doctors & questionnaires)	47	75

Discussion

In 1990, a similar audit was conducted in OPD and medical specialist clinics of 5 Malaysian general hospitals (Ipoh, Klang, Malacca, Muar and Teluk Intan)[8].

Centre 1 was the only centre assessed in both audits. Table III shows a comparison between 1990 and 1996 audit findings in centre I. Overall management of DM improved in centre I except for fundoscopy. The apparent drop in percentage of adequate detection from 32% in 1990 to 12% in 1996 was due to the high percentage of unknown in the current study. This was because "diabetic books" were introduced in full force after 1990 to replace OPD cards for diabetic patients. Data on initial presentation were not transferred to the "diabetic books". In the 1990 audit very poor diabetic control was found in all 5 OPDs (0% adequacy in all centres). In that audit good diabetic control was defined as 50% or more FBS < 8 mmol/l and 50% or more of PPBS / RBS < 10 mmol/l. The present audit showed improvement in centre I even though the criteria was stricter (see Footnote 1b). In both audits, diabetic control was assessed by blood sugar level and not by glycated haemoglobin or fructosamine as the latter tests were not available in most centres.

The importance of good control has been proven to reduce the onset and progression of diabetic retinopathy, nephropathy and neuropathy in both insulin dependent diabetes and NIDDM[11,12,13,14]. Tight metabolic control as assessed by estimation of glycated haemoglobin or albumin appears to be the main prophylactic factor in the prevention of most diabetic complications[15]. Glycated haemoglobin or fructosamine and test for microalbuminuria should be available for assessment of diabetic control in primary care centres. Studies[8,9,16,17] have shown practice patterns of primary care doctors differed significantly from published guidelines on diabetic management[4,6,7]. In one study compliance to recommended guidelines on use of glucose, HbAlc, high density lipoprotein / total cholesterol, blood pressure, proteinuria testing, ophthalmology and foot examinations were assessed . Adherence to several guidelines was less than or equal to 50% indicating that primary care physicians are not

sufficiently convinced of the necessity for these prevention guidelines[17].

In this study, contributing factors to poor diabetic control included inadequate doctors' knowledge and lack of training in diabetic management. Rapid turnover of doctors and posting of junior inexperienced doctors to OPD contributed to this problem. Individualised patient education is indicated for those who refused to switch to insulin although uncontrolled on maximum dosages of oral hypoglycaemics. Elderly patients posed a problem as doctors were less aggressive in achieving good control for fear of hypoglycaemia. Usage of acarbose (glucobay) may help in subsets of patients with normal FBS and elevated PPBS as found in centre 1. Acarbose at present can only be prescribed by specialists in government hospitals and clinics. Referral of this large group of patients will worsen the situation in the already crowded medical specialist clinic. The alternative is to allow usage of drugs such as acarbose in primary care.

Assessment and monitoring of diabetes mellitus were inadequate due to lack of standardised protocols, checklist and supervision. Heavy workload and insufficient supportive staff also contributed to this problem. Centre V gave monthly appointments for diabetics on follow-up. Longer appointments for stabilised diabetics and a second doctor will help reduce workload in this centre.

Refresher courses for all OPD doctors, protocol and checklist to improve monitoring of diabetics, screeners and specialist visits for all centres are recommended. Strengthening the present health education program with pre and post test evaluation to ascertain effectiveness of health education programme need to be done.

Some remedial measures have been implemented (protocol, checklists, refresher course for doctors). Continuing efforts to improve management are been carried out. This will be extended eventually to other primary care centres in the state. A repeat audit one year after full implementation is planned. The authors hope to see improvement in the management of diabetes mellitus in OPDs in Perak.

Acknowledgement

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APPENDIX I

Centre	Diabetic clinic days/ workload	Screeners	Health Education	Special Problems
I	Daily (Monday to Friday) combined clinic with Hypertension (HPT) 120 patients daily (60 diabetics) 2 permanent doctors Average 6 minutes per patient	Yes	Yes 2nd/4th Wednesday of each month 8-10 per group	Nil
II	Wednesday & Friday 85 patients daily 1 doctor (rotation) Average 4 minutes per patient	No	Yes Started November 1995 twice a month (3 days - 1 hour daily) 6-7 per group	1) No manpower for screeners
III	Tuesday & Thursday (combined DM / HPT) 100 patients daily 1 doctor (rotation) Average 4 minutes per patient	Yes	Irregular Individual patients by screeners	1) No space for Health·Education
IV	Wednesday combined with OPD 150 patients daily (60 diabetics) 3 doctors (rotation) Average 7 minutes per patient	Yes	Yes Started December 1995 Every Wednesday by staff nurse 10 per group (3 times monthly)	1) No specialist visits 2) Transport problem to nearest specialist clinic 3) Only 2 technicians to do all blood tests in hospital
V	Friday 160 patients daily Friday morning 100 patients for 1 doctor (including OPD cases) 1 doctor, 2 medical assistants Average 1 minute per patient	No	Yes Every Friday (15 minutes) (Started recently)	1) Workload excessive for 1 doctor/staff 2) Shortage of paramedics 3) 1 window for 2 dispensers to dispense medicine

Data Collection Format

Name of patient:
I/C No:
Number of follow up visits last 2 years:

Criteria	Standard	Adeqiate inadequate unknown
I. Early detection of diabetes within 2 weeks	100%	
2. Adequacy of control of diabetes	70%	
3 Adequacy of knowledge of doctors based on questionnaires	50%	
4. Adequacy of knowledge of patients based on questionnaires	70%	
5. Adequacy of assessment/monitoring		
a) Height - recording once	100%	
Weight - every visit	70%	
b) B/P - every visit	70%	
c) Blood sugar - every visit	70%	
d) Examine feet - every visit	70%	
e) Fundoscopy - yearly (at least once past 2 years)	100%	
f) Urine albumin - yearly (at least once past 2 years)	100%	
g) serum creatinine/blood urea (at least once past 2 years)	100%	
h) ECG (at least once past 2 years)	100%	
i) Referral within 3 months detection of complication	100%	
j) Adequate follow up within 1 month after appointment date	70%	

Overall assessment/monitoring considered adequate
if 70% of criteria from 5a to 5j achieved
(5c, 5d, 5e & 5f or 5g must be adequate)