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A survey of diabetes services in hospitals in Papua New Guinea

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SUMMARY

***Aim*: To determine the number and distribution of diabetic persons in Papua New Guinea (PNG), and to document available services. *Methods*: Survey of the 19 hospitals thought to be the most significant centres for care of diabetes. *Results*: 16 hospitals were successfully surveyed. Type 1 diabetes is very rare, with 18 known cases in the country (6 less than 15 years old). Known type 2 cases totalled around 4600 with almost all cases in coastal centres, particularly Port Moresby, East New Britain and Manus. There were very few cases in the highlands. Insulin is generally available, along with oral hypoglycaemic drugs. Testing for complications is very limited, and glycosylated haemoglobin (HbA1c) testing is available in only one centre. Only 3 trained diabetes educators are available in the country, with 1 dietitian and no specialist endocrinologists. *Conclusions*: The vast majority of persons with type 2 diabetes in PNG are undiagnosed and are not receiving treatment: based on the lower of two country prevalence estimates, less than 3% of the diabetic persons in the country are seen at health facilities. Services are limited, with only a handful of health professionals specially trained in diabetes. Expansion of services and awareness and prevention programs are urgently needed.**

Introduction

Type 2 diabetes is very common in some communities in Papua New Guinea (PNG) (1,2). Estimates suggest one of the highest country prevalences in the world (3,4). However, there is virtually no information on the number of diagnosed diabetic persons in the country nor the documentation of available services. This study aimed to determine this information.

Methods

A questionnaire was developed which asked details about the diabetes service at the hospital surveyed. We identified the 19 provincial and other hospitals thought by us to be the most significant centres looking after diabetic patients in the country. The selected hospitals included the major hospitals in all but two of the provinces. Senior staff involved with caring for diabetic patients were contacted initially by telephone. The questionnaire was then faxed (or details taken over the telephone). 3 hospitals (2 of the smaller hospitals in Papua and 1 in the Islands) could not be contacted. The 16 hospitals successfully surveyed were in all four regions of the country. Southern (Papuan) Region centres were Port Moresby, Alotau and Popondetta; Islands Region: Vunapope, Nonga (at Rabaul), Kimbe, Kavieng and Manus; Highlands Region: Goroka, Summer Institute of Linguistics (SIL) Ukarumpa, Mt Hagen and Mendi; and Momase Region: Angau (at Lae), Modilon (at Madang) and Wewak. Some replies needed further clarification, which was done by telephone.

The questionnaire surveyed the following areas:

1. Numbers of patients with type 1 and type 2 diabetes currently seen at the hospital

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2. Regular tests performed on diabetic patients: blood sugar level, blood pressure, weight, height, urinalysis for sugar, eye examination, foot assessment, glycosylated haemoglobin (HbA1c), urea, electrolytes, creatinine and electrocardiograph

3. Medications available: glibenclamide, metformin, gliclazide, tolbutamide, short-acting (regular) insulin, longer-acting (isophane etc) insulin and mixed short-long insulin ('Mixtard'); the centres were also asked for the number of patients on insulin

4. Capability for patient education, and presence of specialist members of the diabetes care team (endocrinologist, diabetes nurse educator, dietitian, social worker).

Results

Diabetes clinics

All hospitals that could be successfully surveyed see people with diabetes. Only Port Moresby, Kavieng, Manus, Alotau and Nonga have separate diabetes clinics. In the other centres patients are seen in the medical clinic. Children with type 1 diabetes in Port Moresby are seen at the paediatric endocrine clinic.

Numbers of diabetic patients

Type 1 diabetes: only 16 patients with type 1 were reported; 2 others are known to be looked after from Australia. 6 were children aged less than 15 years, with the remainder 15-20 years old.

Type 2 diabetes: around 4585 patients with diabetes are known to the 16 hospitals. Port Moresby, Rabaul and Manus had the largest number of patients (Table 1).

Regular tests performed in clinics

All 16 centres regularly measured blood pressure and weight on patients. 14 centres could regularly check blood sugar level and 15 could regularly perform urinalysis. 15 perform eye checks, although in 2 the testing was limited or irregular. 14 centres regularly checked feet. 3 centres could not perform electrolytes, urea or creatinine determination, and 6 could not perform lipid assays. 9 hospitals regularly performed electrocardiographs on patients. Only 1 centre could perform HbA1c measurement. See Table 2 for full details.

Medications available

Glibenclamide was available in 14 of the 16 hospitals, metformin in 12 and gliclazide in 8. Insulin was generally available and used in all but 2 centres. Of the 14 centres using insulin, 2 (SIL Ukarumpa and Mendi) did not have short-acting and 2 (SIL Ukarumpa and Mt Hagen) did not have long-acting insulin. Mixtard was available in these 3, and in 10 other centres (Table 3).

Education capacity

Patient education is carried out in 12 centres, generally performed by doctors and nurses. However, there are currently no specialist endocrinologists in Papua New Guinea (and none in training). Trained diabetes nurses are available only in Port Moresby. In 2 other centres, nurses had attended diabetes workshops. The only formally trained dietitian is in Port Moresby, and sees only inpatients. Social workers are available in only 4 centres. 6 centres expressed a desire to establish a branch of the Diabetic Association of Papua New Guinea (which currently meets only in Port Moresby) (Table 4).

Discussion

Type 1 diabetes is very uncommon in Papua New Guinea (5). The finding of far lower numbers of patients with type 2 diabetes in the highlands is likely to be due to genetic influences (6). Particularly large clinics in Port Moresby and Rabaul are consistent with previous studies showing a predisposition in the Koki Wanigelan community of Port Moresby (2) and the Tolais of East New Britain (1,6).

Estimates of the number of persons with type 2 diabetes in Papua New Guinea are very high. King et al. (3) in 1998 estimated a prevalence in adults ≥20 years in the year 2000 of 7.4%, amounting to approximately

TABLE 1

PAPUA NEW GUINEAN DIABETES CLINIC STATUS AND NUMBER OF PATIENTS SEEN

Hospital	Province	Region	Clinic where patients seen	Average number of of patients seen at each clinic	Number of type 1 diabetes seen	Number of type 2 diabetes seen	Total
Port Moresby	National Capital District	Southern (Papua)	Diabetes clinic at hospital, and Koki community clinic	35-40	2	~2000	~2002
Alotau	Milne Bay	Southern (Papua)	Diabetes clinic	10	0	20	20
Popondetta	Oro	Southern (Papua)	Medical clinic	2	0	3-4	3-4
Vunapope	East New Britain	Islands	Medical clinic	2	1	35	36
Nonga (Rabaul)	East New Britain	Islands	Diabetes clinic	10-15	10	~2000	~2010
Kimbe	West New Britain	Islands	Medical clinic	Not answered	0	25-30	25-30
Kavieng	New Ireland	Islands	Diabetes clinic	5-8	0	95	95
Manus	Manus	Islands	Diabetes clinic	10	0	300	~300
Goroka	Eastern Highlands	Highlands	Medical clinic	Not answered	0	?4	4
SIL Ukarumpa	Eastern Highlands	Highlands	Medical clinic	Not answered	3	3	6
Mt Hagen	Western Highlands	Highlands	Medical clinic	0	0	3-4	3-4
Mendi	Southern Highlands	Highlands	Medical clinic	2	0	6	6
Angau (Lae)	Morobe	Momase	Medical clinic	4	0	20	20
Modilon (Madang)	Madang	Momase	Medical clinic	0	0	30	30
Wewak	East Sepik	Momase	Medical clinic	3-4	0	30-40	30-40
Vanimo	West Sepik	Momase	Medical clinic	0	0	4	4
				Total	16	~4585	~4600

TABLE 2

REGULAR TESTS PERFORMED AT PAPUA NEW GUINEAN HOSPITAL CLINICS THAT SEE DIABETIC PATIENTS

Hospital	Blood sugar level	Blood Pressure	Weight	Height	Urinalysis	Eye examination	Foot assessment	HbA1c	UEC, lipids	ECG
Port Moresby	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Alotau	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes, no lipids	Yes
Popondetta	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes
Vunapope	Yes	Yes	Yes	Yes	Yes	Not regularly	Yes	No	Yes, no lipids	No
Nonga (Rabaul)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Kimbe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Kavieng	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes, no lipids	No
Manus	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Goroka	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes
SIL Ukarumpa	Yes	Yes	Yes	Yes	Yes	Limited, refer	Yes	Rarely	Yes	No
Mt Hagen	Yes	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes
Mendi	No	Yes	Yes	Yes	No	No	Yes	No	No	No
Angau (Lae)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Modilon (Madang)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Wewak	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes
Vanimo	No	Yes	Yes	No	Yes	Yes	No	No	No	No

HbA1c = glycosylated haemoglobin
UEC = urea, electrolytes and creatinine
ECG = electrocardiography

TABLE 3

MEDICATIONS USED AND AVAILABLE AT PAPUA NEW GUINEAN HOSPITAL CLINICS THAT SEE DIABETIC PATIENTS

Hospital	Glibenclamide	Metformin	Gliclazide	Tolbutamide	Number of patients on insulin	Short-acting insulin (regular)	Longer-acting insulin (isophane)	Mixtard
Port Moresby	Yes	Yes	Yes	No	667 approx	Yes	Yes	Yes
Alotau	Yes	Yes	No	No	1	Yes	Yes	Yes
Popondetta	Yes	No	No	No	1	Yes	Yes	Yes
Vunapope	Yes	Yes	No	No	5	Yes	Yes	Yes
Nonga (Rabaul)	Yes	Yes	Yes	Yes	300	Yes	Yes	Yes
Kimbe	Yes	Yes	Yes	Yes	10	Yes	Yes	Yes
Kavieng	Yes	Yes	Yes	Yes	3	Yes	Yes	No
Manus	Yes	No	No	No	0	No	No	No
Goroka	Yes	Yes	Yes	Yes	1	Yes	Yes	Yes
SIL Ukarumpa	No	Yes	Yes	Yes	3	No	No	Yes
Mt Hagen	Yes	Yes	No	Yes	2	Yes	No	Yes
Mendi	No	No	No	No	3-4	No	Yes	Yes
Angau (Lae)	Yes	Yes	Yes	Yes	5	Yes	Yes	Yes
Modilon (Madang)	Yes	Yes	No	No	1	Yes	Yes	Yes
Wewak	Yes	Yes	Yes	No	4-5	Yes	Yes	Yes
Vanimo	Yes	No	No	No	0	No	No	No

TABLE 4

DIABETES EDUCATION AND ANCILLARY STAFF SERVICES IN PAPUA NEW GUINEAN HOSPITALS

Hospital	Conduct patient education	Who performs education	Specialist endocrinologist	Trained diabetes nurse	Dietitian	Social worker	Desire for branch of Diabetes Association
Port Moresby	Yes	Doctors and nurses	Adult in past Paediatric - visits from overseas	3	Yes	Yes (inpatients only)	Established
Alotau	No	-	No	No	No	No	No
Popondetta	Yes	Doctor	No	No	No	No	No
Vunapope	Yes	Not answered	No	No	No	No	Yes
Nonga (Rabaul)	Yes	Nurses and doctors	No	No	No	No	Yes
Kimbe	Yes	Doctors and nurses	No	No	No	No	No
Kavieng	No	-	No	No	No	Yes	Yes
Manus	Yes	Nurses	No	No	Yes (on-job training)	No	Yes
Goroka	Yes	Nurses and doctors	No	No	No	No	Yes
SIL Ukarumpa	Yes	Doctors and nurses	No	No	No	No	No
Mt Hagen	Yes	Doctors	No	No	No	Yes (part-time)	No
Mendi	No	-	No	No	No	No	Yes
Angau (Lae)	Yes	Nurses and doctors	No	No (workshop only)	No	No	Not answered
Modilon (Madang)	Yes	Doctors and nurses	No	No	No	No	No
Wewak	Yes	Doctors and nurses	No	No (workshop only)	No	Yes	Not answered
Vanimo	No	-	No	No	No	No	No

181,000 cases. Estimates were based on extrapolations from Fijian data. A revised estimate in the International Diabetes Federation 'Diabetes Atlas 2000', based on past PNG surveys (4), was a prevalence of 15.5%, or 378,300 cases.

However, in the hospitals surveyed, only around 4600 type 2 diabetic patients were recognized. We were not able to survey every hospital, but the number of patients in each of those not surveyed is likely to be small. There would also be a small number of patients seen only by physicians in private practice. Making a generous estimate of 400 additional patients, we reach a total of around 5000 diabetic patients in the country. Therefore, on the lower estimate of 181,000 persons with diabetes in PNG only 2.8% are recognized, and on the higher estimate of 378,300 only 1.3% are recognized and receive any form of treatment.

Even for the diabetic patients who are receiving treatment, there are very limited services. Optimal diabetes care ideally needs specialized staff and a multidisciplinary team. However, there are no specialist endocrinologists currently resident in the country and there are only 3 diabetes nurse educators, all of whom are in Port Moresby. Only 4 hospitals had social workers and 1 a dietitian. The only specialist diabetes clinics in the country are in Port Moresby (at the main hospital and at a satellite clinic at Koki), though diabetes patients are also seen at separate clinics in Alotau, Rabaul, Kavieng and Manus.

Insulin was generally available, but not used in some centres even in the presence of sizeable populations with type 2 diabetes. In Port Moresby, insulin was used in approximately one-third of patients. Of the oral hypoglycaemic drugs, glibenclamide was available in nearly every centre, with metformin in most.

The capacity to monitor complications is very limited. Urinalysis for protein and eye checks are generally available, but some centres are not able to perform basic biochemistry and lipid assays. Only the Port Moresby hospital could measure HbA1c, a test that determines glycaemic control and is therefore a mainstay of modern diabetes management. From personal observations, very few patients even in Port Moresby have a glucose meter at home for self-monitoring. Other tests used in the assessment of complications, such as microalbuminuria assays, are completely unavailable in PNG.

The burden of morbidity and mortality from the 175,000 or more undiagnosed diabetic persons in Papua New Guinea is enormous. Uncontrolled hyperglycaemia will in many patients cause serious damage to the eyes, kidneys and nervous and cardiovascular systems, often resulting in complications such as blindness, renal failure, neuropathy, myocardial infarction and amputations. Tens of thousands of lives will be substantially shortened.

Even in patients who are diagnosed and attend clinics, studies in Port Moresby and Rabaul have found generally poor control (1,7), a high prevalence of complications (1,8,9) and a high case fatality rate (9). Erasmus and Sinha (7) found that among 19 newly diagnosed patients, glycaemic control improved in only 2 cases. Limited availability of patient education, low levels of compliance to medications and diet, and other factors undoubtedly contributed to these poor outcomes.

We praise the dedicated doctors and nurses around Papua New Guinea who are striving hard to meet the needs. However, the problem is well beyond the limited resources currently available. Nurses trained in diabetes education are needed in a number of coastal centres, and the larger centres also need dietitians and physicians specializing in diabetes.

The large gap between diagnosed and total estimated cases indicates that public awareness and case detection in health centres are very low. It is imperative to raise community knowledge of the disease, educate health professionals in its prominence and detection, and develop PNG-specific patient education materials. Studies to determine accurate prevalence rates are also urgently required along with effective prevention programs in known high-prevalence areas.

One positive development is that PNG now has a national diabetic association – the Diabetic Association of Papua New Guinea was established in 1999. The small but active association is involved with community awareness, and is about to start a revolving fund for glucose meters and strips. The Association has been welcomed into membership of the International Diabetes Federation.

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