S M.B.E.

The Society for Medical & Biological Engineering S.A. Incorporated

Excerpt from NEWSLETTER FEB 2000

Following is the first installment of Ian Hill's paper on his work in PNG.

MENDI GENERAL HOSPITAL

TWINNING PROJECT "BIOMEDICAL ENGINNERING"

Introduction

The purpose of the first visit to Mendi General Hospital was three-fold: Firstly, to assess the condition of the biomedical equipment at the hospital; Secondly, to repair as much equipment as possible; and Finally, to provide additional training to staff in the operation, care and maintenance of biomedical equipment.

This was my second visit to Mendi after an extremely useful and busy one week introductory visit back in April of this year (1999). The main goal was as before plus to achieve a satisfactory working environment for future visiting staff. It also included looking at the working practices related to Biomedical Equipment, Health and Safety and to repair as much equipment that I could carry spares for and to train Mendi Staff in the "Use and Care of Equipment". The idea being two-fold: Firstly, I would live within the hospital grounds and could be on site to be able to work with all the shifts. From previous experience I could not rely on messages being passed on; and secondly, to keep the living expense down to a minimum. You soon learn that it's a totally different world and you have to be very adaptable and be prepared for the unexpected.

The Journey to Mendi

I departed for PNG with 54 Kilo's of luggage comprising a comprehensive tool kit, seven surplus to requirement wall mounted sphygmos, old flowmeters and "T" pieces, outdated oxygen regulator service kits, a first aid kit, washing powder and a jar of coffee and enough clothes to see me through. Good idea to take a rain coat and a couple of woollen jumpers as it can get fairly chilly at nights at 5,700 feet. You will need a $2 coin for the luggage trolleys at Melbourne airport or risk being caught and fined for using a discarded one (I took the risk). I had second thoughts as to leaving all but my hand luggage in the airport lockers as that would have cost $10. I was pleased that I didn't as I was allowed to take the trolley all the way into my room for the night at the Centra Hotel. The shuttle bus took me to the terminus in the morning and I staggered to the Qantas check in desk with my load. My hand luggage was too heavy and had to be checked in and my luggage was booked right through to Port Moresby on request. It is also a good idea to request, if they don't offer, a transfer bus pass from Brisbane Domestic to Brisbane International. The bus drivers can be really unhelpful and make you go back to the service counter to get one, especially if the bus is filling up. I learnt this lesson last trip!

At the Qantas/Air Nuigini International check in desk, I was charged $100 in excess baggage. It is also a good idea to pre-arrange this with Qantas as I may not have been charged. After clearing immigration I exchanged my Australian Dollars for Kina and was only charged a $4 service fee whereas the banks had charged $15 and could only supply K150. The Air Nuigini flight was very pleasant and the aircraft was almost empty, with passengers occupying only window seats. I cleared Customs at Jackson International Airport with "nothing to declare" and was picked up by the Airways Hotel shuttle bus. The hotel confirmed my flight to Mendi for the following day.
What is displayed on the Domestic Terminal information screens has no resemblance as to what is actually happening. It is an extremely good idea to arrive well in advance of the flight to ensure that you get a boarding pass and to be first in the queue when they announce the flight. The turbulence was very severe with some of the passengers screaming as the aircraft dropped like a stone between the two banks of clouds which made it very difficult eating cake and not spilling coffee that was supplied for breakfast, all over myself.
The slalom approach to Mendi in between the mountains, was just as spectacular as I remembered. We touched down at 11:00 with the pilot over running the airstrip and almost getting the Dash 8 bogged in the mud as we turned to approach the terminal.

Joseph Turrian (CEO) was there to meet me and take me to Kiburu Lodge for the night as the hospital house was not quite ready. In fact the house was never ready and I spent the whole 30 days at Kiburu Lodge. The hospital has problems with these houses being burgled and the occupants losing everything.

The Projects

During my first visit, I had met up with Bob Daly in Port Moresby and learnt of his project:

PNG National Department of Health,
Medical Equipment Management Project (MEMP),
A Joint PNG/Australian Government Project.

The Goals and Objectives of MEMP were:

1. To have 45 to 50 Technicians trained in the repair and maintenance of biomedical equipment.
2. To establish 20 Biomedical Workshops throughout the country.
3. To educate staff at all levels in preventive maintenance and have the capability of undertaking simple repairs.
4. To provide guidelines and procedures for procurement, repair and maintenance of biomedical equipment including guidelines for private sector participation.
5. To improve the reliability of biomedical equipment.

MEMP Circuit Hospital Visits:

1. Develop a program of circuit hospital visits by visiting Australian technical specialists to work with local staff to repair equipment, undertake in-service training and provide on-the-job-experience to the local biomedical staff.
2. Purchase portable tool kits for use by visiting specialists.
3. Run practical workshops in the care and use of equipment in speciality areas for technical and clinical personnel.
4. Prepare Biomedical Engineering Status reports for Health Administrators.
5. To ensure at least 20 district and provincial level staff, are trained through attachment to the visiting Australian teams

Circuit 1. Port Moresby - Popondelta - Alotau - Daru - Kerema.

Circuit 2. Lae - Madang - Wewak - Vanimo - Hagen - Wabag - Goroka - Kundiawa -**Mendi.**

Circuit 3. Rabaul - Kimbe - Kavieng - Lorengau - Nonga - Buka.

The MEMP Biomedical Engineering Establishment in PNG:

1. Central Biomedical Engineering Section (CBES)

    a. National Inventory Management.
    b. Developing National Policies.
    c. Recommending specific equipment purchase for hospital funded acquisition.
    d. Coordinating funding and equipment from donor agencies.
    e. Overall policy compliance, safety and effectiveness.

2. Hospital Based Biomedical Units

    a. Basic repair and maintenance.
    b. Repair and maintenance 'referral' to the larger Provincial Workshops at PMGH and ANGAU.
    c. Outreach repair and maintenance services to Health Centres and Aid-posts.
    d. Engagement of CBES registered private contractors.

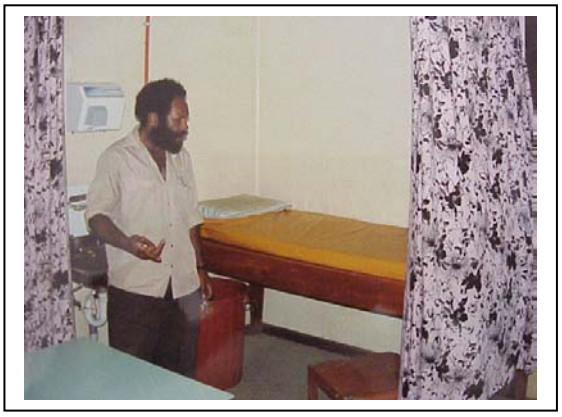
The first day of my second visit was not very productive as Tobias (Electrician Biomed to be) hadn't turned up for work and he had the only key to his office. We visited the Department of Health in town and apparently arrangements were being made to fly Tobias and myself to Tari (a 100 bedded rural hospital NW of Mendi 35 minutes away by air). Also Ialibu, (a 70 bedded hospital about a 2 hour 4 wheel drive to the south east of Mendi) to make an inventory of the equipment and to see what spares were needed, plus repair as much as we could whilst there. Tobias would have to provide a Regional Service to these hospitals in the future. Unfortunately the trip did not transpire due to constraints such as funding and the problems with the "Rascals" who were targeting government vehicles and relieving the passengers of everything, clothes and all. Some of the vehicles owned by Global Construction, road builders in PNG, had signs of shotgun damage. The telephones were not working so there was no contact back home for the whole of the four weeks. There was one satellite phone in the area but the owner was never there. The postal system delivered all of my 7 post cards that I had been sending on a regular basis 2 days before I arrived back home. The roads in Mendi were worse than ever. Even the pot holes had pot holes and this was still a political issue as to when and if they would ever be repaired.

The following descriptions of each area at the hospital had been noted down from my previous visit and at least gave me some preparation for this visit:

Accident and Emergency
The overall condition in this area was unforgivable, consisting of two old suction pumps, two broken sphygmomanometers, one working sphygmomanometer, an AirViva 2, combination Ophthalmoscope/Otoscope, a nebuliser and an oxygen bottle with a regulator flowmeter humidifier combination.

There was a laryngoscope with a large blood stained blade in a very poor condition. This had been casually dug out from under a pile of rubbish in a drawer. A combination Ophthalmoscope/Otoscope was missing from its wall bracket and thought to have been stolen.

Children's and Adult Outpatient Departments
This consisted of a waiting area and two examination rooms each with a combination Ophthalmoscope/Otoscope. One of the units was not working. There was a paediatric Air Viva, an oxygen regulator flowmeter and humidifier. One suction pump served the whole area. All the items were in a soiled state.



The equipment was also in a very poor state and a stored broken suction pump had mouse droppings all over it. The oxygen regulator flowmeter-humidifier and a suction pump were the only working pieces of equipment. There were two electric nebulisers not working. The suction tubing to the patient looked like it should have been in a motor vehicle workshop, trays of sputum filled water sat on top of the newer suction units and looked and smelt like it had been there for days. There were also three suction pumps, (one of which was not working), two nebulisers, two oxygen regulators, (one of which was not working), a Pulse Oximeter with an intermittent adult finger

probe and flat battery, an AirViva, a small volumetric Infusion pump, a laryngoscope with adult blades and a combination ophthalmoscope. The Puritan Bennett Oxygen Concentrator was being shared between two patients and needed a filter change.

Intensive Care Unit

The total compliment of equipment for this Unit was a brand new Physio Control Defibrillator (flat batteries), a nebuliser, a suction machine, and three oxygen regulators with flowmeters, one of which leaked. There was no blood pressure nor ECG machine.

Sister Rose Wa compiled a wish list for me which follows as it was written:

EQUIPMENTS NEEDED IN ICU WARD

NO	ITEMS	STOCK ON HAND	REQUIRED
1	Blood Pressure Machine	Nil	One
2	Stescope	Nil	One
3	Auriscope	Nil	One
4	Optomescope	Nil	One
5	ECG Machine	Nil	One
6	IV Infusion Pump	Nil	Two
7	Larangoscope	One	Two
8	Oxygen Flow Metre	One in good condition	Two more
9	Oxygen Regulators	Nil	One
10	Pulse Oximetre	Nil	One
11	Volume Cycled Ventilator (electrical ventilator)	Nil	One
12	Ambu bags	One	One more
13	Electric fan	Nil	One
14	Aluminium trays for Injection/IDC/LP,DSG		Five
15	Bed pans/urinals	Two	Five more of each
16	Kidney dishes,	Three	Five more
	Bowels, small dishes	None	Three
	Artery forceps	Nil	Five
17	Ward round trolley	One but wheels not functioning well	One for replacement.

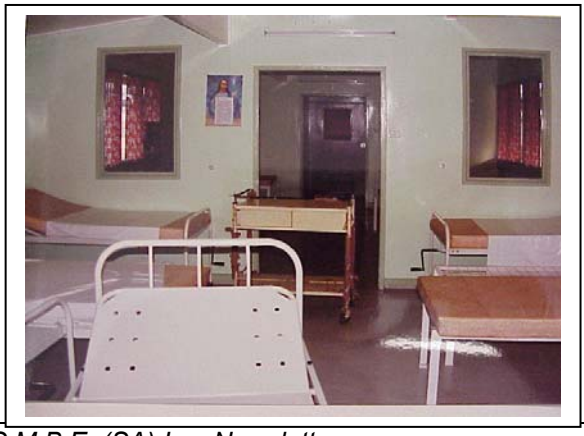
Surgical Ward
There was only a suction pump and oxygen regulator flowmeter and humidier combination, all in a similar condition as previously described. Suction tubing was shared between patients with no form of cross infection control.

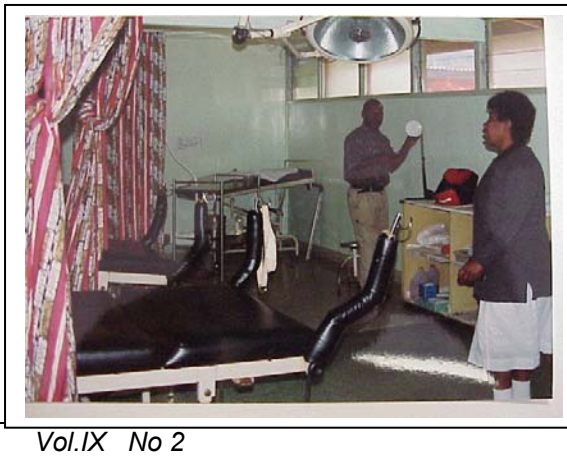
X-Ray Department
The fluoroscreen cover glass was in pieces but was little used. However they did have a new Acoma Mobile Unit and this was used as and when they could get film.

Blood Bank
The only item was an aneroid sphygmomanometer with a bent needle.

Special Care Nursery
Steel woven baskets served as cots for the neonates and an oil filled domestic radiator was the baby warmer between two cots. There were two oxygen regulators but one was minus its flowmeter (not low flow type). The Phototherapy unit looked like an upturned fruit box painted white with five out of six fluorescent lights inserted inside with four make-shift legs.

Labour and Delivery
There was a new double theatre type suction unit, only half of which was working, and two more suction machines (not useable because of lost connectors). There was an intermittently working electric stethoscope, a baby scales, a foetal doppler with a flat battery, and a huge theatre ceiling mounted operating light (no bulb) to provide illumination to three delivery beds in one room. There was also an Ultrasound Scanner (Sonolayer SAL 32B) that appeared to have been dropped, several times, judging by its condition and this didn't work! There was a new Doppler Ultrasound Unit kept under lock and key and hardly used as the female doctor had now moved on to greener pastures.





The picture on the right showing where the staff originally wanted the aneroid sphygmomanometer mounted on the wall. This was no where near the three delivery beds! We ended up putting mounting points at each bed.

Physiotherapy and Plaster Room

The only piece of equipment that worked in this department was a therapy ultrasound, which was being shared round between four injured footballers (self-therapy and he who could handle the hottest setting was top dog for the day). This unit will not last much longer. There was an electric cast cutter on the floor in the corner of the room, and a set of weights for the traction pulleys. The hydrotherapy one person pool looked new and was as dry as a bone. The Mioectole Nerve Stimulator was not working.

Pathology

There were two Qualtex incubators with no heat adjustment and were being used just as storage containers. The Coulter T890 recently repaired still had the same fault in that after a period of not being used it lost it's 30 psi air source and took several minutes before a sample could be taken. The remaining Corning analysers were in as new condition and well cared for.

CONFERENCE CALENDAR

"47th annual meeting of the cardiac society of Australia and New Zealand" August 8-11 Wellington NZ
"24th World Congress of the International Society of Cardiovascular Surgery" Sept 12-17 Melbourne
"21st Annual International Conference of the IEEE Engineering in Medicine and Biology Society" Oct 13-16 Atlanta Georgia USA
"Medax-12th International Exhibition on Hospital Supplies and Medical Technology" Oct 18-21 Tel Aviv Israel
"50th Annual Meeting of Royal Australasian College of Radiologists" Oct 21 26 Sydney

Information on the above is available from the editor or president

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