A public health program and others for about 10,000 villagers in the Kutubu area of Papua New Guinea (PNG)

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ABSTRACT
The paper describes the health conditions in villages of the Kutubu area in the Southern Highlands province of Papua New Guinea from 1993 to 1995. A set of actions were planned aiming at improving the health status of people living in these villages as well as the efficiency of medical services provided to these communities through a public health program, which did not exist earlier. After two years, it was shown that the combination of an adequate action plan, appropriate human and financial resources can produce significant results and marked improvement health wise for a population in dire needs.

Key Words: Public, Health, Program, Papua New, Guinea.

INTRODUCTION
In 1993, the population of PNG was about 5 million divided into two ethnic groups: the Papuans, who live on the littoral and the Pygmies, who live inland. The PNG territory (table 1) covers approximately 450,000 square kilometers and is divided in 19 provinces. About 850 languages are spoken on this medium size island in the Pacific Ocean. Many of them are quasi extinct. Pidgin is the most common idiom and is used as lingua franca to communicate between the multiple tribes. The primary sector contributes about 25% to the Gross Domestic Product (GDP) and the secondary sector about 32%. There were about 19,000 kilometers of roads, including only 680 km of paved ones. The illiteracy rate was about 65% and the jobless rate 40%. The country became independent from Australia in 1975 [1-3]. The child mortality prevalence was 72/1,000 (the worst in the Pacific), the child mortality was 42/1,000, the overall mortality rate was 34/1,000 and the maternal mortality rate was 7/1,000. Life expectancy was 50. There were 442 medical doctors in the whole country. Healthcare investment represented only 3.9% of the GDP [4,5]. The 3 most frequent causes of death [6] were: pneumonia (23.9%), peri-natal complications (10.8%), and malaria (7.9%). Plasmodium falciparum presented resistance against chloroquine on the littoral but not in the mountainous areas [7]. Other endemic diseases [8-9] included: TB, leprosy [10], meningitis [11], measles [12], and lymphatic filariasis [13]. The principal source of food was sago palm, which has poor nutritional value [14]. The capital of the Southern Highlands province is Mendi, where there is a hospital. The villages have aid posts manned by community officers [15]. In 1993, few people had easy access to medications and health stats from the villages were practically non-existent. In that year an American oil company was building a pipe line which extended from Kutubu to the Papua Gulf (table 2). The initial budget projection was $2.9 billion and the contract between this corporation and the PNG government included the provision of healthcare to about 10,000 villagers living in areas of construction of the pipe line. The corporate medical team was made of 1 Medical Doctor or Chief Medical Officer (CMO), 4 American Physician Assistants (PAs), and 20 local nurses (RNs) and Health
Extension Officers (HEOs). There were one 20-bed hospital and 3 clinics in the mountains, and one clinic in Port-Moresby, the capital. The annual budget was $1.2 million.

Upon arrival, the author, who was the CMO, found a poorly organized situation [16-17] due to the following facts:
- The villagers were calling the medical department at any time of day or night requesting helicopters to be sent to their place and take people to the hospital on an urgent basis
- Transportation via choppers or trucks or vans brought groups of villagers at a single time often for urgent care clogging the patient flow
- Complains and recriminations were made daily due to lines, long waiting time, and entitlement mentality
- Main and preventable diseases and symptoms such as malaria, diarrhea, skin lesions, musculosqueletal (foot and leg trauma, arrow wounds, for example) disorders were not addressed proactively
- High level tensions existed between different groups, the most important being:
  ✓ Villagers and local workers because the latter received priority treatment
  ✓ Local and foreign workers because the latter received priority treatment
  ✓ Local and American healthcare professionals because the latter did not integrate the former in the medical process
  ✓ The medical team and engineers who were competing for helicopter availability
  ✓ Local and regional government and the oil company because landowners were not receiving any financial compensation for the use of their land

Approach
The CMO proposed to create a series of programs, including a public health plan.

Objectives
The objectives were as follows:

Direct
- Decrease mortality and morbidity by addressing in priority transmissible diseases effectively and efficiently [18-19].
- Deliver better medical care to villagers in the villages and at the hospital and clinics [20]
  ✓ Restrict transportation of patients to really urgent cases only
  ✓ Help communities identify their main public health problems in the villages
  ✓ Educate villagers so that they become empowered in taking care of their health
  ✓ Guide the local government toward taking more responsibility in providing healthcare to its population in the medium and long term

Indirect
- Save significant amount of money on sick villagers’ transportation costs
- Use the savings to further the medical education of all healthcare professionals involved in the program (local and foreign, doctors and non-doctors)
- Improve the interpersonal relationships between the medical department professionals and the local government

Methods
After data analysis, the different programs were designed in the following way [21].
- Revision of the list of drugs available at the aid posts
- Creation of a logistic system to dispatch drugs stuck in Mendi storage places using trucks and helicopters from the oil company
- Pressure from the oil company on the government to have the aid post officers’ salary paid (some were several months late)
- Creation of a unique and exclusive radio frequency for uninterrupted communication during medical evacuations
- Creation of a computerized system for complete patient files at the hospital (with the oil company engineers)
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- Creation of therapeutic protocols for many diseases created by the CMO for PAs, HEOs, and RNs [22-24]
- Creation of guidelines for the hospital staff to prevent blood-transmitted diseases
- Development and delivery of a medical emergency course to aid post officers transported to the hospital for the event
- Donation of equipment to the aid post officers including: blood pressure cuffs, thermometers, wrist watches, stethoscopes, radios, and solar batteries
- Creation of a medical evacuation protocol for the aid post officers (including pulse, respiratory rate, temperature, blood pressure, etc.)
- Creation of new guidelines to attend patients according to the severity of their symptoms and diseases no matter their origin or status: run of the mill cases became seen by RNs, mild cases by HEOs, severe cases by PAs, and very severe cases by the CMO.

The creation of this plan was based on the following philosophy: “save na mekim”, which, in pidgin, means “know it and do it” [25].

**Components of the public health plan**

**Data Management**
- Creation of a data bank
- Storage and compilation of data
- Analysis of data (which enabled to pinpoint the origin of disease outbursts, stop and prevent them)

**Health Education Program**

1. *Villagers*
   - Water treatment
   - Basic hygiene
   - Collecting and disposing of trash

2. *Healthcare agents in the communities*
   - Water treatment
   - Basic hygiene
   - Collecting and disposing of trash

3. *Health professionals in the villages (including partnership)*
   - Selection
   - Training
   - Evaluation

**Infrastructure and equipment**
- Potable water tanks to store rain water
- Trash pits separated between organic and non-organic
- Ventilated latrines (following the WHO VIP model)
- Pyrethrin-sprayed mosquito nets
- Fruit orchards and vegetable gardens
- Trucks and helicopters to transport drugs to the aid posts

**Medical Programs**
- Malaria control by mosquito net distribution and treatment of patients [26-27]
- Nematodoses control by systematic treatment of all patients (for ancylostomiasis, ascariasis, strongyloidiasis, oxyurosis, and trichocephalosis) [28]
- Immunization [29] (with tetanus as a priority)
- Education and examination of pregnant women (to detect risky pregnancies)

**Implementation**

The program was implemented during 2 years in 1994 and 1995 (tables 3 and 4). In 1994 alone, the following are examples of what was accomplished:

**Community knowledge**
- Census
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- Identification of leaders
- Establishment of priorities for community health (in collaboration with community leaders)
- Implementation of programs (with the leaders’ influence)

*Water supply*
- Raising the awareness of community members on health dangers linked to the ingestion of water contaminated with germs
- Informing community members on how to maintain the potable water sources in good stead
- Informing community members on how to make water potable using filters and boiling
- Informing community members on how to keep water potable through the cleaning of containers (tanks, bottles, etc.)

*Nutrition*
- Informing villagers on health risks linked to eating contaminated foods and on how to prevent diseases through cleaning and handling them properly
- Informing villagers on the importance of washing hands before meals

*Trash*
- Informing villagers on health problems linked to the inadequate handling of trash
- Informing families on how to dispose of trash properly
- Discussing with health agents alternative ways of disposing properly of trash by communities
- Explaining the concept of trash pit and showing how to build one
- Explaining how to maintain trash pits properly

*Stool disposal*
- Mapping of places were locals were defecating
- Informing the villagers on health problems linked to defecating in wrong places and therefore the importance of using latrines
- Helping the construction of one latrine per family

*Hygiene at home*
- Informing the villagers on the health importance of washing hands before meals
- Informing villagers on the health importance of clean water
- Informing villagers on the health importance of wearing proper shoes to avoid trauma, skin and other diseases
- Informing villagers on the health importance of cutting nails

*Prioritization of care*

*At the hospital*

**Research Components**

Three research programs were included by the CMO:
- Malaria
  To assess the prevalence of plasmodial resistance to chloroquine in the Kutubu area
- Diarrhea sources
  To be able to prevent outbreaks at the village level.
- Lymphatic filariasis
  This was done in collaboration with a team of researchers from Cook University in Australia and aimed at assessing the incidence and prevalence of lymphatic filariasis in villages located at the bottom of mount Bosavi (volcano)

**Results**

The results of this action plan were multiple and very significant, as follows:

*Medical evacuations (medevacs)*
- The prevalence fell from 1 helicopter medevac from the villages every 3 days on average to one every 2 weeks
- The prevalence fell from 1 to 2 medevacs to Australia on average per month to 3 in 2 years.

*Malaria*
- The prevalence fell from 2 cases of malaria per week on average to 1 case per month

*Diarrhea*
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- The prevalence fell from several cases of diarrhea per week on average to 1-2 cases every 2 weeks
- *Neonatal mortality*
- The prevalence of child birth mortality fell from several per year to a few in 1995
- *Traffic accidents*
- The prevalence of deaths due to traffic accidents fell from multiple cases per year to a few in 1995

*Patients visits at the hospital*
After 2 years the number of villagers coming to the hospital fell more than 50%

*Medical service efficiency for the villagers*
With the (1) supply of medical equipment and drugs to the aid posts, (2) delivery of a course on medical emergencies to aid post officers, (3) payment of aid post officers’ salaries, (4), new radio frequency solely for medevacs, (5) faster and better care of villagers at the hospital and (6) different programs carried out by the oil company medical department, the efficiency of healthcare provided to them increased very significantly.

*Medical service delivery at the hospital*
With the new protocols, processes and procedures created at various levels the efficiency of services delivered to in and out patients at the hospital increased very significantly. The spectacular decrease of medevacs, better sleep and less stress increased the medical staff efficiency, it boosted its morale and trust from the community soared. Moreover, tension between the different groups subsided progressively to become inexistent after 2 years. With the savings made mainly on medevacs, the whole medical department could be computerized and linked by internet; every single team member could attend CME courses according to priorities determined in common. These courses took place in PNG, Australia, and the USA. This also increased the overall quality of medical services, notwithstanding the unexpected [30].

**CONCLUSION**

The results of this public health program in PNG showed unequivocally that when conditions are met, i.e.:  
- Political will and support from federal and local authorities as well as from traditional leaders in the villages  
- Apt professionals, for example healthcare providers experienced in local socio-economic and pathologies and public health specialists  
- Adequate funding enabling to eliminate or mitigate local constraints like communication challenges and unexpected occurrences like disease outbursts  
- Synergetic leadership and teamwork

Moreover, the program showed that research programs can be imbedded in private public health programs if it is a mandate by the local government or as a part a good citizen strategy of private corporations toward host countries.

Spectacular healthcare outcomes can be expected at all levels. The key is capacity, not only in terms of quantity but, as importantly, in terms of quality. The right people in the right place at the right time working for the right purpose always find the best solutions.

**REFERENCES**